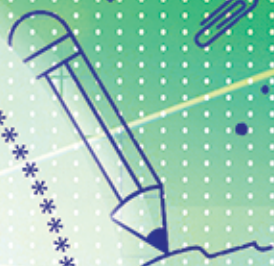


A

$$E=MC^2$$



B



**EDUCATION
AND NEW
DEVELOPMENTS**

2019

VOLUME I



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**Edited by
Mafalda Carmo**

Education and New Developments
2019

Volume I

Edited by
Mafalda Carmo

Edited by Mafalda Carmo, World Institute for Advanced Research and Science (WIARS), Portugal

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FOREWORD

This book contains the full text of papers and posters presented at the International Conference on Education and New Developments (END 2019), organized by the World Institute for Advanced Research and Science (WIARS).

Education, in our contemporary world, is a right since we are born. Every experience has a formative effect on the constitution of the human being, in the way one thinks, feels and acts. One of the most important contributions resides in what and how we learn through the improvement of educational processes, both in formal and informal settings. The International Conference seeks to provide some answers and explore the processes, actions, challenges and outcomes of learning, teaching and human development. The goal is to offer a worldwide connection between teachers, students, researchers and lecturers, from a wide range of academic fields, interested in exploring and giving their contribution in educational issues. We take pride in having been able to connect and bring together academics, scholars, practitioners and others interested in a field that is fertile in new perspectives, ideas and knowledge.

We counted on an extensive variety of contributors and presenters, which can supplement our view of the human essence and behavior, showing the impact of their different personal, academic and cultural experiences. This is, certainly, one of the reasons we have many nationalities and cultures represented, inspiring multi-disciplinary collaborative links, fomenting intellectual encounter and development.

END 2019 received 547 submissions, from more than 50 different countries, reviewed by a double-blind process. Submissions were prepared to take form of Oral Presentations, Posters, Virtual Presentations and Workshops. The conference accepted for presentation 135 submissions (25% acceptance rate), from which, 114 submissions are published in full text in these volumes. The conference also includes a keynote presentation from an internationally distinguished researcher, Prof. Dr. Denise Whitelock, Professor of Technology Enhanced Assessment and Learning, Institute of Educational Technology, The Open University, UK, to whom we express our most gratitude.

This conference addressed different categories inside the Education area and papers are expected to fit broadly into one of the named themes and sub-themes. To develop the conference program, we have chosen four main broad-ranging categories, which also covers different interest areas:

- In **TEACHERS AND STUDENTS**: Teachers and Staff training and education; Educational quality and standards; *Curriculum* and Pedagogy; Vocational education and Counseling; Ubiquitous and lifelong learning; Training programs and professional guidance; Teaching and learning relationship; Student affairs (learning, experiences and diversity; Extra-curricular activities; Assessment and measurements in Education.
- In **PROJECTS AND TRENDS**: Pedagogic innovations; Challenges and transformations in Education; Technology in teaching and learning; Distance Education and eLearning; Global and sustainable developments for Education; New learning and teaching models; Multicultural and (inter)cultural communications; Inclusive and Special Education; Rural and indigenous Education; Educational projects.
- In **TEACHING AND LEARNING**: Critical Thinking; Educational foundations; Research and development methodologies; Early childhood and Primary Education; Secondary Education; Higher Education; Science and technology Education; Literacy, languages and Linguistics (TESL/TEFL); Health Education; Religious Education; Sports Education.
- In **ORGANIZATIONAL ISSUES**: Educational policy and leadership; Human Resources development; Educational environment; Business, Administration, and Management in Education; Economics in Education; Institutional accreditations and rankings; International Education and Exchange programs; Equity, social justice and social change; Ethics and values; Organizational learning and change, Corporate Education.

This is the Volume I of the book *Education and New Developments 2019* and it contains the results of the research and developments conducted by authors who focused on what they are passionate about: to promote growth in research methods intimately related to teaching, learning and applications in Education nowadays. It includes an extensive variety of contributors and presenters, who will extend our view in exploring and giving their contribution in educational issues, by sharing with us their different personal, academic and cultural experiences.

This first volume focus in the main areas of TEACHERS AND STUDENTS and PROJECTS AND TRENDS.

We would like to express thanks to all the authors and participants, the members of the academic scientific committee, and of course, to our organizing and administration team for making and putting this conference together.

Hoping to continue the collaboration in the future.

Respectfully,

Mafalda Carmo
World Institute for Advanced Research and Science (WIARS), Portugal
Conference and Program Chair

Porto, Portugal, 22 - 24 June, 2019

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KEYNOTE LECTURE

ASSESSMENT FOR LEARNING: WHERE ARE WE ON THE DIGITAL ASSESSMENT SPECTRUM?

Prof. Dr. Denise Whitelock

(B.Sc. M.Ed Ph.D)

*Professor of Technology Enhanced Assessment and Learning, Institute of Educational Technology,
The Open University (United Kingdom)*

Abstract

Digital assessment is an evolving construct used in education to enrich, inform and complement the teaching process. Using automatic feedback however has been under-utilised and under-valued throughout the assessment process. This presentation will take you through a number of projects which have automated some aspects of assessment.

Those selected from my own research have a strong conceptual underpinning, for instance Dweck's work to develop Open Comment which provided feedback to Arts students. With Open Mentor, I used Bale's work on interactive categories to help tutors develop effective and supportive feedback. SafeSea, on the other hand, allows students to trial essay writing before taking the sometimes daunting step of submitting their first essay, using analysis based on Pask's conversational framework.

This presentation will discuss the issues raised by teachers and students in this arena. It will provide examples of how their concerns are currently being addressed by both researchers and software developers in order to support educator feedback to students. Finally, the issue of potential disruptors will be raised which moves us into the realm of crystal ball gazing.

Biography

Professor Denise Whitelock has over twenty years experience in designing, researching and evaluating online and computer-based learning in Higher Education. She is a Professor of Technology Enhanced Assessment and Learning in the Open University's Institute of Educational Technology. She is currently leading the UK's contribution to the Adaptive Trust e-Assessment System for Learning (TeSLA) <http://tesla-project.eu/project>. She has just completed directing the CODUR http://in3.uoc.edu/opencms_in3/opencms/webs/projectes/codur/en/index.html and SAFeSEA <http://www.open.ac.uk/researchprojects/safesea/projects>. The aim of this latter research was to provide an effective automated interactive feedback system that yields an acceptable level of support for university students writing essays in a distance or e-learning context. Her work has received international recognition as she holds visiting chairs at the Autònoma University, Barcelona and the British University in Dubai.

Website: <https://iet.open.ac.uk/profiles/denise.whitelock>

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The background features a vertical color gradient from light green at the top to light blue at the bottom. Overlaid on this is a network of white lines forming irregular polygons, with a fine grid of small white dots in the background.

ORAL PRESENTATIONS

CAN A DIGITAL GUIDED PEER FEEDBACK SYSTEM FOSTER LEARNING

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Abstract

Despite the fact that scientific literature highlights the importance of feedback for learning, there remains a challenge for students to construct good quality feedback in collaborative settings. This study designs, implements, and evaluates a digital learning module with an intensified peer feedback support. The goal is to explore whether a digital module with guided peer feedback which encourages challenges and motivation support students' domain specific knowledge gain. The extent to which the use of such a digital learning module is appreciated by students is studied as well.

Participants were 203 students who were randomly assigned to groups of three. students were asked to explore various perspectives, and the 'pros and cons' on the topic of 'Genetically Modified Organisms (GMOs)'. The findings show that the digital module fosters students' learning and satisfaction. The use of peer feedback support guided the students in appropriate ways to analyse learning partners arguments about the topic, express agreements/disagreements and when possible integrate various points of views in their own reflection report. This digital learning module provided a safe and respectful learning environment for students to also practice their argumentation and exercise critical discussion and reasoning skills without recourse to, or fear of, personal (ad hominum) statements, enhancing their awareness of the topic.

Keywords: Attitudinal change, digital learning module, learning, peer feedback, student satisfaction.

1. Introduction

With the advancement of educational technologies, digital modules are now being introduced in higher education in different countries (Noroozi, 2017; Van Seters et al., 2012). Different modalities and functionalities of such digital and online learning modules have shown to increase students' motivation, their understanding and retention of knowledge (Sweller, Van Merriënboer, & Paas, 1998), to facilitate the acquisition of domain-specific knowledge (Diederer et al., 2003). Embedding representational tools such as graphs, texts, diagrams, and pictures in digital learning modules to authenticate and visualize learning contexts and to acquire complex cognitive skills and perform deep learning (Mayer, 2003).

Despite investments on digital modules, the use of such learning modules are challenging especially in real educational settings. A promising approach to stimulate motivation for students to embrace such digital learning modules in their regular courses is to design and develop modules with peer feedback possibility that provide students with fun opportunities for learning. Receiving feedback from learning peers with the same motivational needs and also giving feedback to them in a reciprocal manner are important aspects of learning process (see Bayerlein, 2014; Crisp, 2007). Effective feedback can guide students to realize the gap between their own current and expected, and provide them with advice on what to improve and how to improve (De Nisi & Kluger, 2000).

Although scientific literature highlights the importance of feedback for learning as well as the features of high quality feedback (see Bayerlein, 2014; De Nisi & Kluger, 2000), there remains a challenge for students to construct good quality feedback in collaborative learning environments (see Noroozi et al, 2011, 2012a, 2012b, 2013a, 2013b, 2013c; 2016a, 2016b, 2017, 2018a, 2018b). For various reasons, some students may avoid giving critical feedback to the learning peers while some others may prefer not to receive critical feedback from their learning peers. These reasons include psychological, emotional, and social barriers for giving and receiving critical feedback such as fear of losing face or getting into a fight with learning partners (Andriessen, 2006), and perceiving critiques and counterarguments as personal attacks (Rourke & Kanuka, 2007). For example, there are students who would be reluctant to oppose and disagree with their learning peers, while others may not appreciate

being challenged themselves (Nussbaum et al., 2004). Furthermore, less assertive students may avoid giving critical feedback just due to the (negative) competitive and disagreement aspects of the critiques (Nussbaum et al., 2008). As a result, the feedback typically remains at the surface level and lack well-founded arguments for promoting critical thinking, and deep and elaborative learning. This is a striking omission since deep processing, critical thinking and logical reasoning are essential objectives in education that positively associate with learning performance (see Noroozi et al., 2012b). Therefore, additional feedback support is needed if students are to willingly and with a high degree of motivation provide critical yet constructive feedback in such digital learning modules. This study provides such peer feedback support in a digital learning module to scaffold learning by guiding students on how to represent, structure, evaluate, and analyse their feedback for the learning partners.

To conclude, the importance of digital learning modules for learning is well researched, yet little empirical studies have addressed their combined effects on domain-specific knowledge gain, attitudinal change, and students' satisfaction. The picture is even more unclear when it comes to the features of these digital learning modules with regard to the peer feedback support. This study thus designs, implements, and evaluates a digital learning module with an intensified peer feedback support.

The goal of this study is to explore whether a digital learning module with guided peer feedback which encourages challenges and motivation support students' domain specific knowledge gain in the field of biotechnology and molecular life sciences. In addition, the extent to which the use of such a digital learning module is appreciated by students is studied as well. Furthermore, since interactions of students during peer feedback involve social process (O'Keefe, 1982) and facilitate consideration of alternative viewpoints (Nussbaum et al., 2008), it was examined whether the confrontation of viewpoints during peer feedback with learning partners leads to modification of students' conceptions and attitudinal change in a digital learning modules.

2. Method

The study took place at Wageningen University in the Netherlands. The topic for discussion was Genetically Modified Organisms (GMOs) with the focus on the use of "cultured meat manufacturing – insect cells". The three learning partners in each group were distributed over different locations of a classroom. A digital learning module was designed and used in this study. This digital learning module is a web-enabled platform that provides students with various modes of information presentation, such as texts, exercises, graphs, diagrams, and pictures with the feedback features to stimulate interactions between members of a group in an active learning environment by getting them thinking together about topics, media or material that is relevant to them. The feedback features in this digital learning module is designed in such a way as to guide the interaction style for both synchronous and asynchronous interactions – promoting reasoning, critical discussion, and justified arguments –.

The main feature of this digital learning module is the use of guided peer feedback. This digital learning module provides the context and interaction style for reasoned and structured feedback, justified arguments and allowing the students to produce reusable content from their group experiences. This is done using a variety of input text boxes and sentence openers embedded in the platform for provoking and promoting students' reasoning, conceptual change, and argumentative feedback processes and practices. The structure of the guided peer feedback was designed on the basis of the characteristics for writing a complete and sound reflection report in the field of Molecular Life Sciences and Biotechnology. To do so, a series of meetings were held with the experts of the field and also the teachers of the course to define the elements of a complete and sound reflection report for students in the field of Molecular Life Sciences and Biotechnology. These meetings were resulted in a list of items that should be included in the reflection reports of students (see Table 1 for the list of these items).

The validity of these items was obtained through circulating them among the experts and the teachers of the course. We then designed our guided peer feedback on the basis of these items (see Table 1) and embedded them in the digital learning module using input text boxes and sentence openers.

Overall, the session took about 4 hours and consisted of four main phases. A pre-test post-test questionnaire was used to measure students' domain-specific knowledge gain. This questionnaire consisted of 17 multiple-choice questions. Specifically, both in the pre-test and post-test, each student was asked to answer these questions. A pre-test post-test questionnaire was used to measure students' attitudinal change on the GMOs topic. This questionnaire consisted of eight questions on a five-point Likert scale ranging from "strongly disagree", "disagree", "neutral", "agree" through to "strongly agree". Both in the pre-test and post-test, each student was asked to indicate the extent to which s/he agreed with the GMOs statements. A questionnaire was adapted to assess students' motivation and satisfaction with the learning experiences. This questionnaire consisted of four main sections and 36 items in total on a five-point Likert scale ranging from "almost never true", "rarely true", "occasionally true", "often true" through to "almost always true".

Table 1. Features of a good reflection report and guided peer feedback embedded in the digital module.

Number	Features of a good reflection report by panel of experts and teachers	Guided peer feedback embedded in the digital module using input text boxes and sentence openers
1	The intuitive opinion on the topic.	To what extent your learning partner present his/her intuitive opinion on the topic? Is that clear? Why or why not? (30 to 50 words).
2	The arguments in favour of the topic (pros).	To what extent your learning partner provide arguments in favour of the topic? To what extent your learning partner reflect the opinion of the advocates on the topic? (30 to 50 words).
3	The scientific facts in favour of the topic (pros).	To what extent your learning partner provide arguments against the topic? To what extent your learning partner reflect the opinion of the opponents on the topic? (30 to 50 words).
4	The arguments against the topic (cons).	To what extent your learning partner provide scientific facts in favour of the topic? (30 to 50 words).
5	The scientific facts against the topic (cons).	To what extent your learning partner provide scientific facts against the topic? (30 to 50 words).
6	The opinion on the topic taking into account various pros and cons.	To what extent your learning partner integrate various pros and cons of the topic? (30 to 50 words).
7	The arguments and scientific facts (evidence, examples, figures, facts etc.) to support opinion.	Does your learning partner come to a conclusion based on his/her arguments? What do you think about his/her conclusion? (30 to 50 words).
8	The final conclusion and statement on the topic.	What are your suggestions for improving the quality of the reflection report of your learning partner? (30 to 50 words).

3. Results

ANOVA test for repeated measurement showed that the domain-specific knowledge of students improved significantly from pre-test to post-test, $F(1, 200) = 287.50$, $p < .01$, $\eta^2 = .59$. This indicates the positive effects of the digital learning module on the domain-specific knowledge gain of students. Students' mean quality scores for domain-specific knowledge was 9.37 ($SD = 1.89$) for the pre-test and 12.22 ($SD = 1.76$) for the post-test. So, in average, the gain of knowledge for every student was 2.85 which is significant.

Students' motivation and satisfaction with the learning experiences appeared to be sufficiently high (around four on a five-point Likert scale) for all students. Specifically, the average score of students for 'perceived effects of the domain-specific learning outcomes' was 3.82 on a five-point Likert scale higher ($SD = .73$). The average score of students for 'perceived effects of the domain-general learning outcomes' was 3.26 ($SD = .76$). The average score of students for 'the ease of use of the module' was 4.23 ($SD = .63$). The average score of students for 'appreciation of the module' was 3.44 ($SD = .62$). During the plenary discussion sessions, students appreciated the module with regard to its dynamic nature, user-friendliness, and variation of the sentence openers. Furthermore, they said that the module was useful with respect to practicing, provoking and promoting their critical reasoning and argumentation skills.

This section presents the findings for the effects of the digital learning module with guided peer feedback on students' attitudinal change. A check was performed on students' attitudinal change on the GMOs from pre-test to post-test.

MANOVA test for repeated measurement showed that students significantly shifted their attitude towards GMOs from pre-test to post-test, $Wilks' \lambda = .24$, $F(1, 202) = 74.43$, $p < .01$, $\eta^2 = .76$. This was the case with all the eight questions with regard to students' positions on the GMOs. There is an indication that the digital learning module with guided peer feedback affected students' attitude to the GMOs. While students in the pre-test were almost fully in favour of GMOs, the digital learning module and also the peer feedback from their learning partners shifted students' attitude towards being neutral. The results showed that students GMOs' attitude can be shifted through argumentation and engagement in critical thinking and reasoning through engaging with the digital learning module supported with peer feedback.

4. Discussions and conclusions

With implementation of a dialogue learning module, students were able to gain domain-specific knowledge as demonstrated in their post-test compared with pre-test. This study used a digital learning module that also supported peer feedback process to engage students in an intensified processes of learning and writing about a controversial topic. The module was designed in such a way as to provoke students for exchanging and directing diverse and multiple conflicting opinions towards deeper reasoning. While various information presentation of the digital learning module such as textual and graphical information e.g. texts, exercises, graphs, diagrams, pictures etc. fostered domain-specific knowledge of the students, the use of peer feedback support promoted and scaffolded argumentation and critical reasoning enabling the students to provide constructive and critical feedback for their peers. The use of peer feedback support guided the students in appropriate ways to analyse learning partners arguments about the topic, express agreements/disagreements and when possible integrate various points of views in their own reflection report. This digital learning module provided a safe and respectful learning environment for students to also practice their argumentation and exercise critical discussion and reasoning skills without recourse to, or fear of, personal (ad hominum) statements, enhancing their awareness of the topic. Exchanging diverse and multiple conflicting opinions, analysing one another arguments, and expressing agreements/disagreements supported with scientific facts, arguments, logical evidence and examples were then reflected in the attitudinal change of students towards the controversial topic of the GMOs from pre-test to post-test.

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A STUDY ON E-LEARNING IN SMALL ONLINE DISCUSSION GROUPS AND EXPERIMENTAL DESIGN IN ADVANCED LEVEL BIOLOGY

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Abstract

This pilot study focuses on assessing the effectiveness of discussion in small online student groups. Class discussions offer students opportunities to test their ideas and opinions against the ideas and opinions of their peers. More effective learning may be promoted through properly designed online discussion tasks. A class of 28 Advanced level Biology Students followed in this study were 16-17 years old at a pre-university college, where face-to-face learning is the norm. A two-week online course was designed to be followed in two steps: an ice breaker activity aimed at establishing an online learning community; a one-week experimental design program (EDP) designed to encourage discussion of experimental procedures in small groups of 4-5 students. The study was carried out during two one-week slots in 2017-18. Students' short term performance during the program and their long term performance when compared to a control group were analyzed. Several statistical tests were used to analyze the data using the facilities of SPSS. The Shapiro Wilk test was used to determine whether the score distributions violated the normality assumption. Since the score distributions satisfied the normality assumption, parametric tests were used to compare mean scores between various groups of students, where a 0.05 level of significance was adopted for each test. The Paired samples t-test was used to compare mean scores between pre- and post- EDP tests; the Independent samples t-test was used to compare mean scores between 'test' and 'control' groups; and the One-Way ANOVA test was used to compare mean scores between several classes. Moreover, 95% confidence intervals were computed to assess the variation in the mean scores if this study had to be replicated with other groups of students in the future.

Short term results showed that the EDP was effective in improving students' critical evaluation in experimental design procedures. However, though annual scores showed that the 'test' group mean was higher than that of the 'control' group, statistical analysis of these results, did not support any difference in achievement between the test and the control group.

Students' perception of this program indicates a number of positive and negative issues related to web-based learning also cited by the literature: the use of the discussion forum that permitted time to think about experimental design issues, different perspectives of colleagues to problem solving were positive issues while work overload and incorrect or insufficient feedback were some disadvantages mentioned.

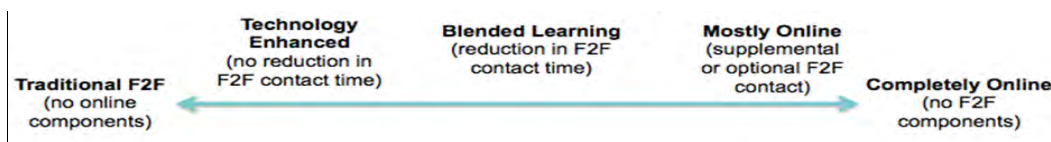
Changes in science instruction, particularly biology, along with new digital learning opportunities may offer better approaches for future positive achievement among young people.

Keywords: *Web-based learning, online course design, small discussion groups, experimental design, biology teaching and learning.*

1. Introduction

Blended learning is a form of learning where traditional face-to-face (F2F) methods are combined with digital materials. Figure 1 shows a spectrum of various teaching methods from traditional F2F to the completely online method.

Figure 1.



"Hybrid" or "blended" are terms commonly used to describe courses that combine F2F classroom instruction with online learning. This allows the student much more flexible scheduling, while maintaining the F2F contact with the instructor and classmates that is typical of a more traditional course. As a general rule of thumb, courses in which fewer than 20% of the learning activities occur online are more likely to be labelled web-enhanced than hybrid (Hybrid courses, 2018). One of the challenges of technology enhanced courses that do not replace classroom activities with online activities is the 'course-and-a-half syndrome'. Course-and-a-half syndrome involves adding online components to a course without reducing any of the F2F instruction (Freeman & Trembl, 2013).

Effective blended learning considers the strengths of both the online and F2F environments and strategically incorporates activities that take advantage of the strengths in both environments. This involves rethinking the course design. Guidelines to avoid course-and-a-half syndrome, include redesigns that replace some 25% of F2F time with online activities (David O. McKay, 2018).

Advantages and disadvantages of F2F and completely online methods have been well documented (Qiu Yun, 2011). Blended learning seeks to take advantage of the best of both traditional and completely online learning methods. However, the preferred mode of blended learning was not possible in this study for logistic reasons; instead an attempt was made to explore ways of introducing web based learning to students in discussion of principles of experimental design

Opportunities for class discussion are limited in a F2F environment. However, discussion is an important aspect of active learning and problem solving. Class discussions offer students opportunities to test their ideas and opinions against the ideas and opinions of their peers. Studies have shown that online discussion can be an effective tool to foster collaborative learning, provide more productive use of class time (Alkharusi, Kazem & Al-Musawai, 2010), as well as increase active learning .

The topic for discussion in this study was experimental design as this is the underlying process of scientific investigation. Students may recognize the general steps involved in scientific investigation but often have only a surface understanding of the process. Hands-on experience in the design of experiments has been widely recognized as an effective means of teaching principles of experimentation and as a critical component of undergraduate science education (Adams, 2009).

In the early stages of the biology programme at Junior College (JC), where F2F learning is the norm, 16-18 year-old students, studying Advanced Level Biology complete the first part of a 'hands-on' laboratory set of practical sessions in which they design and conduct their own experiment before answering questions on a worksheet relating to the analysis of the data and interpretation of their results. As they progress through their studies, there are opportunities to design experiments in subsequent practical sessions. However, students struggle to design their experimental procedures, possibly because there is little time for discussion of their procedures. The following pilot study focused on assessing the effectiveness of online discussion in terms of JC students' understanding of principles of experimental design as currently expected by the Advanced Matriculation Biology syllabus (Malta)

2. Aim, purpose of research & materials used

1. To initially establish an online learning community of 28 Advanced Level Biology Students by designing an online VLE 'icebreaker activity' programme
2. To design and assess a subsequent online one-week programme for small groups of 5-6 students
3. To assess the effectiveness of resulting online discussion groups, compared to a control group of 227 students

2.1. Materials

Two Online programmes were designed for the purpose of this study based on principles followed at ION in 2015;

Cluster sampling was used, where a class of 28 first year (2017-2018) students taking Advanced Level Biology participated in these programmes.

3. Methodology

The study was carried out in two main steps, each including an online programme involving the discussion forum.

Step 1: The online VLE introductory programme was available to all 28 students after a F2F introduction to familiarize students with the use of the discussion forum.

Step 2: The Experimental Design Programme (EDP) was available to students from the 9th to the 17th March 2018, where the 28 students participating in the course were split up into six groups of four or five.

Within the group, a student was expected to participate as follows:

- i. Read recommended online resources and choose one of 5 questions on experimental design (from AM past paper 4) by the 10th March
- ii. Post their first response by the 12th March.
- iii. Give feedback to at least two other participants within the group from the 12th to the 15th March
- iv. Post their second revised response by the 17th March
- v. Finally post their reflection activity on the 17th March, to conclude the programme.

During this week, each half of the class had their weekly tutorial hour replaced by a two- hour computer lab session to partially replace F2F time with online activity time. The facilitator’s role during the course was to give feedback to students as necessary, taking care not to take the central role but rather to be a ‘guide on the side’ of the various threads of discussion in the forums.

In the EDP, the assessment mark/score obtained by students in their first post and in their second post was recorded for all 28 students.

Several statistical tests were used to analyse the data using the facilities of SPSS (Statistical Package for Social Science) version 24. The Shapiro Wilk test was used to determine whether the score distributions violated the normality assumption. Since the score distributions satisfied the normality assumption, parametric tests were used to compare mean scores between various groups of students, where a 0.05 level of significance was adopted for each test. The Paired samples t-test was used to compare mean scores between pre- and post- EDP tests; the Independent samples t-test was used to compare mean scores between the ‘test’ and ‘control’ groups; and the One-Way ANOVA test was used to compare mean scores between several classes. Moreover, 95% confidence intervals were computed to assess the variation in the mean scores if this study had to be replicated with other groups of students in the future.

4. Results

a. Short term results of EDP

The paired samples t- test was used to compare mean scores between first and second post during the EDP. This programme was followed by 26 of the 28 students in the class. The null hypothesis specifies that there is no difference in the mean scores between first and second posts and is accepted if the P-value exceeds the 0.05 level of significance. The alternative hypothesis specifies that there is a significant improvement in the mean scores between first and second posts and is accepted if the P-value is less than the 0.05 criterion.

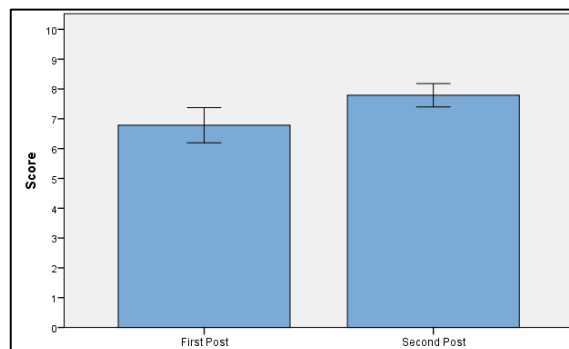
Table 1 shows that the mean score in the second post (7.79) exceeds the mean score in the first post (6.69) by 1.1 points and this difference is significant since the P-value (approx. 0) is less than the 0.05 criterion. Hence it can be generalised that the EDP was effective in improving students’ critical evaluation in experimental design procedures, in the short term.

Table 1. Results of Paired Samples t-test showing mean assessment marks of the first post and second post during the EDP, Standard Deviations and P-value.

	Paired Samples T-Test			P-value
	Mean	Sample size	Std. Deviation	
First Post	6.69	26	1.517	0.000
Second Post	7.79	26	0.971	

The fact that the two confidence intervals (Figure 2) are disjointed (do not overlap) explains why the Paired samples t-test yielded a significant difference in the mean scores between the two postings.

Figure 2. Error Bar Graph of mean scores for first post and second post that displays the 95% confidence interval of actual mean scores if this study had to be replicated with other groups of students in the future.



b. Long term results of EDP

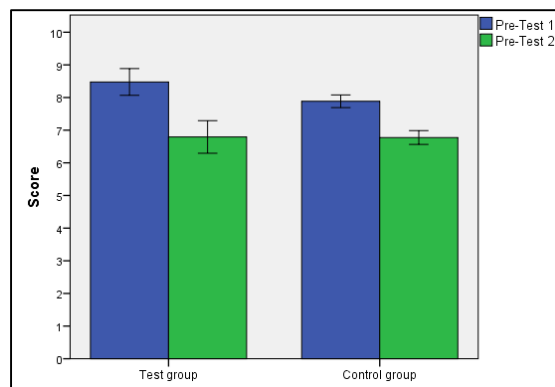
The independent samples t-test was used to compare 'test' and 'control' group results in pre- and post-EDP test scores.

i) Comparison of pre-test scores:

Table 2. Comparison of 'test' group and 'control' groups mean scores in practical tests involving experimental design procedures before the online EDP using Independent Samples t-test showing mean scores for two pre-tests (1 and 2), sample sizes, standard deviations and p-values.

Independent Samples T-Test					
	Group	Sample size	Mean	Std. Deviation	P-value
Pre-Test 1	Test group	27	8.20	1.749	0.219
	Control group	227	7.82	1.489	
Pre-Test 2	Test group	27	6.68	1.338	0.782
	Control group	212	6.77	1.539	

Table 3. Error Bar Graph displaying 95% confidence intervals of the mean pre- tests 1 and 2 scores for the 'test' and 'control' groups.



Output of Independent samples t-test for scores of pre-EDP test 1 and 2: the mean scores vary marginally between the 'test' and 'control' groups; differences between the two groups are not significant since the p- values exceed the 0.05 level of significance (Table 2). This result is complemented by the error bar graph (Table 3) since the 95% confidence intervals overlap. There was no significant difference between the 'test' and 'control' groups of students before the online programme.

Comparison of post-test scores following the online (EDP) programme:

Post-EDP test Scores obtained by students in the Annual Biology Exam (June 2018) Question (Paper one Number 8) involving knowledge of experimental design were compared to find if there was any significant difference between the different Biology classes using the One-Way ANOVA test.

The 'test group' in this study refers to the '4B' class that followed the online experimental design programme, while all the remaining first year (2017-2018) Advanced biology classes pertain to the 'control' group.

The One-Way ANOVA test was used to compare mean scores between the advanced biology classes and this was carried out for two separate pre-EDP tests (November 2017 and March 2018)

The null hypothesis specifies that the mean scores vary marginally between the classes and is accepted if the P-value exceeds the 0.05 level of significance. The alternative hypothesis specifies that the mean scores vary significantly between the classes and is accepted if the P-value is less than 0.05 criterion.

Table 4. Comparison of mean scores between classes in post-(EDP) test question involving experimental design procedures after the online experimental design programme using the One-Way ANOVA test showing mean scores, sample sizes, standard deviations and p-value.

Classes	Sample Size	Mean	Std. Deviation	P-value
3A	27	9.519	1.5657	0.975
3B	25	9.660	1.7061	
4A	25	9.520	2.1817	
4B (test group)	28	9.964	1.9904	
5A	27	9.852	2.3197	
5B	28	9.464	2.0364	
6A	29	9.707	1.4238	
6B	29	9.707	1.4238	

Table 5. Error Bar Graph displaying 95% confidence intervals of the mean post-test scores for all classes (4B is the test group).

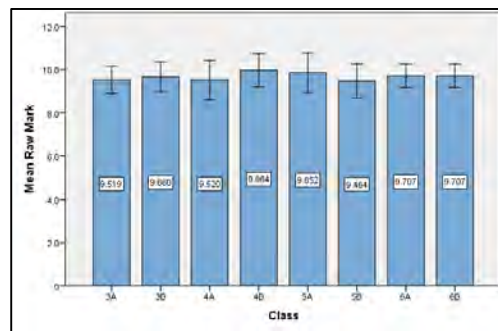


Table 4 shows that though the ‘test’ group (4B) obtained the highest mean score (9.964) in this cohort, there is no significant difference in the mean scores between the different classes. The error bar graph (Table 5), displaying the 95% confidence intervals of mean scores, shows that these confidence intervals overlap considerably complementing the result of the One-Way ANOVA test.

a. Reflection Activity

Twenty-three students out of twenty-six submitting their reflection.

Students’ perspective of positive aspects of EDP included: 1. Gaining confidence in tackling experimental design issues; 2. Chance to view different perspectives to problem solving by class mates; 3. Giving and receiving feedback from classmates/teacher.

Negative aspects of EDP included work overload, feedback from colleagues not always correct, final procedure was not carried out in the lab.

5. Discussion, conclusion and recommendations

The results of this study showed that students’ performance in tackling their experimental design improved significantly by the end of the one week. Results of paired t- test show a significant difference in the scores obtained. (Table 1; Figure 2)

However, though annual results in a question related to experimental design showed that the test group mean was higher than that of the control group, statistical analysis of these results did not support any difference in achievement between the test and the control group (Table 4 & Table 5)

These results indicate that in the short term, the online discussion activity did help students to improve their performance in experimental design questions but this advantage was lost in the long term i.e. at the end of the academic year. Changes in science instruction, particularly biology, along with new digital learning opportunities may offer better approaches for future positive achievement among young people.

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A CPR MODEL FOR MODIFIED MUSIC STANDARDS IN PROFESSIONAL MUSIC TRAINING: THE CASE OF TUT

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Abstract

The purpose of this paper is to use the National Association for Music Education's three artistic processes of creating, performing, and responding (CPR) guidelines for music teachers, music supervisors and administrators, and school boards, legislators, and other decision-makers to analyze and explore evaluation measures and the process of giving students tools in instructional programs that would lead them to become successful and competitive learners. Consideration is given to the areas and practices of the guidelines in the process of evaluating student learning across a range of standards representative of the quality of learning outcomes and balanced music curriculum that includes not only responding to music but also creating and performing music. The case of the Music Department in the Tainan University of Technology (TUT), Taiwan, is used to gain insight into some of the implications of student results. The findings demonstrate that a true assessment of music performance in authentic contexts is realized by raising the quality of practice, defined as meeting learning objectives in performance, that conform to the criteria of academic and performance requirements.

Keywords: *Assessment, measurement, standards.*

1. Introduction

Assessment in higher education has been under scrutiny since 1990 (Rawlusk, 2018, p. 34), and music assessment is included in the areas "identified by those in the measurement community as prime examples of unreliable measurement" (Parkes, 2012, p. 98). Researchers from the National Association for Music Education, Centre for Educational Research and Innovation (CERI), American Educational Research Association (AERA), American Psychological Association (APA), and National Council on Measurement in Education (NCME) conducted a study indicating that the education assessment process is designed to self-examine program performance and quality by providing feedback to participants and stakeholders and those "who develop tests, who use tests, and who take tests" (Reynolds, Livingston, & Willson, 2009, p. 15). Professional educational assessment provides essential "information that is used for making decisions about students, curricula and programs, and educational policy" (Mazur & Laguna, 2017, p. 119) and provides information to assist policy makers "become competent in selecting and using assessments" (p. 115). Assessment helps improve the value of the decisions made and outcomes produced.

Continuously assessing the assessment process also provides an opportunity for commercial test publishers, professionals, and researchers to exchange views on "guidelines for the ethical and responsible use of tests" (Reynolds et al., 2006, p. 14). Lyotard (1983/1988, p. 13), Reynolds et al. (2006, p. 14), Bradley (2011, p. 79), and Richerme (2016, p. 284) noted the process of assessing assessment draws on information gleaned from the revised 2014 National Core Music Standards, like the 1994 predecessors, namely, *Standards for Educational and Psychological Testing* (AERA, 1999), accredited by the American National Standards Institute (ANSI); *The Student Evaluation Standards* (Joint Committee on Standards for Educational Evaluation [JCSEE], 2003); *Code of Professional Responsibilities in Educational Measurement* (NCME, 1995); and *Code of Fair Testing Practices in Education* (Joint Committee on Testing Practices [JCTP], 1998), among others. While assessments are focused primarily on the people involved, the whole assessment process is used to examine whether the participants and instruments have achieved their stated objectives (Richerme, 2016).

2. Purpose of study

The purpose of this paper is to provide a review of noteworthy developments at the Tainan University of Technology (TUT), Taiwan, Music Department's seven-year program from high school directly to a bachelor's degree in vocational education. A performance assessment process at the TUT has been selected to discuss criteria and guidelines for measuring the effectiveness of both student assessment and the ongoing process of program evaluation. Selected areas for consideration are the following:

- The selection and/or development of instruments;
- Alignment to existing programs;
- Student rights and responsibilities;
- Prevention of bias;
- Instructor and administrator responsibilities;
- Student achievement;
- Accommodations;
- Issues in developing, selecting, scoring, and interpreting students' results.

In this paper, the above processes are explored with reference to the TUT's various goals and strengths, and the opportunity is used to make recommendations for improvement. Alignment with these processes could offer important criteria for defining and communicating measures for evaluating questions and objectives. Ensuring schools have access to recent and multiple forms of assessment has contributed to "emphasizing the intra-active nature of measurement and empower[ing] themselves to critique and reimagine existing measurement apparatuses and their measurement and assessment practices" (Richerme, 2016, p. 174). Additional creative measures are required for schools to rise to the challenge of "assessment criteria, such as the overall impression of the performance, technical ability, expressive components, and the basic parameters of the quality of the performance" (Mazur & Laguna, 2017, p. 115). Equally important is ensuring students are competent in creating, performing, and responding to enhance results and conclusions.

3. Strengths of seven-year program at TUT

As Bergee (2003) noted, "Assessment of music performance in authentic contexts remains an under-investigated area of research" (p. 137). Bergee also developed an assessment process to evaluate performance aspects using criteria-specific rating scales, which "are more comprehensive, encouraging attention to all aspects of the performance and providing balanced feedback to performers" (p. 147).

Performance assessment has also been seen as a meaningful task for creating the critical link between teaching and learning in more applied music settings (Parkes, 2010). As Parkes (2010) noted, "Performance assessments must have transparent criteria, be fair, be generalizable and transferable, have cognitive complexity and content quality, and be comprehensive" (p. 101). At the TUT's Music Department, performance assessments are seen to have their own set of strengths, and Parkes (2010, p. 249) cites several researchers' summaries as follows:

Assessment tasks clarify the meaning of complex learning targets. Assessment tasks allow students to allocate the correct amount of effort to the aspects of the course (Gibbs & Simpson, 2004-2005, p. 12-14), engage students in productive learning activity, and ensure feedback is given on the tasks often and in suitable detail (p. 14-17). Assessments also allow students to focus on the feedback appropriately in relation to what they think they are supposed to be doing (p. 18-21), receive and attend to feedback, and that act on the feedback (p. 23-24).

Performance tasks require integration of knowledge, skills, and abilities. Performance assessments require students to demonstrate their learning outcomes through complex performance tasks. For example, the TUT's music appreciation competency evaluation assesses inspiration, rhythm, melody, harmony, and tone, and students are asked to demonstrate their music appreciation ability by showing measurable knowledge about what to listen for in music.

Performance assessments may be linked more closely with teaching activities. Performance assessments include solo and ensemble performances, using a holistic rubric for tutors to use in grading written work. However, reports from tutors revealed they simply 'adapted' the descriptors to their own existing grading processes. Student responses were also mixed with comments indicating they preferred more personalized comments added to the rubric as part of the feedback (Parkes, 2010, p. 99).

Assessments do provide students opportunities to intra-act with their musical surroundings. Reynolds et al. (2009) asserted, "Performance assessments require test takers to complete a process or produce a product in a context that closely resembles real-life situations" (p. 23). At the TUT, students in the Music Department's seven-year program are required to take both academic credits and performing

credits. The questions raised is how can staff as the TUT make sure learning outcomes are effective? Some types of evaluation used are derived from Simon (2014) such as, Needs Assessment (paper-pencil tests), Formative Evaluation (expert consultation, vertically aligned), Summative Evaluation (feedback from the jury evaluating the performance, horizontally aligned), “norm-referencing” (relative standards), and “criterion-referencing” (absolute standards) (p. 86). A score of 60 is required to pass.

Assessment tasks let teachers assess the processes students use as well as the products they produce. At the TUT, for example, solo piano performance assessments are “focus[ed] on key points of instruction” (Common Arts Assessment Initiative, 2014, p. 1) and include such areas as “Interpretation/Musical Effect, Rhythm/Tempo, and Technique” (Bergee, 2003, p. 143).

4. Conclusion

As Parkes (2010) noted, the features of assessment as explained by Shepard (2000) can be seen in the higher education literature across several countries, and more importantly, the research of music performance literature. The increasing demand for “standard-setting process primarily involves consideration of qualitative, evaluative criteria, only then to be followed with the support of the quantitative measurement data” (Wesolowski et al., 2018, p. 226), and this has heightened the need for music performance evaluation. In this paper, an attempt was made to explain the performance assessment process at the TUT to show what reliability means in a current music education context.

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SOME DEMOGRAPHIC, PERSONAL AND CLASS CHARACTERISTICS AS PREDICTORS OF SCHOOL CLIMATE

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Abstract

Being a teacher, like any job, has some of its specifics that contribute to whether the teachers feel more or less comfortable in their workplace. In general, teachers believe that the school climate describes a general perception of the situation at a workplace. School climate determines the quality of relationships and the feeling of comfort or discomfort in the relationships between the participants of the educational process. School climate is associated with the quality of the school environment, common perception of school behavior, and school management.

The aim of the study was to check the potential predictors of school climate among classroom teachers. Research included the contribution of demographic and class characteristics, stress experience, and social support as personal variables contributing to the prediction of the school climate. The study involved 311 classroom teachers (97.7% female) from Croatia. During the State expert summit for teachers *Strengthening of professional competences of classroom teachers*, in June 2017, teachers completed the *Scale of Social Resources*, *Scale for Measurement of Teachers' Stress Sources*, and the *Questionnaire of School Climate*, assessing their own stress levels, social support, and school climate.

Research results showed that demographic and class characteristics are not crucial for predicting the school climate, however, school climate is connected to the teacher's experience of stress and support. Different sources of stress and social support proved to be significant predictors and accounted for 23.8% of the total variation of the school climate. A higher level of stress caused by the student's inappropriate behavior, a lower level of stress caused by the need for professional recognition, and the perception of greater social support predict a more positive school climate. Stress caused by inappropriate student behavior encourages teachers to change their behavior, but also to take responsibility for creating a positive classroom discipline through appropriate methods and forms of work which encourage student activity and promote a stimulating school climate. Teachers are aware that they can probably affect the stress of professional recognition a bit less, which creates a lesser need for stress for the climate to stay positive. Reducing the amount of stress is possible with the systematic support of competent institutions, experts, expert associates, and school principals, but also society as a whole, which should show greater respect for the teacher's calling.

Keywords: *Social support, stress, school climate, teachers, Croatia.*

1. Introduction

The studies of school climate started, more intensively, in the '60s of the 20th century in Anglo-Saxon countries (Domović, 2004). As one of the fundamental characteristics of extremely successful schools, Levine and Lezotte (1990) emphasize a productive school climate which is characterized by: environment in which order is reinstated; commitment of the staff towards a clearly articulated goal focused on achievement; problem solving orientation; cohesion, co-operation, consensus, communication, and collegiality; participation of staff in decision-making; with emphasis on work recognition. Positive school culture is conditioned by a stimulating climate characterized by humane relations and trust among the teaching community. Positive school culture is one of the factors that influence the development of pedagogical traits of teachers, and the quality of their educational work, relations between colleagues, working conditions at school. Teacher's emotional traits directly affect the emotional climate in a school. Teachers achieve them through working experience, experiential learning, and continuous professional development.

Research about the connection between demographic characteristics and school climate mostly show that smaller schools in rural environments have some advantages over larger schools in urban environments (Nader, 2012). Schools in smaller communities have greater co-operation with parents, greater student involvement in school activities and a closer relationship between students and teachers, contributing to the development of a positive school climate, while other research (Othmana & Muijsb, 2013) showed that teachers in rural environments perceive school climate as worse than teachers in urban environments. Research about the teachers' perception of school climate in terms of teacher's age, place of work, and the educational level shows that younger teachers perceive the school climate as worse, they feel less supported and believe they are less effective in work, while teachers older than 45 have a much more favorable perception of school climate. The same research also showed a significant difference in the assessment of the relationship with students regarding the place of work. High school teachers perceive a much better relationship with students, from the point of view of discipline (Orzea, 2016).

Research results (Stančić, Kiš-Glavaš & Nikolić, 2015) show that students with disabilities are satisfied with the relationship and support of teachers, professional associates, and school principals. Teachers highly value an inclusive climate in schools, in order to provide adequate support to students with disabilities, active participation of students with disabilities in all educational activities of the school, taking into account the individual needs of each student. The results of the research (Kantorová, 2009) on the quality of school climate in Czech high schools showed that teachers are the most satisfied with all areas of school climate (overall school attitude, learning motivation, quality and competence of teachers, school rules and classroom discipline, solidarity of a class as a social group, architectural, aesthetic and hygienic aspects of the school), then by the level of satisfaction, follow parents who are somewhat less satisfied, while the greatest dissatisfaction exists among students. Job satisfaction achieves significant multiple correlations with the observed school climate characteristics, and no single predictor of school atmosphere is a significant at-risk level. Involvement, clarity, collegial cohesion and control proved to be predictor variables that confirm teacher's job satisfaction (Domović, 2004). Social support proved to be necessary to alleviate all causes of stress, and teacher's interest proved to be another source of stress among the researched 26 professions in the UK (Johnson, Cooper, Cartwright, Donald, Taylor & Millet, 2005). Collie, Shapka and Perry (2012) proved that stress is related to school climate, which is mostly influenced by the motivation and behavior of students. The perceived stress is conditioned by the student behavior, i.e. more effective teaching equals a greater job satisfaction, and a lesser perception of stress. There is no statistically significant difference between the assessment of class and subject teachers when it comes to the perception of working conditions as a source of stress or when it comes to work relations. It has been proved that teacher's satisfaction with life or job is greater if there is a greater focus on the problem. The satisfaction is lesser if the focus is set on emotions, which increases insecurity, and teacher's unpreparedness for stress (Brkić & Rijavec, 2012). Lazarus and Launier (1978) found out that the way people deal with stress has greater importance for their overall morale, social functioning and health than the number and strength of the stress episodes themselves.

Starting from the definition of school climate defined by Hoy and Hannum (1997) as relatively stable quality of the school environment, affecting the behavior of its members, and based on a common perception of behavior in school, influenced by formal and informal organizations, personality of participants and school management, the aim of this study was to check the potential school climate predictors for classroom teachers. The contribution of demographic characteristics and class characteristics in predicting the school climate and the experience of stress and social support as personality variables, personal characteristics contributing to the prediction of the school climate have been verified. The demographic characteristics of teachers (years of work experience and vocational qualifications), the characteristics of classes (number of students in the classroom and whether students with disabilities were present), the level of different sources of stress (inappropriate student behavior, professional recognition and workload) and social support have been tested.

2. Method

2.1. Participants

A total of 311 elementary school teachers (1st-4th grade elementary school, 97.7% female) participated in the research from all counties of the Republic of Croatia, most of them from Eastern Croatia (57.4%). The majority of teachers were older than 41 (61.6%) and more than 15 years of work experience (68.6%).

2.2. Instruments

The Scale for measuring the source of teachers' stress (Sorić & Mikulandra, 2004) measures the general source of teachers' stress caused by the job. It consists of 25 statements, and teachers need to show their agreement on the five-degree Likert type scale. In this case, 1 means "not at all stressful" and 5 "very stressful". The scale for measuring the source of teachers' stress can be divided into three subscales

that measure different sources of stress: Inappropriate student behavior ($k=6$), Need for professional recognition ($k=12$) and Workload ($k=7$). The overall result is obtained on the basis of the arithmetic mean of all particles, and it is ranged from 1 to 5, while the results for the subscales are obtained based on the arithmetic mean of the selected particles and it is also theoretically ranged from 1 to 5. The reliability of the scale for measuring the source of teachers' stress was, in our research Cronbach $\alpha = 0.91$, while for each subscale it was: Inappropriate Student Behavior $\alpha=0.80$, Need for Professional Recognition $\alpha=0.84$ and Workload $\alpha=0.74$. *The social provision scale* (Nekić, 2008) measures the general perception of social support available to an individual, i.e. current relations with important persons (e.g. friends, family members, work colleagues, but does not specify any relationship). It consists of 24 statements, and answers are given on a 4-degree Likert type scale, with 1 meaning - fully agrees, and 4 - completely disagree. The overall result is obtained on the basis of the arithmetic mean of all particles, and it is theoretically ranged from 1 to 4. The reliability of the social provision scale in our study was Cronbach $\alpha=0.89$. *The questionnaire of school climate* (QSC (in Croatian UŠK) -Teacher's version, Velki, 2012) measures the global dimension of school climate, including the relationship between students and teachers, and the relationship between school staff, the sense of belonging to school, learning atmosphere, parent involvement, predicting student's future based on schooling, and professional development. It consists of 18 statements, and teachers need to show their level of agreement, based on a five-degree Likert scale, with 1 meaning "completely agree" and 5 "completely disagree". The overall result is obtained based on the arithmetic mean of all particles and it is theoretically ranged from 1 to 5. The reliability of the questionnaire – teachers' version was, in our research, Cronbach $\alpha=0.88$.

2.3. Procedure

Data gathering took place during the State expert summit for teachers *Strengthening of professional competences of classroom teachers* held from 19 to 21 June 2017 in Osijek. Data was gathered in a group, and the questionnaire completed in approx. about 20 minutes. All of the participants agreed to fill in the questionnaires. The research was completely voluntary and anonymous.

3. Results

Table 1 shows descriptive data for measured variables. Testing of normality of distribution showed that the distribution of major research variables does not deviate significantly from the normal distribution. Asymmetric indexes did not exceed values greater than 2.00, and since the distributions were asymmetric on the same side, we decided on the parametric statistics (Field, 2009).

Table 1. Descriptive data for measured variables ($N=311$).

variables	Min	Max	M	SD	asymmetry	flatness
school climate	2.17	5.00	4.07	.428	-.500	1.286
inappropriate student behavior	1.00	4.83	3.05	.758	-.295	-.121
need for professional recognition	1.27	4.82	3.03	.599	.001	.290
workload	1.14	4.57	3.10	.662	-.162	-.285
social support	2.00	4.00	3.48	.379	-.895	.438

The teachers mostly had between 16 and 25 years of work experience (37.9%) and more than 26 years of work experience (30.7%), while a small number had between 6 and 15 years of work experience (20.4%), and the least had less than 5 years of work experience (11%). Most teachers did not have senior vocational qualifications (54.8%), mentors totaled 26.8%, while counselors were 18.4%. Most of the teachers (51.3%) worked in middle-sized classes (10 to 20 students), followed by large classes (33.2%, 21 to 30 students) and least worked in small classes with less than 10 students (15.5%). At least one student with disabilities was represented in 48.2% of the classes.

To check the potential predictors of school climate, a regression analyses in two steps was made (Table 2). In the first step, the contribution of the demographic characteristics of the teacher (working time and vocational qualifications) and the characteristics of the class in which they work (class size and the inclusion of students with disabilities) are checked. The second step assessed levels of different stress sources, and the perceived social support as the predictors of the school climate. The demographic characteristics of teachers, and the characteristics of the class did not prove to be significant predictors of the school climate.

Table 2. Regression analysis for predicting the school climate.

predictors		School climate - β
demographic characteristics	work experience	-0.005
	professional vocation	-0.063
class characteristics	class size	0.052
	students with disabilities in the class	-0.007
Regression model	R=0.078; R ² =0.006; R ² kor=0.000;	F(4,307)=0.462; p>0.01
demographic characteristics	work experience	0.061
	professional vocation	-0,055
class characteristics	class size	-0.023
	students with disabilities in the class	0.059
stress	inappropriate student behavior	0,264**
	need for professional recognition	-0.317**
	workload	-0,041
	social support	0,386**
Regression model (final solution)	R=0.508; R ² =0.258; R ² kor=0.238;	F(8,303)=12.819; p<0.01

* p>0,05; ** p>0,01

Demographic characteristics and class characteristics did not show as significant school climate predictors. They have no contribution to explaining the school climate. Different sources of stress and social support have shown as significant school climate predictors and accounted for 23.8% of the total variation of the school climate. A higher level of stress caused by the student's inappropriate behavior, a lower level of stress caused by the need for professional recognition and the perception of greater social support predict a more positive school climate.

4. Discussion

Research results showed that demographic characteristics of teachers, such as years of work experience, age and professional vocation of teachers, are not connected to school climate, as opposed to research (Orzea, 2016) where younger teachers perceive an unfavorable school climate. In this research, it can be concluded that the perception of school climate is associated with some other predictors because work experience, age, professional advancement, students per class and the inclusion of students with disabilities in classes is of no importance to the perception of the school climate. If objective and permanent demographic characteristics are not connected with school climate, then it is possible to intervene in predictors that change the school climate by providing support and additional training. In the research conducted, the school climate was associated with the teacher's experience of stress and support as well as in previous research (Domović, 2004, Johnson et al., 2005). Different sources of stress and social support have proven to be significant predictors of climate school in this research, i.e. higher levels of stress are caused by inappropriate student behavior and lower levels of stress by the need for professional recognition, while the perception of greater social support predicts a more positive school climate. Stress caused by inappropriate student behavior encourages teachers to change their behavior, but also to take responsibility for creating positive discipline in the classroom through appropriate methods and forms of work that encourage student activity, and thus a stimulating school climate, as demonstrated in research by Collie, Shapka and Perry (2012). Therefore, when teachers are more focused on solving problems and less on emotions, they are surer in the decisions they make, more prepared for stress and are more satisfied with their job (Brkić & Rijavec, 2012), while at the same time the way of dealing with stress becomes more important than the amount and strength of stress (Lazarus & Launier, 1978). Teachers are aware that they may be less likely to affect stress affected by the need for professional recognition, so that area needs to be less affected, in order to keep the climate positive. Reducing the amount of stress is possible with the systematic support of competent institutions, experts, expert associates and school principals (Johnson et al., 2005), but also the society as a whole, which should show greater respect for the teachers.

The disadvantages of the study are the uneven number of male and female participants, which is common in research among teachers, where women dominate. Research results would be more relevant if more methods were used, not only the method of self-assessment. The advantages of this research are scientific justification, meaningful and grounded operationalization of the main variables, and the construction and application of appropriate instrumentation on a representative sample. It is recommended, for future research, to use additional assessment methods (e.g. with subject teachers, high school teachers, principals, expert associates, but also students) as well as verifying some additional demographic characteristics of teachers, and class characteristics which can potentially affect the stress of the classroom teacher.

5. Conclusions

One of the specific competencies of a teacher is the ability to create a climate conducive to learning and humane relationships in school. Research results show that demographic and classroom characteristics are not crucial for the school climate, but the school climate is connected to the teacher's experience of stress and support. A positive school climate is predicted by a higher level of stress caused by the student's inappropriate behavior, a lower level of stress caused by the need for professional recognition, and the perception of greater social support. Therefore, it is necessary to strengthen the teachers, through formal and informal training, for appropriate problem solving and ways of dealing with stress, as well as to provide them with continuous social support. Seeing that stress has proven to be crucial to the perception of school climate, future research will explore potential predictors of teacher stress, such as demographic and class characteristics, whether there are differences in stress levels in the region of Croatia in which they work, and check the correlation between stress levels with school climate and social support.

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(RE)CONSTRUCTING PERSONAL TEACHING METAPHORS IN A BRAZILIAN TEACHER INITIATION PROJECT

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Abstract

This paper explores the (re)construction of pre-service English teachers' personal teaching metaphors as they designed and implemented language teaching materials for the first time. The research participants and I lived alongside each other during the first year of a teacher education project, forming part of a Brazilian government programme called PIBID (Teaching Initiation Scholarship Programme), in which I collaborated as a teacher educator. The programme awards grants to teacher educators, and to pre-service and in-service teachers participating in teacher initiation projects developed by universities in partnership with state schools. The PIBID project, in which the participants of this study were engaged, involved in-service English teachers from two state schools and pre-service teachers designing and implementing language teaching materials with the help of digital resources. To explore the development of student teachers' metaphors, I adopt a narrative inquiry methodology, which considers narrative as both method and way of understanding experience. Considerations about the role of metaphors in teacher education and storied perspectives on identity, knowledge and context also inform this study. The field texts include pre-service teachers' written, spoken and visual narratives of experience gathered over the course of an academic year. The personal teaching metaphors articulated and rearticulated by materials design and implementation experiences encapsulate the pre-service teachers' desire to have a significant impact on pupils' language learning and welfare. They also encapsulate the feelings and challenges concerning the implementation of their images of teaching, and the effect of teaching experiences on their professional identities. Overall, they help the pre-service teachers not only communicate, but also make sense of important stages within their professional identity (re)construction, namely, the imagining, living out and re-imagining of language teaching.

Keywords: *Narrative inquiry, personal teaching metaphors, professional identity.*

1. Introduction

Metaphors not only communicate, but also shape our understanding of the world and actions (Lakoff & Johnson, 1980). Exploring teachers' metaphors is therefore essential for making sense of their beliefs, experiences and professional expectations, as a considerable number of studies have highlighted (e.g., Carter, 1990; Craig, 2018; Kitchen, 2011; Leavy, McSorley, & Boté, 2007; Pinnegar, Mangelson, Reed, & Groves, 2011). Furthermore, by becoming aware of their own teaching metaphors, teachers are provided with opportunities to reflect on who they are becoming as professionals.

Metaphors are an important aspect of a teacher's professional identity, which is understood here through Connelly and Clandinin's concept of "stories to live by" (1999, p. 4). In this perspective, "identities have stories, they are narrative constructions that take shape as life unfolds" (p. 95). They are "multiple, evolving, shifting, and contradictory", as teachers experience situations both in their professional and personal lives (Clandinin & Huber 2005, p. 44). Essential to this definition is the link between identity, knowledge and context (Connelly & Clandinin, 1999).

Context is seen through the personal and professional knowledge landscapes metaphor, which involves "space, place, and time" and "has a sense of expansiveness and the possibility of being filled with diverse people, things, and events in different relationships" (Clandinin & Connelly, 1996, p. 24). Knowledge is taken to mean personal practical knowledge, which is "composed of both kinds of knowledge [theoretical and practical], blended by the personal background and characteristics of the teacher, and expressed by her in particular situations" (Clandinin 2013b, p. 67), reflecting both "a person's life story" and "the contexts in which teachers live" (Connelly & Clandinin, 1999, p. 2).

Teachers' personal practical knowledge has moral, aesthetic and emotional dimensions, and is informed by metaphors, images of teaching, practical principles, personal philosophies, and narrative unities (Clandinin, 2013b; Connelly & Clandinin, 1988). Metaphors articulate learning and teaching conceptions, and guide future actions. Images of teaching (and metaphors) are influenced by a teacher's past and are recalled within the present. They reflect the way teachers' imagine teaching spaces and/or themselves in teaching situations. Rules tell teachers what to do in classes. Practical principles concern 'purposes in a deliberate and reflective way' (Connelly & Clandinin, 1988, p. 64–65). Personal philosophy is 'a way one thinks about oneself in teaching situations' (1988, p. 66). Narrative unity is 'a meaning-giving account, an interpretation, of our history and, as such, provides a way of understanding our experiential knowledge' (1988, p. 75).

By adopting a narrative inquiry methodology (Clandinin, 2013a; Clandinin & Connelly, 2000), this study explores the (re)construction of pre-service English teachers' personal teaching metaphors as they designed and implemented language teaching materials for the first time. My research participants and I lived alongside each other during the first year of a teacher education project, forming part of a Brazilian government programme called PIBID (Teaching Initiation Scholarship Programme), in which I collaborated as a teacher educator. The programme is sponsored by CAPES (Coordination for the Improvement of Higher Education Personnel), awarding grants to teacher educators, and to pre-service and in-service teachers participating in teacher initiation projects developed by universities in partnership with state schools. Its main aims are to integrate schools and teaching degree programmes, and to improve the quality of education at state schools.

This paper is organized in three sections. I begin by outlining my methodological approach. Then, I discuss the participants' metaphors derived from their process of designing and implementing language teaching materials. Finally, I present some thoughts that emerged from the discussion and the wider implications of this study.

2. Design

This study takes the form of a narrative inquiry, a research methodology that analyses experience as a storied phenomenon (Clandinin, 2013a; Clandinin & Connelly, 2000). Analysis involves the reconstruction of participants' experiences, situating field texts (the term for data in this narrative approach) within the three-dimensional inquiry space: temporality, sociality and place (Clandinin 2013a; Clandinin & Connelly 2000). Temporality refers to the past, present and future of the experience. Sociality refers to personal and social conditions. Place refers to the influence of the location. The field texts include written, spoken and visual narratives, taking the form of written journals, drawings and recorded conversations gathered over the course of an academic year.

Narrative inquiry's emphasis on particular people and circumstances demands a reduced number of participants, six pre-service English teachers in this case. Here, I discuss the metaphors derived from language teaching materials design and implementation experiences of three of them. They gave themselves the pseudonyms Alice, Carla and Marcela. When field texts began to be gathered, Alice was 50 years old, Carla was 24 years old and Marcela was 18 years old. They were in the second year of her undergraduate Portuguese-English language teaching degree.

The PIBID project that my participants and I were engaged in involved in-service and pre-service teachers designing and implementing English reading activities with the help of digital resources. The PCN (National Curriculum Parameters) (Brasil, 1998) and the OCEM (Curriculum Guidelines for High School) (Brasil, 2006) served as guiding educational documents. This study follows the first year of the project. I designed the project's proposal and collaborated as a teacher educator.

3. Discussion

Materials design and implementation helped the pre-service English teachers articulate and rearticulate their personal teaching metaphors. Such metaphors informed and shaped the pre-services' *stories to live by* (Connelly & Clandinin, 1999), that is, their professional identities by weaving together diverse aspects of their personal practical knowledge, such as: images of teaching, rules, practical principles, personal philosophies and narrative unities (Clandinin, 2103b; Connelly & Clandinin, 1988). The personal teaching metaphors articulated and rearticulated by materials design and implementation experiences encapsulated the pre-service teachers' desire to have a significant impact on pupils' language learning and welfare. They also encapsulated the feelings and challenges concerning the implementation of their images of teaching, and the effect of teaching experiences on their professional identities. Overall, they helped the pre-service teachers not only communicate, but also make sense of important stages

within their professional identity (re)construction, namely, the imagining, living out and re-imagining of English teaching.

Some pre-service teachers used different metaphors for each stage, while others continued to embellish a particular metaphor throughout. Alice, for example, used the invisible/visible English teacher metaphor to make sense of English teaching and refer to the type of teacher she wanted to be (e.g., a proficient teacher who could build a rapport with pupils and break up the routine). The metaphor then represented her attempts to live out her imagined identity. By the end of her materials design and implementation experiences, she incorporated other features to her metaphor (e.g., the role of schools in the search for visibility and the understanding of this process as never ending), as she re-imagined English teaching.

Carla used the image of the dream English classroom (where teachers simply transferred content and pupils behaved) to account for how she imagined English teaching. This metaphor also articulated her struggles to live up to the dream English teacher in the reality of the school where she would implement her materials. After failed attempts to implement her materials, she realized that such an image could no longer shape her goals as a teacher. As Carla re-imagined English teaching by identifying areas for improvement (e.g., how to communicate with pupils and control the class), the dream English classroom began to evaporate.

Marcela imagined English teaching through her metaphor of the teacher showing that English is not rocket science (e.g., by being innovative and caring). Nevertheless, she herself doubted her ability to implement this image due to her language level. As she lived out the profession, she used this metaphor to make sense of her own teacher development: Marcela discovered that *teaching* English was not rocket science. For example, she realised that by studying English more independently and developing themes in classes, her pupils would not find *learning* English rocket science.

This study highlights the link between materials development and the (re)articulation of personal teaching metaphors. In particular, it sheds light on how new metaphors, or interpretations attributed to existing ones, emerge as teachers re-examine conceptions, and confront the uncertain throughout the process. While imagining teaching situations, writing and trying out their own activities, teachers get to identify, reflect on and rethink their personal teaching metaphors. Furthermore, this narrative inquiry identifies different categories of metaphors, which account for teacher identity (re)construction in its early stages. There are metaphors capturing how pre-service teachers imagine the profession (articulating images of teaching and professional expectations), live out the profession (articulating the negotiation of their imagined teacher identities), and re-imagine the profession (articulating the effect of teaching experiences on them). This awareness, in turn, reinforces the importance of exploring metaphors in second language teaching education practice and research as a means of understanding how teachers experience teacher preparation and the profession, as well as of tracing and fostering professional development.

4. Conclusion

Narrative inquiry is shaped by “particularity and incompleteness” and thus “leads less to generalizations and certainties” (Clandinin, 2013a, p. 52). It values “a particular experience, in a particular setting, involving particular people” (Pinnegar & Daynes, 2007, p. 21), and aims to “understand rather than control and predict the human world” (p. 30). The methodology’s strength lies in “understanding the complexity of the individual, local and particular”, providing “a surer base for our relationships and interactions with other humans” (Pinnegar & Daynes, 2007, p. 30).

In exploring the metaphors that particular pre-service English teachers derive from their experiences of designing and implementing materials in particular settings, this narrative inquiry is insightful for both second language teacher education practice and research. It illustrates teacher identity formation in its early stages, shedding light on how pre-service teachers imagine, live out and re-imagine the profession. This in turn can inform second language teacher education curriculum. For example, teacher educators may consider the pre-service teacher identity formation stages explored in this study (imagining, negotiating and re-imagining stories of teaching English) when designing proposals in their own programmes. Second language teacher education researchers, meanwhile, may adapt these stages in order to study teacher development in other contexts.

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SOMETIMES STUDENTS MAKE THE BEST TEACHERS: DEVELOPING AND ENHANCING GRADUATE SKILLS

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Abstract

This paper will provide a discussion and demonstration of an experimental implementation of a new approach to fostering graduate skills and enhancing the learning experience of final year's students in Digital Media and Information Studies (DMIS), an undergraduate degree at the University of Glasgow. Teaching staff in the subject area worked collaboratively with students in a Peer Assisted Learning (PAL) study to develop a training programme for student demonstrators for the computer-based lab sessions that are a requirement in the DMIS level 1 courses. The process enabled the development of training in practical and critical thinking skills for the students, and developed a two-way process of mentoring and feedback that allowed both staff and students to learn from the process. The evaluation of the programme has indicated that involvement in this project has had a number of positive outcomes for students. Most significantly, it has enhanced and developed student graduate attributes, making a contribution to an excellent student experience. This initiative used existing methods in peer learning, and built on research such as Student Peer Learning & The AALL Professional Evolution, Equity & innovation Students Supporting Student Learning (SSSL) Symposium 2012.

This paper will be delivered by teaching staff involved in the project, supported with video contribution from students taking part in the scheme as supporting evidence of their experience of the effectiveness of the activity on student learning experiences and employability beyond graduation. Evaluation at the end of the project evidences the positive effect for both sets of students, with qualitative feedback overwhelmingly positive.

The University of Glasgow has developed Graduate Attributes as a core objective of student learning: "core attributes are valued and developed across academic, social and professional settings". This paper will reflect on the success of embedding defined UofG Graduate Attributes into this scheme: these include Subject Specialist, Confident, Effective Communicators, and Resourceful, and Responsible. Our project, has shown that these attributes are achieved not only through the classroom activities but also through application of training and accreditation, from participation in UofG GTA training, Subject meetings, and support to apply for UofG accredited Recognising Excellence in Teaching (RET) scheme. This in turn is aligned to Chartered Institute for Library and Information Professionals (CILIP) professional accreditation for the single honours DMIS degree, ensuring our demonstrators graduate with a firm set of graduate attributes and employability skills.

Keywords: *Cooperative learning, peer teaching, undergraduate, graduate attributes, educational benefits.*

1. Context

The Department of Information Studies at the University of Glasgow has a long and distinguished history in a number of significant areas of Information Studies, with particular expertise in digital curation, research data and information management, museum studies, and digital heritage. Information Studies has a unique undergraduate degree in Digital Media and Information Studies, accredited by the Chartered Institute of Librarians and Information Professionals (CILIP) that has grown significantly in numbers in the last two years.

We offer what is known in Scotland as a Single honours in Digital Media and Information Studies in the College of Arts (MA) and also a Joint MA degree in with another subject from the College of Arts or Social Sciences. Students enrolled on these programmes study over four years, following a broad curriculum in their first two years, with Digital Media and Information Studies contributing 33% of their Level 1 curriculum and 33% of their Level 2 curriculum. In their 3rd and 4th year, they focus on one subject (single honours) or two subjects (joint honours). Students graduate with an MA, a degree awarded by the four ancient Scottish Universities.

2. Subject coverage

We focus our teaching on the connection between the Information Age, information studies, and digital media. Digital media – i.e. media that can be created, viewed, distributed, modified and preserved on digital electronic devices through encoding in machine-readable formats – epitomise the transition from the Industrial to the Information Age. In combination with the internet and World Wide Web, digital media represent the means to access the digital universe of opportunities and challenges. Within information studies, the entire lifecycle of digital media becomes the subject of study and analysis.

2.1. Challenge

The practicality of delivering this curriculum is to present the theory through traditional lectures and for the students to learn in smaller class sizes through practice, group work and reflection in a computer lab environment. We had established a fairly small Peer Assisted Learning group for final year students that met informally with 1st year students and we decided to expand this PAL system to create lab demonstrator internships. The objective was to empower students to do the following: to lead lab sessions in subject specialism on the demonstration of DMIS level 1; to support teaching through the demonstration of exercises in line with agreed learning outcomes of the course; to lead sessions on DMIS and to oversee students carrying out practical exercises; and offer assistance, as appropriate, including the provision of detailed explanations of how the activity related to the wider area of study.

We have a University-wide commitment to develop our students' graduate attributes across the curriculum. The PAL (Arendale 2014) lab demonstrator scheme therefore gives senior honours students the opportunity to develop and enhance graduate attributes through employment as a lab demonstrator. This role enables them to provide a valuable support mechanism for DMIS level 1 students via technical support as well as offering wider peer-to-peer support.

3. PAL Schemes

We developed this internship role, designed to support both the final year and first year students, given the context that final year students will form a network (Arendale 2014) with Information Studies staff delivering Level 1 course. This network is first port of call for other opportunities in the subject area, such as Open Days. We set out a framework for the final year students based around UofG's Graduate Attributes, the academic abilities, personal qualities and transferable skills which all students will have the opportunity to develop as part of their University of Glasgow experience. For example, role descriptors addresses these attributes: sound knowledge of subject specialism; expert knowledge of relevant subject/class/session; excellent communication skills;

For the Level 1 student this scheme had the goal to help students adjust quickly to university life; acquire a clear view of course direction and expectations in the DMIS lab sessions; improve their learning skills and adjust their study habits to meet the requirements of higher education; enhance their understanding of the subject matter of their course through collaborative group discussion; and prepare better for assessed work and examinations.

4. Method

In order to follow the implementation of the scheme, a survey was carried out over two years 2016/17 and 2018/19 asking both the first year students and the final year students about their experiences. A simple questionnaire was used for the first year students. We set up focus groups throughout the year and carried out a survey of the final year students.

PAL Lab Demonstrators were asked five simple questions with the first three questions having five-point scale (e.g. Likert Scale). These questions were designed to test the graduate attributes we anticipated the final year students gaining after the year's experience. (Keenan 2014)

The survey again for the first year students was based on the five point scale and had five quantitative questions with one open question for qualitative comments. The results were less firmly positive as the final year students but overall the PAL scheme shows an awareness of the scheme and in some cases, highly positive. We had a low response rate to the survey so the results may not indicate any significance.

5. Discussion

The results of 2016/17 survey are encouraging, the results from the 2018/19 feedback show us clearly managed to successfully link and embedded the graduate attributes to the role, and that the students themselves reflected better on the experience. The results from the first year students were mixed, giving us some opportunities for development and to rethink our teaching practices.

After the first survey in 2016/17 we redesigned our training and set up more regular meetings of the group, explained the weekly task in more detail, developed key questions for each lab session and set up an informal mentoring scheme for current final year students to engage with third year students to encourage the uptake of the internship role.

6. Conclusion and follow on work

We have learned a significant amount about the teaching methods of our programme that can be effective, ensuring more interactivity in the lab sessions. The results show us convincingly that the employability skills of our final year students are developed and established more confidently in them as a direct result of the PAL Scheme. We will be developing more training and support for the final year students to continue the success for this aspect of the scheme. The first year students will have an additional two classes per semester to embed the theory more fully in the practice for their own critical reflection, thus supplementing the PAL scheme and addressing the issue of variability in final year student as a lab demonstrator.

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SEXUALITY EDUCATION AND TEACHER TRAINING IN PORTUGAL

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Abstract

In 2017 we started a study on sexuality education (SE) involving two Public Higher Education Institutions (HEI) with master's degree courses for kindergarten and primary education teachers in Portugal. The objectives of the study are: i) to determine if the study plans of teacher training (both for kindergarten and primary education teachers) of the different HEI include curricular units of SE; ii) to verify whether the legal framework in Portugal includes issues directly related to SE; iii) to identify specific contents of SE as part of curricular guidelines in pre-school and primary education; iv) to identify what knowledge, attitudes and behaviours about sexuality exist among future kindergarten and primary education teachers; and v) to develop and evaluate curricular proposals through the design of didactic resources to support educational practices that promote an integrated approach to the different dimensions of SE. In this free paper presentation, the results related to the first three objectives of the study will be presented and discussed.

Although there is a legal framework in Portugal that integrates SE from the 1st to the 12th year of schooling, data analysis revealed that only a limited number of HEIs explicitly integrate curricular units directly associated with SE. In addition, the recent guidelines for curriculum support continue to give little or no relevance to the subject. Since kindergarten and primary education teacher training is the responsibility of HEIs, it is urgent to ask questions like these: 1. Are the teachers scientifically and pedagogically prepared to teach SE in schools? 2. How do HEIs plan to meet SE training needs? Is the political power conscious of the situation? Will there be a political will to think about SE strategies that involve schools, families and the community?

Keywords: *Sexuality education, pre-service teacher training, legal framework.*

1. Introduction

During the last decade, the visibility of sexuality has increased in the agenda of education and public health policies in several countries. International organizations such as the WHO, the UNESCO, the UNICEF and the UNAIDS promoted studies and published documents with proposals for a curricular approach along with guidelines for teacher and technician training in sexuality education (SE) in a perspective of human rights, gender and interculturality.

According to WHO (2000, p.6) “sexuality refers to a core dimension of being human which includes sex, gender, sexual and gender identity, sexual orientation, eroticism, emotional attachment/love, and reproduction. It is experienced or expressed in thoughts, fantasies, desires, beliefs, attitudes, values, activities, practices, roles, relationships. Sexuality is a result of the interplay of biological, psycho- logical, socio-economic, cultural, ethical and religious/spiritual factors. While sexuality can include all of these aspects, not all of these dimensions need to be experienced or expressed. However, in sum, our sexuality is experienced and expressed in all that we are, what we feel, think and do”.

In Portugal, *Carta de Aveiro*¹ calls for the promotion of sexual health, respect for gender equality, multiculturalism and diversity, highlighting the importance of a comprehensive, scientifically grounded and culturally relevant SE based on the respect for the Human Rights. Awareness of the challenges that human development poses at a global scale, invokes for greater accountability of the education systems to give curricular expression to the links between sexuality and gender inequality, poverty, violence, discrimination, health and civic rights.

¹Carta de Aveiro on Sexuality and Sexual Education, approved at the 1st International Congress on Sexuality and Sexual Education, held in November 2010, at the University of Aveiro. In Teixeira *et al* [org.] (2010) pp. 413-416.

Within the framework of their autonomy, the schools must be able to use the corridors of freedom for the construction of the curriculum, taking into account the dynamics of scientific and pedagogical knowledge, the challenges associated with different socio-cultural contexts and the ethical-political matrix of human rights. In this way, they enable young people to make informed, safe and responsible choices in the field of sexuality (Teixeira & Marques, 2016).

2. Design and objectives

In 2017, we started a study on SE involving two Public HEIs with master's degree courses for kindergarten and primary education teachers². The objectives of the study were: i) to determine if the study plans of teacher training (both for kindergarten and primary education teachers) of the different HEI include curricular units of SE; ii) to verify whether the legal framework in Portugal includes issues directly related to SE; iii) to identify specific contents of SE as part of curricular guidelines (eg programs, essential learning) in pre-school and primary education; iv) to identify what knowledge, attitudes and behaviors about sexuality exist among future kindergarten and primary education teachers; and v) to develop and evaluate curricular proposals through the design of didactic resources to support educational practices that promote an integrated approach to the different dimensions of SE. In this paper, only the results related to the first three objectives of the study will be presented and discussed.

3. Methods

The qualitative, interpretative and descriptive study was developed in three stages: the first involved research and analysis of study plans, programs, specific legislation on SE and other guiding documents; the second focused on the answers given by future educators and/or teachers of the 1st Cycle of Basic Education (CBE), to a questionnaire on knowledge, attitudes and behaviors and the third stage, still in progress, intends to elaborate, implement and evaluate didactic resources of support to integrative practices of SE.

In the first stage, 3 guiding questions were formulated: (1) Does the study plans of teacher training include curricular units of SE? (2) Does the legal framework in Portugal include issues directly related to SE? and (3) Is it possible to identify specific contents of SE as part of curricular guidelines?

To obtain answers for these questions we: (1) searched websites of Public Higher Education Institutions in Portugal offering undergraduate courses in Basic Education and/or Masters in Pre-School Education and Teaching of the 1st CBE, to collect, analyze and systematize curricula and programs of the curricular units related to SE; (2) investigated, analyzed and interpreted the current legislation in Portugal on SE; and (3) researched, analyzed and interpreted guidance documents at the level of organization and curricular management, for Pre-School Education and for the 1st CBE, to verify if they recommend SE.

4. Discussion

Based on the formulated questions, we herein present and discuss the obtained results:

4.1. Does the study plans of teacher training include curricular units of SE?

There are 20 public HEIs³ in Portugal that minister the degree in Basic Education - the only degree that allows access to professional master's degrees, namely the Master's Degree in Pre-School Education and Teaching 1st Cycle of Basic Education. Of these 20 HEIs, n = 17 teach the Master's Degree in Pre-School Education and Teaching 1st Cycle of Basic Education (only HEIP7, HEIP8 and HEIP2 do not offer this course). In order to identify the importance attributed to SE in the training of kindergarten and primary education teachers, the websites of these HEIs were searched. This was carried out with the aim of knowing the curriculum of the two courses and identifying the presence of curricular units of SE. Subsequently, a second research was carried out in order to obtain the programs of other curricular units with the objective of analyzing them and identifying programmatic contents on SE.

Regarding Basic Education Courses, we noticed that four do not offer curricular units of SE and do not make the programs available online (HEIP3, HEIP9, HEIP12 and HEIP13). On the other hand, as

²This study was part of the research project “La educación en sexualidad y igualdad en la formación inicial de profesorado y educadores sociales: análisis comparativo España, Portugal, Brasil y Argentina”, based in the University of Castilla La Mancha, having as partner institutions in Portugal, the School of Education of the Polytechnic Institute of Coimbra, the Department of Education and Psychology of the University of Aveiro and the Research Centre “Didactics and Technology in Education of Trainers”.

³Of these, 13 HEIs are Polytechnic (HEIP) and the remaining 7 HEIs are University (HEIU). Based on this difference, the HEIPs were coded from 1 to 13 and the HEIU from 1 to 7.

far as HEIP8 is concerned, the study plan provided on the website does not match the study plan published in *Diário da República*, so we were not able to access the program of these curricular units, particularly the one of the curricular unit “Health Education”.

There are three HEIs that provide curricular units associated with Health or other areas where SE could be present, but we found that the curricular unit designation may be fallacious. In these three cases, the programs of each curricular unit were available and their analysis revealed that the contents do not provide SE (HEIP1: "Health Education" and "Earth and Life Sciences"; HEIU4: "Promotion and Education for Health"; HEIU7: "Health Promotion"). On the other hand, three other HEIs offer in their curricular plan curricular units associated with Health, but do not offer their program. Based on the previous cases, we cannot interpret the presence of curricular units associated with Health as a guarantee of the presence of SE (HEIP6: "Health Education", HEIU1: "Human Body and Health", HEIU5: "Health Education"). There is also 1 HEI (HEIP7) that despite having the program available, does not have any CU neither of SE nor related to Health.

There are two HEIs that present a different case, because although the curricular unit's programs are not available online, optional curricular units entitled "Sexuality, Health and Education" (HEIP4) and "Education for Gender Equality" (HEIP2) are offered in the Basic Education Course curriculum. While the first does not raise doubts about the presence of SE, the second does not allow us to infer whether SE is addressed or not.

Regarding the remaining six HEIs in which the curricular units' programs are made available, we found contents that focus on the health dimension associated with SE as well as Human Reproduction. References to gender identity and sexual attraction were also found. In HEIP11 there are two curricular units associated with SE: one that addresses the contents of the Reproductive System, morphology, physiology and diseases, alluding to fertilization, pregnancy and childbirth ("Life Sciences") and other where SE is explicitly part of the program ("Education for Health Promotion"). In HEIP5 there are also two curricular units – “Human Biology” and “Health Education”. The first approaches human reproduction and the latter (optional curricular unit), approaches sexuality and sexually transmitted infections besides human reproduction. According to the programs, HEIU2 has two optional curricular units: “Human Biology” discusses the human body (anatomy, physiology and histology, reproduction, reproductive system, hormonal regulation) and “Health Education” includes topics such as gender identity and sexual education.

In HEIU3, the curricular unit “Integrated Nature Sciences II” includes an approach to the reproductive system and measures of health and disease prevention. Of note, in HEIP10, the curricular unit “Human Biology and Health” has a program where the reproductive system, sexually affective education (sexuality dimensions, interpersonal relations, feeling communication, stereotypes, grow and change, hygiene, sexual attraction, family planning, reproduction, pregnancy and birth, sexually transmitted infections), ill-treatment, neglect and sexual abuse of minors are explicitly covered. Finally, in HEIU6, the curricular unit “Human Biology and Health” is not restricted to human reproduction, as verified by the analysis of its program: male and female reproductive system; education for sexuality (family planning and contraceptive methods for men and women: prevention/protection of sexually transmitted infections; interpersonal relationships and sexuality; sexual education in schools).

From the analysis carried out, it was possible to verify that none of the Master's Degree in Pre-School Education and Teaching 1st Cycle of Basic Education in any of the HEIs includes a formative offer of SE. Regarding Basic Education Courses, only one HEI clearly offers a curricular unit of SE, although optional. In the curricular units of Basic Education Courses where SE content is addressed, we noticed that six are not mandatory. As optional, the curricular units may or may not be taught and even when they are, may not be attended by all the students in the course.

4.2. Does the legal framework in Portugal includes issues directly related to SE?

In Portugal, the law 60/2009 establishes a regimen for the application of SE in schools, and provides for the compulsory design and implementation of SE projects, centered in the school, within the framework of Health Education, from the basic to secondary education. The Ordinance 196-A/2010, which regulates it, establishes the minimum contents to be addressed at each of the school levels.⁴

In order to answer the question, the two legal documents were analyzed, both at the level of the normative guidelines established (mainly in Law 60/2009), and of the contents to be addressed in the 1st CBE (Ordinance 196-A/2010). The analysis revealed that there is no allusion to issues related to body, gender, sexual identities, sexual diversity, sexual practices, homophobia and family diversity.

In Ordinance 196-A / 2010, the following contents are established for the 1st CBE (from the 1st

⁴Republic Diary, Series I, Law 60/2009 of August 6 and Republic Diary, Series I, Ordinance 196-A/2010 of April 9.

to the 4th year of schooling): "notion of body; the body in harmony with Nature and its social and cultural environment; notion of family; differences between boys and girls; protection of the body and the notion of limits, saying no to abusive approaches" (Ordinance 164-A – Annex Table). Regarding the 3rd and 4th years of schooling, it states that "In addition to the items included in the physical environment programs, the teacher can develop topics that lead students to understand the need to protect their own bodies, to defend themselves against abusive approaches, advising that if are faced with doubts or problems of gender identity, they should feel the right to ask for help from people they trust in their families or at school "(ibid.).

A more detailed analysis of the aforementioned legislation reveals that the proposal of minimum contents of SE is based on the biomedical model of sexuality, has a weak thematic articulation and absence of an interdisciplinary view, moving away from the most current approaches on sexuality and gender, in particular by the absence of issues related to the media and the sexualization of the public space.

4.3. Is it possible to identify specific contents of SE as part of curricular guidelines?

Pursuing the third objective and seeking to answer this question, four guidance documents were analyzed in terms of organization and curricular management, for Pre-School Education and for the 1st CBE in Portugal, namely: *i*) Essential Learning - Basic Education (*Direção Geral da Educação*, 2018)⁵, *ii*) Profile of the Student Exiting Compulsory Schooling (Martins et al., 2017)⁶, *iii*) Curricular Guidelines for Pre-School Education (Silva, Marques, Mata, & Rosa, 2016)⁷ and *iv*) Curricular Organization and Programs of Basic Education - 1st Cycle (*Ministério da Educação*, 2004)⁸.

Essential Learning - Basic Education (ELBE) corresponds to "a common set of knowledge to be acquired ... as well as the abilities and attitudes to be developed by all students" (Preamble of the Order no. 6944-A / 2018, of July 19). With regard to this document, we have analysed the subject Study of the Environment (present in the four years that comprise the 1st CBE) and the area of Citizenship and Development (primary and secondary education). The remaining three documents were analysed in their entirety. The Profile of the Student Exiting Compulsory Schooling (PSECS), is a reference document for the organization of the entire education system, contributing to the convergence and articulation of decisions on various dimensions of curriculum development. The Curricular Guidelines for Pre-School Education (CGPSE) are a reference document for the construction and management of the curriculum in pre-school education, considering the social evolution and the latest national and international studies. The document Curricular Organization and Programs of Basic Education – 1st Cycle (COPBE) has been revised since its publication in 1990, and is currently in force for some areas of the 1st CEB, namely the Study of the Environment.

In each of these documents were searched keywords related to the following categories: educate on equality; educate in tolerance / respect; educate in health / health; affective-sexual relations; body: bodily changes; sex / gender system; sexual identities; sexual abuse / violence; sexual diversity / sexual orientation; sexual practices; sexual phobias (homophobia, transphobia, ...); affectivity / pleasure / tenderness; sexuality / sex education; and family diversity. It should be noted that the following categories are totally omitted in all documents: affective-sexual relations; sexual abuse / violence; sexual practices; sexual phobias (homophobia, transphobia, ...). In all the documents analysed, it was found that more than half of the categories are not present.

In the opposite direction, the categories "Educate in health / health" and "System sex / gender" are the only ones that are present in all the documents. Three other categories emerge in three of the four guiding documents, namely: "Educate in tolerance / respect" category is present in all documents except COPBE; "Body: bodily changes" just does not figure in the PSECS; and category "Sexuality / sex education" is not present in the CGPSE. The categories "Educate in equality" and "Affectivity / Pleasure / Tenderness" are present only in two documents, respectively: ELBE and CGPSE; and the "Affectivity / Pleasure / Tenderness" category in CGPSE and COPBE. The remaining categories mark only one of the documents: "Family Diversity" in ELBE; "Sexual diversity / sexual orientation" in CGPSE; and "Sexual Identities" at COPBE.

⁵Approved by Order No. 6944-A / 2018, of July 19, published in Republic Diary No. 138/2018, Series II. They entered into force with Decree-Law no. 55/2018, of July 6, published in Republic Diary 129/2018, Series I.

⁶Approved by Order 6478/2017, July 26, published in Republic Diary 143/2017, Series II.

⁷Approved by Order 9180/2016 of July 19, published in Republic Diary 137, Series II.

⁸Published in 1990 (Order 139/ME/90, of August 16, published in Republic Diary 202, Series II), was revised (4th edition) with the entry into force of the guiding Organization and Management of Basic Education (Decree-Law 6/2001, of January 18, published in the Republic Diary 15/2001, Series IA, Statement of Rectification 4-A/2001, dated February 28, published in Republic Diary 50/2001, Series I-A, and Decree-Law 209/2002, of October 17, published in Republic Diary 240/2002, Series I-A).

It should be noted that the CGPSE document, although recent, does not advocate Education in Sexuality since kindergarten. However, in comparison with the other documents analysed, it stands out for the use of inclusive language.

5. Conclusions

Since kindergarten and primary education teacher training is the responsibility of Higher Education Institutions (HEI), and given the results obtained in this first stage of the study and, it is urgent to ask new questions, namely: 1. Are the teachers scientifically and pedagogically prepared to teach Sexuality Education (SE) in schools?; 2. How do HEIs plan to meet SE training needs? Is the political power conscious of the situation? Will there be a political will to think about SE strategies that involve schools, families and the community?

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PRESERVICE TEACHERS' EXPECTATIONS OF PROFESSIONAL CONVERSATIONS ON PROFESSIONAL EXPERIENCE IN SCHOOLS

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Abstract

Professional experience is one of the most significant learning events in preservice teacher education. The professional conversations that preservice teachers engage in with their supervising teachers while on professional experience have the potential to contribute significantly to preservice teacher learning. This qualitative research explored preservice teachers' expectations of their supervising teachers and of the professional conversations they expected to engage in while on professional experience. The participants in this research were 31 preservice teachers (17 females, 14 males) who were completing their professional experience placement in a large, urban Australian secondary school that has a highly diverse student population. The findings indicated that there was little shared understanding of the purpose and aims of professional experience by the preservice teachers and their supervising teachers. When professional conversations occurred, they focused specifically on the immediate teaching practices of the preservice teacher rather than developing a greater understanding of the broader goals of education. Further, findings revealed that while the preservice teachers were located in a highly diverse learning environment, few professional conversations focused on the diversity and uniqueness of the school context. We suggest greater shared responsibility between supervising teachers and preservice teachers and further training of supervising teachers and preservice teachers in professional dialogues as ways forward.

Keywords: *Professional conversations, preservice teachers, professional experience.*

1. Introduction

For preservice teachers, going out to schools for professional experience is one of the most significant learning events in their teacher training. There has been much written about how professional experience shapes preservice teachers' thinking and beliefs about teaching and their professional identities as teachers (Harlow & Cobb, 2014; Timostuk & Ugaste, 2010). Professional experience affords preservice teachers opportunities to apply the theoretical components of teaching to real world classroom contexts (Buckworth, 2017) under the direct supervision of experienced teachers who provide guidance, feedback and support (Mena, Hennissen & Loughran, 2017). The quality of the professional experience is recognised as the most influential aspect of teacher education programs for preservice teachers (Nielsen et al., 2017). Preservice teacher learning is contingent upon the quality of their interactions and conversations with their supervising teachers during professional experience (Helman, 2006). Professional conversations generally occur as a dyad between the preservice teacher and the supervising teacher who has been assigned to the preservice teacher at the school. These conversations allow preservice teachers opportunities to discuss in situ how teaching works. That is, preservice teachers can observe how their supervising teacher practices teaching and then engage in reflective conversations about what they observed (or understood they observed). It is through professional conversations also that preservice teachers can connect theory learnt in their coursework to actual practice in the classroom.

The role of professional conversations has gained interest in teacher education because of the potential positive impact they can have in strengthening the preservice-supervising teacher relationship. Timperley (2011) defines professional conversations as "the formal and informal dialogue that occurs between education professionals including teachers, mentors, coaches, and school leaders and is focused on educational matters" (p. 6). We extend this concept to include preservice teachers. There are many different kinds of professional conversations between preservice teachers and their supervising teachers. Feedback from supervising teachers offers one form of professional conversation. This type of conversation encourages preservice teachers to reflect on their classroom practices to consider which ones

are working well and which aspects of practice need improvement. Establishing appropriate protocols for this type of dialogue provides a safe space for preservice teachers to engage in professional conversations (Segal, Lefstein, & Vedder-Weiss, 2018). However, not all professional conversations are effective. According to Martinez Agudo (2016) supervising teachers generally lack training about how to provide effective feedback through engagement in professional conversations. While the ideal of professional conversations holds much promise, there is evidence that the majority of professional experiences are completed without preservice teachers engaging in any significant forms of professional conversations with their supervising teachers. The research reported on in this paper used a qualitative approach to explore preservice teachers' expectations of their supervising teachers and of the professional conversations they expected to engage in while on professional experience.

2. The role of supervising teachers and their responsibilities

Differing terms have been used to describe teachers who supervise preservice teachers on professional experience. Similarly, multiple terms such as field experience, practicum and clinical placements have been used to describe professional experience that is classroom-based practice in schools under the supervision of an experienced teacher. Alternate terms for the supervising teacher are cooperating teacher, school associate, sponsor teacher and mentor teacher. Supervising teacher is the term commonly used in Australia for teachers that oversee and support a preservice teacher during placement (Martinez Agudo, 2016; Nielsen et al., 2017). Nielsen et al., (2017) argue that, while "supervising" is an official term that is used widely, it connotes a task orientation whereas "mentoring" indicates a wider scope of activities used to facilitate preservice teacher learning. Further, Le Cornu and Ewing (2008) suggest that the term mentor emphasises more of a two-way collegial relationship which is mutually beneficial for the mentor and the preservice teacher rather than a hierarchical expert-novice one-way view. While we acknowledge the broad range of ways in which experienced teachers work with and support preservice teachers, we use "supervising teacher" in this paper as it is the term used in the context in which this study is situated.

Supervising teachers can instil in preservice teachers a sense of confidence, power and agency (Izadinia, 2015) or conversely, can inhibit the development of teacher identity and voice (Nielsen et al., 2017). One reason for this variance in experience may be due to supervising teachers being underprepared for the role (Nielsen et al., 2017) with few opportunities to engage in professional learning to develop skills and competencies for supervising preservice teachers. A number of authors (such as Hobson et al., 2009) report that teachers tend to model their supervision of preservice teachers on their own past experiences as preservice teachers. Burns, Jacobs and Yendol-Hoppey (2016) suggest that the protocols around supervision of preservice teachers are vaguely defined in manuals or information sheets provided to them by teacher education institutions. Supervising teachers must then make some assumptions about how to work with preservice teachers so that there is a common understanding between them and the preservice teacher as to why the preservice teacher is in the class and what they will do while there. Without clearly defined roles, supervising teachers may rely on their prior knowledge of how to supervise preservice teachers and so, in effect, are developing their own unwritten expectations which preservice teachers must then decipher in order to successfully complete their placement (Buckworth, 2017; Lafferty, 2018). Not surprisingly, if these expectations are not clearly conveyed to the preservice teacher problems may result.

Supervising teachers are expected to establish supportive relationships with the preservice teachers under their care and supervision. However, when supportive preservice teacher-supervising teacher relationships do not emerge, preservice teachers experience reduced opportunities for professional growth. One of the tensions that may arise in these relationships is when there is a mismatch between the beliefs and practices of the preservice teacher and the supervising teacher. While this difference in perspectives may offer up opportunities for rich discussions about teaching practice, some preservice teachers feel it is more judicious to 'bite one's lip and stay quiet rather than voicing their ideas. Taking on this compliant stance tends to encourage preservice teachers to simply replicate existing practices in order to fit into the school and pass their evaluations rather than engaging in critical discussions of professional practices. Rajuan, Beijaard and Verloop (2010) described this process of conforming to the expectations of the supervising teacher rather than exploring new possibilities as a 'passive socialisation into teaching' (p. 217) which allowed for little growth for the preservice teacher.

3. Research methods

The qualitative research reported on in this paper is part of a wider study that was conducted in a large, urban secondary school in eastern Australia. The school has the capacity for a population of 2300 students in Grades 7 to 12. The school has high student diversity with approximately 33% of the students speaking English as an additional language or dialect (EALD). The school commits to hosting several preservice teachers, sometimes as many as 60 at a time, drawing from four different teacher education institutions in the state. Participants in the study were 31 preservice teachers who were undertaking professional experience in the school. Data were collected through focus groups with 5-6 preservice teachers at a time. The data were analysed using content analysis (Mayring 2004) with the researchers initially analyzing their own set of data looking for emerging themes. Following this process, the researcher discussed the emergent themes and then analysed the other researcher's focus group data independently. The researchers then discussed the themes collaboratively referring back to the original data and using quotes from the transcripts to support the themes. These themes were reviewed and refined throughout the process (Schreier, 2014) until agreement was reached on a stable set of categories.

4. Results and discussion

In response to our first research question, what are preservice teachers' expectations of supervising teachers, two themes emerged. First, there was a wide variability in expectations and experience of the preservice teachers. The variation is exemplified in the responses of two preservice teachers. One preservice teacher participant noted that they expected that the supervising teacher would "email me what I'd be teaching and the content and any resources or anything so that I could start planning even before I came. Yeah, that didn't happen" and another noted a similar experience also in that "she [the supervising teacher] didn't know what I was going to be doing or that sort of stuff". However, at the other end of the continuum was the comment that their supervising teacher "was in contact with me really early, before I even came for an induction day" and from another "from the very first week she already told me her expectation with everything laid out". A lack of shared understandings around expectations is of concern as it may result in negative emotional experiences for preservice teachers which, in turn, may lead to negative outcomes (Buckworth, 2017). Our second theme that emerged in response to the first research question was that preservice teachers' expectations of their supervising teachers and professional experience schools may be very different from their lived experiences. For example, one preservice teacher noted that "we were given so many warnings (from uni) ... about prac ... then I came here and I was like, I can't even think of a scenario where anything would go wrong because my teachers are great, and the school support network is fantastic." Other preservice teachers noted also that professional experience "completely exceeded" their expectations.

Our second research question was what are preservice teachers' expectations of professional conversations with supervising teachers. The key theme to emerge from this research question was that the main focus of professional conversations between the preservice teachers and their supervising teachers was on quick fixes to resolve immediate classroom issues rather than on deeper discussions around broader views or perspectives of education. One preservice teacher acknowledged that the most powerful conversations they had with their supervising teacher were "a lot of feedback conversations" as it "means I can identify what's going wrong with what I can change", the focus remained on more technical aspects of classroom practice based around behavioral skills and a competency-based approach rather than a critical inquiry approach that helps teachers to become critical, reflective agents of change (Calderhead & Shorrock, 2003). While it appeared that the preservice teachers received large volumes of feedback (such as "about 800 words of feedback each on our first lesson") the focus of the feedback was "a lot of technical talk". This finding aligns with that of Hennissen, Crasborn, Brouwer, Korthagen & Bergen, (2008) who found that mentoring conversations with preservice teachers were mainly around instructional matters and organisation, learners and the class and subject matter. Interestingly, while the context for our study was a secondary school with the preservice teachers seen as subject experts in their fields, it appeared that few, if any, professional conversations of subject matter occurred between the preservice teachers and their supervising teachers.

Other professional conversations such as "just general checkins" were appreciated by preservice teachers. While it is important for preservice teachers to feel supported, it appeared that many of the professional conversations did not reach beyond support to more critical discussion of practice. One interesting finding to emerge from the study also was related to the pairing of the preservice teacher with the supervising teacher. While the university attempts to ensure that preservice teachers are supervised by experienced teachers on their professional experience placements, several preservice teachers noted a preference for having supervising teachers with less experience as one noted it "was helpful to have a

teacher who's not too far out of university because she more understands how I'm feeling." There was a perception that supervising teachers who had just a few years of teaching experience were "quite empathetic and understood where we were coming from". This sentiment was expressed also by other preservice teachers in our study. It may be that having a supervising teacher closer in experience to the preservice teacher may facilitate more two-way collegial relationships (LeCornu & Ewing, 2008) than a hierarchical expert-novice view.

5. Implications

From our data, it appears that there was a high degree of variability between preservice teachers' expectations and lived experiences of their interactions with their supervising teachers. While it is acknowledged that this was a small scale study conducted at one school site, and our findings are not generalisable, our data adds to the body of research around professional conversations between preservice teachers and supervising teachers. Our findings, at least, suggest that professional conversations may be falling short in terms of engaging in critical rigorous discussions of practice. Instead, it appears that professional conversations relate more to immediate issues of practice rather than more sophisticated, critical approach focused on inquiry into practice. The findings of our study have implications for teacher education, preservice teachers and supervising teachers and professional experience contexts. We suggest that preservice teachers need to be more proactive and informed in their engagements with their supervising teachers and that preservice teachers may need to drive professional conversations towards a more critical inquiry approach. It appears also from our study that supervising teachers and preservice teachers alike need training in how to engage in richer professional conversations that view schools as sites of social reform. Certainly, this area of research requires further investigation.

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DIGITAL LITERACY OF PRIMARY EDUCATION TEACHERS IN THE AREA OF DIGITAL SAFETY

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Abstract

Digital Literacy (DL) is one of the key competencies modern teachers should have. Regardless of the stage of education, they should be skilled in using modern ICT solutions. Fluent use of digital media is one of the DL components – as much important as the ability to understand and anticipate online threats. DL of teachers determines not only their own safety but also the safety of children in elementary education. The paper sets out to address the following question: What is the level of digital literacy regarding e-threats among primary school teachers? The answer was given based on a competence tests and a diagnostic survey results. The research was conducted among 222 teachers in Poland and was commissioned by the Ministry of National Education (project executor: Cities on the Internet Association Tarnów and Navigo Wrocław). It is the first research based on a real measurement of DL in the following areas: ergonomics of using ICT, reliable evaluation of online information, influence of advertising on children, relationships with other people through the Internet, setting logins and passwords, and malware protection. The conclusion are surprising: teachers have insufficient knowledge regarding protection of children against e-communication threats but their competencies regarding malware protection are relatively high. Particular support in strengthening DL should be provided to trainees, that is, teacher who begin their professional career.

Keywords: *Digital literacy, teachers, primary education, safety, internet.*

1. Introduction – the need to analyze digital literacy in the light of digital safety

Internet has become the key element supporting different areas of our daily functioning. Fluent navigating through new media requires proper competencies. This type of skills is called digital literacy (DL). With the popularization of the Internet and, in consequence, networked services, DL has become as crucial as reading, writing, numeration, fluency in foreign and native languages, team work and entrepreneurship. However, we need to point out that as a whole, DL involves not only technical abilities, but also ability to anticipate threats related to the online services (Tomczyk, 2008).

Different risks, both at individual and social level, like frauds, fake news, addictions, cyberbullying or exposure to harmful content has become the challenge for the information society. There are groups which are particularly susceptible to the dangers of the digital world. An important strategic element in fighting these threats is media education focused on improving the DL level. Over the years, we can notice the great increase in the number of research on the digital threats among children and youth, and proposed solutions to raise the level of digital safety among students (Lee, 2018). DL are more and more often mentioned, already at the pre-school educational level (Tecce DeCarlo et al., 2018). Nevertheless, the holistic approach to digital safety requires analyses of the family (Tomczyk, 2018) and school environment. Parents are the first adults responsible for the digital safety of the youngest users. They do it by modelling proper behaviours and introducing adequate media education and socialisation (Creer, 2018). These activities are then complemented by teachers. However, effective media education requires competent teachers who are prepared to implement adequate measures to prevent the present digital threats (Stośić, Stośić, 2015; Del Rey et al., 2015). This prevention, based on the formal education, begins already at the early education stage. It is necessary as the age of the first contact with the new media decreases systematically and home environments are saturated with devices connected to the Internet.

2. Methods

The objective of the study was to present knowledge and skills that constitute the digital literacy of teachers in grades 1-3 (integrated primary education, first education cycle) regarding digital safety. The research fit into the risk paradigm in media pedagogy in Poland, that is, they focus on analyzing the positive influence of media (e.g. increased effectiveness of learning and teaching) but also the negative consequences connected with protecting children from media-related risks.

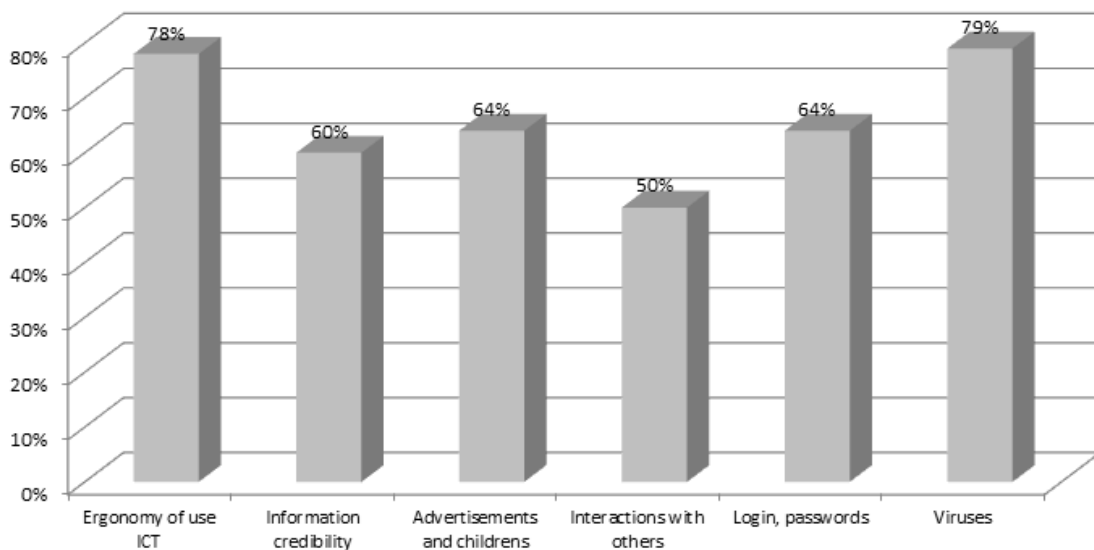
The study was conducted in a group of 222 teachers in Poland, in the 2nd half of 2016. The sample included primary school teachers – first education cycle (integrated primary education). The sampling was carried out by the external agency NAVIGO, commissioned by the Cities on the Internet Association (Stowarzyszenie Miasta w Internecie, SMWI) from Tarnow (Tomczyk, Srokowski, Wąsiński, 2016). The research was financed by the Polish Ministry of National Education within the program Bezpieczna+ (Safety+). Each teacher filled in the knowledge and competence test which measured their level of DL in the following areas: ergonomics of using the digital tools, assessment of credibility of online information, influence of advertisements on children safety, threats resulting from interactions with other Internet users, ability to secure logins and passwords and safe logging, and protection against viruses. Each of the above areas was measured using 3 testing questions (18 questions total). The presented results are innovative because the test measured the real level of knowledge and skills, whereas previous analyses were based on respondents' declarations. The knowledge test (up to 100% correct answers possible) was supplemented with the diagnostic survey measuring the attitudes towards the new media and showing the socio-demographic characteristics of the sample (independent variables). The study was conducted compliant to the principles of social research ethics, were anonymous and voluntary.

There were 96.44% (N=217) women and 3.56% (N=8) men — teachers in the first education cycle. The vast majority of the respondents were females because Polish education system is dominated by women, especially at the primary and pre-school level. The most respondents were teaching in village schools (50.2%), then in: town with population up to 50,000 (21.3%), city with more than 200,000 residents (12.4%), city with population of 50-100,000 (10.7%), city with population of 100-200,000 (5.3%). The respondents' professional experience varied — the average number of years at work was 20.7 (SD=10.88), median 24. The average age of the surveyed teachers was 43.95 (SD=10.31) and is very similar to the data regarding the whole education industry in Poland.

3. Results

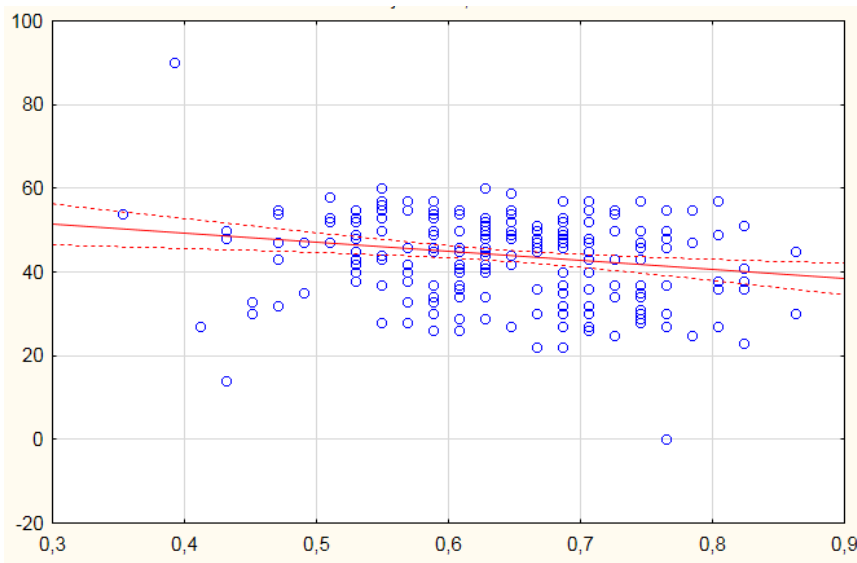
The interviewed pre-school teachers show diverse levels of knowledge and skills in the area of digital safety. The strongest DL components are: ergonomics of using the new media and protection against malware, whereas the weakest element is protection against unsafe online interactions, assessment of credibility of online information and influence of online advertisements on children. The technical aspects of DL are slightly more advanced than the social aspects of digital media influence. Figure 1 presents the percentage distribution of the competence test results.

Figure 1. Percentage distribution of average correct answers related to 6 areas of digital safety.



The diverse results are determined by several factors. For example, the higher results were obtained by: men $F(1, 223)=4.0959, p=.04418$, teachers from school where digital safety procedures have been introduced $F(2, 222)=4.9239, p=.00808$, respondents declaring there has been a case of violation of the digital safety in their school $F(2, 222)=4.2467, p=.01549$, teachers who positively evaluate the possibilities of using ICT in education $F(4, 220)=3.3142, p=.01162$, teachers who highly evaluate their DL level $F(4, 220)=3.5156, p=.00834$. The established rules of using the new media in a classroom and the frequency of classes addressing the problem of e-threats are not related to the competence test results. We also noticed that the older respondents, the less knowledge they have about the digital threats ($r^2=-.2040, p<0.002$) – Fig. 2. In addition, the more years of professional experience, the lower results of the competency test ($r^2=-.109, p<0.1$), however this correlation is not statistically significant.

Figure 2. Relation between age (x) and competence test results (y).



The comparison of the areas of the digital safety is also interesting. Knowledge in one area does not translate directly into the expertise in another DL areas. There is one exception: correlations regarding the soft skills like ability to recognise online advertisements and their impact on children and understanding the threats resulting from online interactions (in particular, with strangers). We also noticed that the high level of technical knowledge about protecting the digital devices against, for example, viruses, does not determine the knowledge and skills in the areas of social aspects of the e-threats. The detailed relations are presented in Table 1.

Table 1. Relationship between the DL components.

	Ergonomy of use ICT	Information credibility	Advertisements	Interactions with others	Viruses
Information credibility	,0905	1,0000			
Advertisements	,1427*	,1564**	1,0000		
Interactions with others	,1346*	,0588	,2640***	1,0000	
Viruses	-,0008	,0812	,0648	,2262**	1,0000

* <0.05 , ** <0.001 , *** <0.0001

4. Discussion

DL has become one of the key competencies for modern people. In the age of the development of digital services, the problem of digital safety becomes particularly important (Pyżalski, 2012). Skills and knowledge related to the technical securing the new media and understanding of the risk mechanisms in the digital world are the key element of DL (Kopecky et al., 2015). The scale of e-threats among the youngest Internet users has increased visibly during the recent years (Kopecký et al. 2015). The primary

responsibility for the protection against risky behaviours and situations belongs to the family members and then professionally equipped teaching staff (Frانيا, 2014). One of the important factors improving the digital safety in schools is the high DL level among teachers, developed through their formal education (university studies), non-formal (trainings) and incidental (self-education) (Tureckiová, Veteška, 2011; Stosic, Velickovic, 2013).

Based on the data collected, we noticed the diverse level of knowledge, skills and basics regarding the digital safety. The weakest areas: recognizing false and true information and understanding the mechanisms of risky online interactions are the areas which require particular improvement (Sztokowski, 2010). Not only teachers, but also other social and professional groups are at risk of disinformation. Minimization of hoax is becoming the common challenge at the present stage of information society development (Bajarin, 2018; Ravitch, 2014). An example which can confirm the above statement is the panic stirred by media and misinformation among the pedagogues regarding the online blue whale challenge (Yilmaz, Candan, 2018; Irina et al., 2017). Information about this non-existing game has become an example of media disinformation — shared with noble intent, which affected mostly pre-school teachers.

Our data show another important aspect of DL. This new type of literacy is heterogeneous and consists of many inter-related areas of knowledge and skills. DL is a hybrid of technical skills and knowledge of the social consequences of new media influence (Ziemba, 2014). In addition, both technical abilities and knowledge in the area of the digital safety must be constantly updated due to the dynamic nature of the online reality.

5. Conclusions

Digital safety of children and youth has become one of the research priorities in media pedagogy and school practice (Potyrała, 2017). Based on the selected risk paradigm connected with the noticeable growth of the scope of e-threats, the problem of adequate DL is one of the significant factors which protect against the threats of the digital world. The priority of eliminating the e-threats is visible in the number of studies and publications regarding online threats (the scientific aspect) as well as the vast offer of trainings addressed to teachers (preventive aspect). The analysis of DL in the context of primary education becomes particularly important when we consider the fact that teachers and parents are the ones who bear the main responsibility for modelling the habits of safe media use among the young users.

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AI CLASSROOM ANALYSIS SYSTEM FOR LANGUAGE TEACHING DEVELOPMENT

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Abstract

One of the highly validated language classroom observation methods is Communicative Orientation of Language Teaching initiated by N. Spada and M. Fröhlich. This method, however, is not widely used by language teachers because of its time-consuming coding procedures. To overcome this shortcoming, the authors developed a new portable language classroom analysis tool named Mobile COLT and have started to plan its automatic version. Mobile COLT facilitates real-time class analysis using a Windows tablet. Since it can quantitatively display the features of the class, Mobile COLT can be an innovative tool for language teacher development. Its manual version has been already constructed, and the research to examine its effectiveness has been conducted in primary and secondary schools. This paper expounds the functions of Mobile COLT, the application in classroom practices, and the development of the automatic version of Mobile COLT.

Keywords: *AI, language teacher development, automatic classroom analysis, COLT.*

1. Introduction

Second language class observation studies were started to examine the features of language classes, focusing on not only learners but also teachers, and to investigate how their actual classes reflected SLA theories and teaching methodological theories. Since the late 19th century, various observation schemes have been invented and they have been used in numerous language classes. In 1995, after going through a period of trial and error, the scheme known as COLT (Communicative Orientation of Language Teaching) was introduced by N. Spada and M. Fröhlich. However, there has been a barrier to the widespread use of COLT by instructors and teachers. This barrier is the time-consuming process of segmenting classes into several different activities and episodes, then coding their features by rewinding a video clip again and again, and finally calculating the rates of features coded. In the early 21st century, Web 2.0 technology has enabled us to interact with web pages, making it possible to conduct distance online teaching and learning in collaborative modes on a common virtual platform. Using this technology, the authors of this article expected that the barrier of using COLT would be overcome and it would be possible to provide researchers, instructors and teachers with an innovative, handy tool for assessing language classes. Thus the development of a new video-on-demand platform equipped with class analysis function was started in 2012. It was completed in the spring of 2014. Moreover, based on similar technology, a portable class analysis system was developed together with a simplified version of COLT coding system. It was named Mobile COLT and this newly developed system was expected to be effective in language teacher development. Studies were conducted in primary and secondary schools to confirm its effectiveness. Then, in 2018, the authors started to work on the automation of Mobile COLT to facilitate recording and the process of COLT analyzation. This newly designed system will enable language teachers to reflect on their own practices without the help of observers or coders. This paper expounds the development of the systems with its theoretical background, and its unique features.

2. Background

2.1. COLT

Interaction analysis of second language classes has been conducted for more than a half century. The Flanders System, the Jarvis System, and the Stirling Project System were developed from 1967 to 1981, and based on the results of such research, Fujimori (1990) proposed his original observation system

containing analysis units such as Act, Move, Exchange and categories such as Speaking, Content & Topic. His method was to analyze a class into segments and categorize them according to their features. COLT observation scheme proposed by N. Spada and M. Fröhlich adopted a similar method, with a more theoretically reliable background. They developed it to examine if a language class reflects the Communicative Language Teaching (CLT) theories. COLT consists of two parts: Part A for quantitative analysis and Part B for qualitative analysis (Spada & Fröhlich, 1995). Part A has five categories or features: Participant Organization, Content, Content Control, Student Modality, and Materials, and each category has several subcategories, for example, Listening, Speaking, Reading, Writing, Others for Student Modality (language skills), according to which each segment of a class called activity and episode is identified and coded. Table 1 is the coding format for the original COLT Part A. In this scheme, classes containing Group Work, activities with more meaning-focused Content (Management and Message), Student Control, and Extended (discourse) Material are considered more communicative.

Table 1. COLT Part A coding scheme.

PARTICIPANT ORGANIZATION				CONTENT				CONTENT CONTROL		STUDENT MODALITY				MATERIALS																
Class		Group		Individual		Management		Language		Other topics						Type		Source												
T↔S/C	S↔S/C	Choral	Same Task	Different task	Same Task	Different task	Procedure	Discipline	Form	Function	Discourse	Sociolinguistic	Narrow	Broad	Teacher/Text	Teacher/Text/Stud.	Student	Listening	Speaking	Reading	Writing	Others	Minimal Text	Extended Text	Audio	Vidual	L2-NNS	L2NS	Ls-NSA	Student-made

After this scheme was invented, a considerable number of studies focusing on CLT have utilized it and attempted to examine its usefulness and validity. It has been confirmed that COLT can be used as a tool for clarifying language class features; such as the change of activity contents in longitudinal studies (Sugino, Koga, & Kawashima, 2004), the occurrence of negotiation of meaning and corrective feedback (Panova & Lyster, 2002; Ahlem & Spada, 2006), and the efficiency of L2 use (Yamada, 1996).

2.2. Lesson studies

“Lesson Study” is defined as studies of actually conducted school classes. The typical type of lesson study at school consists of a demonstration class given by a teacher followed by a meeting of reflection on the performed lesson by observer teachers. The term lesson study was first used in 1999 by Makoto Yoshida in his doctoral dissertation. (cited in Takahashi & Yoshida, 2004). The origins of lesson study can be traced back to the early 1900s’ when study meetings about new teaching methods took place in attached schools and private schools (Nakatome, 1984). Lesson study was established as a strategy of in-service training by the middle of the 1960s (Fernandez & Yoshida, 2004). It was first used by Mathematics teachers.

Lesson Study has been introduced in many different countries such as in the US, the Netherlands, South Africa, and Bangladesh. Although the English proficiency of Japanese young people is not sufficiently high, the tradition of lesson studies has also been passed on to Japanese English teachers, and English lessons at school have been studied in many different ways. However, the lesson studies which have been conducted to date, including those in mathematics and science, generally take a qualitative approach based on impressive discussions among participants. They are not based on objective quantitative data, and therefore they cannot provide teachers with clear and reliable guidelines to improve their teaching.

As mentioned above, COLT can provide language teachers with quantitative data of the conducted class. If COLT can be used in language classrooms and the analysis results can be shown without delay after the class is over, it would be a powerful tool to add an objective perspective to lesson studies, which have been rather subjective in nature, and this integration of objective and subjective perspectives might have the potential to help reform language classes drastically.

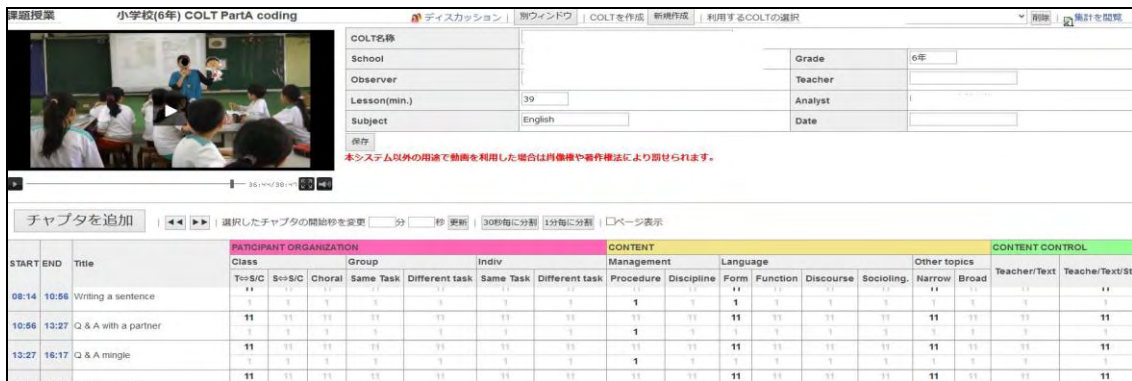
3. Development of CollaVOD

Based on the COLT scheme, the authors started to develop a VOD (Video-on-Demand) system equipped with functions needed to analyze a class. It was named CollaVOD. Two major developments have been realized. One was an asynchronous communication tool to discuss a filmed class collaboratively from different locations, and another was a class analysis tool devised to code interactions between a teacher/student(s) and student(s) occurring in a class according to COLT coding scheme. When this tool is used while a course creator makes online VOD material in a virtual classroom, users can use

COLT to analyze the class when they log in to the class. They first decide where to start and end one episode of an activity, for example, a greeting at the start of the lesson lasting two minutes. Then they start coding the episode by checking proper categories of COLT that correspond to the features of the episode (Figure 1). The process is repeated until all the coding is completed, in other words, until the class time ends. This tool was also equipped with the function of automatic calculation of distributional rates within and across COLT categories. The coding procedure itself is the same as coding on a paper with a pen, but there are quite a few advantages of using this system as follows:

1. Coding work can be done collaboratively from distant locations either asynchronously or synchronously.
2. Teachers can check the features of their classes by observing graphical images and their Global Scores, which is an index of communicativeness of a language class, soon after the coding is completed.
3. It has the function of creating new COLT categories and revising the coding system with high flexibility, which enables researchers to explore and propose a different class assessment scheme.

Figure 1. Procedure of Manual COLT Coding on CollaVOD.



4. Development of mobile COLT

After confirming the efficiency of CollaVOD, the authors started to develop the mobile version of COLT analysis system. This version was planned and constructed in a way that would allow a language class observer to carry it into the class and analyze the class while he/she is observing and recording it. The development was completed in 2016 and was named Mobile COLT. Mobile COLT uses categories revised from those of the original COLT of Spada and Fröhlich (1995). Table 2 shows the newly adapted categories. With these new categories, observers can code the segments of a class far more easily and quickly in real time.

Mobile COLT can be installed into a Windows PC or Tablet and it functions on Google Chrome. When the webpage to start this application is opened, users are requested to put in the names of the coder and the target class before logging in. After logging in, they can choose whether or not they will use the recording function to start coding.

Table 2. Simplified coding categories of Mobile COLT.

LANGUAGE		PARTICIPANT ORGANIZATION			CONTENT			CONTENT CONTROL		STUDENT MODALITY		MAT-TEXT	MAT-AUDIO	MAT-VISUAL	MAT-SOURCE					
L1	L2	Whole		Meaning			Teacher/Text				Text		Media		Source					
		Class	Indiv	Group	Management	Message	Form	Teacher/Text	Student	Listening	Speaking	Reading	Writing	Minimal Text	Extended Text	Audio	Visual	L2-NNS	L2-NSA	Student-made
		11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11

Mobile COLT has the following distinctive features.

1. Users only need one tablet PC installed with Mobile COLT in order to record and code a class.
2. The result of the coding is instantly displayed at the end of a lesson.
3. The coding results can be revised even after the coding is completed.
4. More than one observer can use the coding application if their PCs are connected by Wi-Fi.

5. Implementation of lesson study with the use of mobile COLT

Lesson study using Mobile COLT was started for teacher development in different levels of schools. The authors visited language classes of these schools five times in the year of 2016 and 2017 to observe and code the classes, and gave the teachers feedback as hints for the improvement based on the COLT analysis results. Table 3, 4, and figure 2 show the coding results of the visited classes. These results indicate that the degree of teaching improvement vary with different levels of school and teachers need to be informed of detailed effective teaching methods to implement the provided feedback in their classroom practices.

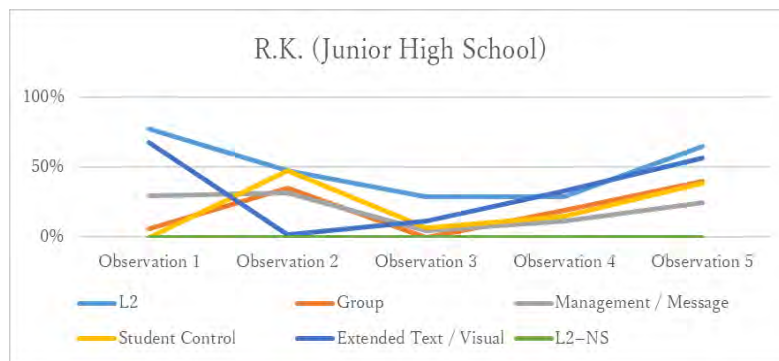
Table 3. Usage rate of L2(English).

	1st Clas:	2nd Clas:	3rd Clas:	4th Clas:	5th Clas:
Elementary	67%	47%	79%	46%	68%
Junior High	78%	48%	29%	29%	65%
High	87%	55%	89%	93%	

Table 4. Usage rate of message-focused activities.

	1st Clas:	2nd Clas:	3rd Clas:	4th Clas:	5th Clas:
Elementary	29%	45%	71%	29%	58%
Junior High	47%	94%	9%	21%	48%
High	52%	55%	64%	51%	

Figure 2. Chang in teaching style of a junior high school teacher in a year.



6. Automation of mobile COLT

When Mobile COLT is used in a classroom, a coder, who is well-informed on language teaching and COLT coding method, needs to accompany the teacher in the classroom. S/he helps the teacher with the COLT analysis by working on segmenting and coding the activities of a class while carefully observing them. This can only be done by trained coders, and it is one of the obstacles to diffusing the use of Mobile COLT among language teachers. Thus, in 2018, the authors have set out to develop a new version of Mobile COLT. It is designed to code a language class automatically without help of a coder. The automation process can be realized through the three steps. The first step is to transcribe the teacher's utterances in class using the latest Speech-to-Text technology. The second step is to extract key phrases like "Talk in pairs", "Read aloud", "Repeat after me", etc. from these transcribed utterances, and collate the combination of these phrases with the information on coding patterns stored beforehand in the server. The last step is to decide the length of the activity based on the information gained from the previous two steps and to confirm the validity of coding work considering the relatedness to the coded activities that AI has already learned. The Implementation of this automatic version of COLT will make a great contribution to language teacher development.

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THE INFLUENCE OF DIFFERENTIATED ASSIGNMENTS (SCAFFOLDING METHODS) ON FIRST-YEAR STUDENTS-TEACHERS' ACADEMIC PROGRESS

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Abstract

The aim of this study was to determine the influence of differentiated assignments, using scaffolding methods, on the possibility of improving first-year student teachers' academic progress in a South African university. Research participants ($n=296$) were divided into two groups, Group A ($n=136$) and Group B ($n=160$), who were engaged in this study during the first semesters of their courses in the years: 2012 (group A) and 2013 (Group B). Only Group B was supported with differentiated assignments that included scaffolding methods. The participants of both groups completed two assignments and a test in the first semester. Results were recorded and compared to formulate findings and recommendations. The results presented in this article will assist lecturers in evaluating differentiated, scaffolding activities, that could be used to support first-year students who are encountering various learning barriers in higher education. These extra scaffolding methods showed to contribute to the academic success of first-year student teachers.

Keywords: *Differentiated, scaffold, barriers, language, student teachers, academic progress.*

1. Introduction

Despite the inclusion of the Bill of Rights in the Constitution of the Republic of South Africa, Act 108 of 1996 (RSA, 1996), which guaranteed educational opportunities for all students with all abilities, cultures, races, languages, infectious diseases, genders and religions, this has not successfully been implemented in educational institutions. The majority of the South African first-year students enter higher education with barriers such as a lack of funds to purchase study material (causing anxiety and stress), change of living environment from a rural to an urban context, and language barriers, to mention only a few (Steyn & Kamper, 2011).

The academic language that is used in lecture halls is often students' second language. Coupled with diverse cultural backgrounds, this could negatively influence their learning approach, as students may not be able to interpret new terminology correctly (Barlow, 2002). Dale and Cuevas (1992) highlight that terminology is closely connected to content, and hence the students' levels of language proficiency can influence their academic success. The reason being that students may find it difficult to grasp the meaning of questions in summative assessment, while constructive feedback on formative assessment could be interpreted incorrectly (De Vito, 2000, p. 170).

Research by Okoro (2000) and Paul and Elder (2008, p. 34) indicate that students cannot successfully progress in tertiary institutions if they are unable to communicate effectively in English and apply critical thinking skills in learning activities. If students find it difficult to cope with English as a second language, it may cause them to eventually fall behind or drop out from university (Oluwole, 2008, p. 41).

Apart from the barriers listed above, studies by Barnes and Piland (2011, p. 4) show that factors such as poor time management skills, the fast pace of the teaching in classes, large class sizes, the large volume of content covered in every class, insufficient face-time with lecturers, family responsibilities, insufficient study skills, and a lack of self-discipline and motivation could also be considered as barriers that could influence academic success. In addition, Steyn and Kamper (2011) indicate that student equity cannot be achieved solely by the allocation of bursaries to students from diverse socioeconomic contexts, courses should also include supportive teaching methods to develop students' potential. Therefore, academic support needs to be revised and adjusted to students' needs.

Vacca (2008, p. 23) postulate that intervention strategies (scaffolding methods) to assist students can support them to achieve successful academic results in higher education. Scaffolding is an effective

strategy by which a competent person (adult or a peer) assists students to execute an assignment beyond their existing abilities (Hammond, 2002, p. 23). Assignments and course material can be designed in a manner that will enable students to solve problems, achieve the lesson goal and complete the assignment successfully with the support of the lecturer (Daniels, 2001, p. 61). Barnes and Piland (2011, p. 3) are of the opinion that a pre-orientation programme for first-year students can be helpful to teach them study and time management skills, developing supportive mentor and peer relationships, and getting acquainted with the college campus facilities.

In line with the various barriers students encounter at tertiary level, I adopted an inclusive mind- set in this study to accommodate students' learning needs. To support students in achieving academic success, I employed differentiated assignments consisting of scaffolding methods, not only to assist students with language skills but also to develop their critical thinking skills.

The findings of this article are based on the information gained through quantitative data. First-year students' test results of 2012 (no scaffolding methods were used) and 2013 (differentiated assignments were employed) were recorded and compared to determine the effectiveness of scaffolding methods in the form of, differentiated assignments on the academic progress of students.

2. The importance of scaffolding methods

The study was guided by the social theories of Vygotsky and Bourdieu. Vygotsky's socio-cultural theory (1978, p. 79) advocates that support (scaffolding) from an educated person to a novice is important to acquire knowledge successfully. According to this theory, meaningful concepts, cognitive growth and learning emerge from social interaction between students on an interpersonal level. This social interaction enables students to construct new knowledge from their understanding by progressing from what they already know (actual development) to new knowledge (potential development) (Vygotsky, 1978, p. 79). This is in line with Bourdieu's social capital theory that student teachers should interact with their peers in class, share ideas and discourse in order to communicate effectively in a language and acquire knowledge and skills that will support (scaffold) them to progress academically (Bourdieu & Coleman, 1991, p. 31). Studies by Wertsch (1991, p. 7) and Field (2004, p.7) show that the support of an educated person is needed to assist a novice to solve problems while, verbal communication between students is important to clarify new concepts and share ideas.

In this study, scaffolding (extra-support) can be defined as an educated person (the lecturer) that supports a developing adult (student-teacher) by creating differentiated assignments according to students' learning styles. Differentiated activities are created to address the learning needs of students by changing and modifying assignments, assessment, teaching and learning methods in the class (Tomlinson, 2003). Chapman and King (2005, p. 45) emphasise that before a lecturer can create differentiated assignments, baseline and diagnostic assessment methods should be used to determine major learning barriers in class. These assessment methods can include: portfolios, quizzes, self-reflections, class discussions and others to establish students' weaknesses and strengths (Tomlinson, 2003).

Various scaffolding methods can be combined with differentiated activities to assist second- language English students to achieve academic success. Differentiated assignments are developed to enable all students to progress academically regardless of their various learning styles and barriers. Differentiated activities can be created in the following ways: using interesting topics, modifying the curriculum, using flexible and a variety of scaffolded learners-centred teaching methods and strategies, employing differentiated assessment procedures, creating a supportive learning environment, and teaching strategies, using a variety of equipment, resources and media, and allocating extra time to complete assignments (De Jager, 2013, p. 80).

Visual scaffolding is emphasised by various research studies as an important method for assisting students to grasp new concepts. Oluwole (2008, p. 41) claims that if sufficient visual images were included in teaching and learning activities, students would become visual thinkers and retain information for a longer period. When solving a problem and thinking critically, students base their primary thoughts on visual images rather than words (Cifuentes & Hsieh, 2004, p. 109). Examples of visual scaffolding methods include: pictures, videos, 3D animation, photographs, graphical presentations, [graphs, maps, tables] and others.

The value of constructing and interpreting visual presentations in the form of drawings is underestimated in students' support. Drawings can be used as a "thinking activity" to clarify the facts and theories of objects and natural phenomena; to express one's understanding of a concept; to generate new ideas; to reflect; and to facilitate problem solving (Oluwole, 2008, p. 41).

The rationale for this study is that the findings will contribute to the field of scaffolding instruction by assisting lecturers to adopt an inclusive mind set when creating differentiated activities and modifying lecturing methods according to students' needs.

3. Research method and design

First-year student teachers of both academic years 2012 ($n=136$) and 2013 ($n=160$) of a South African University participated in this study. The research was based on quantitative data collected in the first semesters of both 2012 and 2013. The data was supported and guided by theoretical findings in the literature study to determine the effect of differentiated activities (scaffolding methods) on first-year student teachers' academic progress. In this study differentiated learning activities consisting of various scaffolding methods were employed to support students' needs.

The research methodology was based on the research aims, namely:

- to determine whether scaffolding methods used in differentiated assignments could improve students' academic progress; and
- to establish whether scaffolding methods could contribute to their ability to develop English language and critical thinking skills.

To determine whether differentiated assignments (scaffolding) could improve first-year students' academic progress, the academic results of two groups', Group A (academic year 2012) and Group B's (2013), were recorded and compared with one another.

The research was executed during the first semester of each academic year. The same two assignments, based on solutions to challenges in education, were completed by Groups A and B in the subject "General Subject Didactics". However, two differentiated assignments consisting of scaffolding methods were constructed for Group B only.

4. Differentiated assignments

During the first semester, the lecturer used diagnostic, formal and informal assessment techniques to identify students' major learning barriers. The main barriers diagnosed were insufficient English language skills, lack of confidence to communicate in class discussions, the inability to question unclear concepts, lack of time management and critically thinking skills. To encourage active class participation that could affect their academic progress, *three* differentiated assignments (consisting of various scaffolding methods) for each of the two assessment opportunities were designed to accommodate the different learning styles of students. Once the students' had selected an assignment consistent with their learning preference, they were grouped according to their choices and a handout consisting of the extra support (visuals, text, graphs, etc.) was provided to enable them to complete the assignment. Students could choose which differentiated assignment they wanted to complete. Differentiated assignment examples were as follows:

- Students had to reflect on visual images provided and summarise in English writing, the new concepts deriving from the images and how these concepts could be applied in real-life situations to solve problems.
- Students had to draw pictures on how they would solve a problem (if they lacked English writing skills) which was constructed from real-life examples, they had to identify key phrases and were challenged to create their own problems in a written essay on the topic.
- Graphic presentations (tables, graphs, etc.) were used to interpret new data and a short summary of observation, interpretation and problem solving followed, after which a short class activity in writing was created where they had to review and criticise a peer's work. After the completion of each assignment, all students were engaged in active, small-group class discussions explaining new concepts to one another and finally presenting their findings to the rest of the class. The two assignments and the test for the first semester of both groups were assessed, recorded and the averages compared.

5. Data analysis and discussion

The two assignments for both Groups A and B were constructed on the same problem solving questions and prescribed content. The first assignment results of both Groups A and B were rather disappointing; Group A averaged 48% and Group B, 52%. The possible reason for the poor results could be that students were not proficient enough in English to understand new concepts.

Other reasons might be that students were not orientated to learn in large classes (Group A=136 and Group B =160) and might have suffered from a lack of funds to purchase study material. Steyn and Kamper (2011) point out that a financial barrier can cause anxiety and stress in students and contribute to poor academic performance. In addition, the same authors mention that student equity cannot be achieved by allocating study bursaries to students from diverse socioeconomic contexts, consequently courses should include supportive teaching methods to develop students' potential. It follows that academic support needs to be revised and adjusted to students' needs. In this study, it was also found that 80% of all

participants were from rural areas and had to adjust to a new urbanised learning environment that may have contributed to the low scores in the first assignment. Although the differentiated activities did not contribute to the results the researcher had hoped for in the first assignment, there was an improvement of 4% in Group B in 2013. The improvement could be connected to the extra support (scaffolding) students received in the form of differentiated activities.

The differentiated activities, students selected were as follows: only five students chose the option to draw their findings of the stated problem, 12 selected the interpretation of graphs, and 143 chose visual images. It was significant that students who chose assignments supported with images received higher scores than those who chose the interpretation of graphs and the drawing of findings. The reason might be that students were unable to apply drawing and critical thinking skills to interpreting data, while the objectives of the assignment might not have been clear to students. With the second assignment, the average of Group A declined to 2% (46%) and Group B only increased by 3% (55%). The low scores could most probably be linked to the short academic semester and the fact that many students had not returned to campus after their practical teaching. The reason might be that many students from other provinces and from low-income families did not have sufficient funding to be transported back timeously from home to campus for the first lecture. Student absenteeism in lectures may have influenced the results. It seems that a follow up study is necessary where I use interviews to find out what exactly the barriers are that students face. It was established again in assignment two, that most of the students ($n=142$) in Group B selected the differentiated assignment with visual images as a scaffold. The reason might be that students were still not confident with the learning of new terminology in a second language and were not able to apply critical thinking skills. Although students were engaged in small-group activities which enabled them to interact and explain unclear concepts in either their mother language or English to one another, students still lacked self-confidence to present their findings to the rest of the class. The reason could be connected to students' low self-esteem in expressing themselves in English as a communication medium. After completing the two assignments, students wrote a test at the end of the first semester. The assessment results of the first test increased from 48% for Group A to 54% for Group B. The low scores of Group A might be related to insufficient support during assignments. Furthermore, previous feedback on assignments which should have been constructive might have been interpreted negatively or incorrectly. Although Group B's test results, averages were 6% higher than that of Group A, students still lack sufficient language, critical thinking, study, and time management skills, despite the scaffolding methods employed. The reason for Group B's higher test results could also be linked to the possibility that students gained more confidence in the course material with the assistance of differentiated assignments (scaffolding methods) and were intrinsically motivated to progress academically.

6. Conclusion and recommendations

In this study, 80% of the students from diverse backgrounds struggled to adjust from a rural to an urban learning environment and to finance their studies. Although a financial barrier can cause anxiety and stress in students and contribute to poor academic performance, supporting students with study bursaries cannot guarantee students' academic success. To assist students whose learning experiences changes from a rural to an urban environment, supportive teaching programmes and methods to develop students' potential and a pre-orientation programme for first-year students could be helpful to acquaint students with available support structures, campus facilities and to develop supportive mentor and peer relationships, while teaching them study and time management skills. In addition, an introduction to the course could commence with a handout to students that consists of a glossary of academic terminology pertaining to the subject. It follows from the above that, academic support needs to be revised and an inclusive approach needs to be adopted to address students' needs in creating differentiated assignments. In such assignments, various scaffolding methods should be employed to assist students to clarify new concepts, support insufficient language skills and enable them to apply critical thinking skills in problem solving. Differentiated assignments could be created as follows: using interesting topics, modifying the curriculum, using flexible and diverse scaffolded learner-centred teaching methods and strategies, employing differentiated assessment procedures, creating a supportive learning environment and teaching strategies, using a variety of equipment, resources and media and allocating extra time to complete assignments. The design of differentiated activities can be created in a way that enables students to solve problems, achieve the lesson goal and complete the assignment successfully with the support of the lecturer. Students with language and critical thinking barriers can achieve higher scores in assignments when concepts are clarified with visual images. The value of visual presentations and interpretations is often underestimated in student support. Visual images included in teaching and learning activities can clarify difficult concepts and encourage students to become visual thinkers. By connecting new concepts

to visual images, information is retained for a longer period. Students with drawing skills can use these skills as a “thinking activity” to clarify the facts and theories of objects and natural phenomena; express their understandings of a concept; generate new ideas; reflect; and facilitate problem solving. Students encountering language barriers tend to solve problems and think critically by projecting their primary thoughts on visual images rather than words. Students therefore choose visual images to learn new terminology and clarify unclear concepts.

It is recommended that lecturers should keep in mind that inadequate language proficiency could prevent students from understanding the meaning of questions in summative assessment. In addition, feedback on assignments that should have been constructive might be interpreted negatively or incorrectly. This can contribute to low scores in test results. In conclusion, differentiated methods have the advantage of assisting students in clarifying unclear concepts and new terminology. Thus, intervention strategies (scaffolding methods) to assist English second-language (ESL) students could support such students to achieve successful academic results at tertiary institutions. Regular reflection on the success of created and differentiated assignments is important for scaffolding students’ study materials.

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UNDERSTANDING WHY SOME FUTURE TEACHERS FIND IT SO DIFFICULT TO FOLLOW WRITTEN INSTRUCTIONS

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Abstract

This study consists of a participatory action research (Brandão & Streck 2006; Thiollent 2006, 2011) based on the Exploratory Practice theory (Allwright 2002, 2003, 2008; Gieve & Miller, 2008); the complexity theory (Morin 2006; 2015; 2017) and reflective teaching (Liberali 2015). It is an attempt to understand the difficulties some of my students, who are (future) teachers, encounter in following simple written instructions. One may argue that the answer is probably related to their habits as “digital natives” (Prensky 2007). In the past, we presented as one of the characteristics of this “connected generation” (Cardoso 2013) the difficulty to concentrate and, therefore, to read long texts. However, when taking exams, these learners fail to follow even very short instructions, such as “write in ink” or “correct the following sentences”. On the other hand, these learners’ success at university depends on these short instructions. Moreover, being these students (future) teachers, we wonder how they will be able to give clear instructions to their own learners.

To try to understand this *puzzle* (Allwright 1991), we have developed this Exploratory Practice project. The idea is not to find a solution to the problem, but to understand and make learners aware of this fact. The study will take about four months and the results will be presented at the END 2019 conference in June.

Another point to be discussed during the presentation is how far can we still consider the differences between the *connected generation* and the other generations, as we have all become in a way or another deeply influenced by modern technology, and in some cases (cultures), even addicted to it.

Keywords: *Reflective teaching, written instructions, connected generation, exploratory practice, complexity theory.*

1. Introduction

As university teachers, we have been experiencing a change in our students’ profile for some time. This new generation born after the 1980’s, sometimes called “digital natives” (Prensky 2007) or, as I prefer to call them, “connected generation” (Cardoso 2013) has not experienced life without computers. Most of these learners cannot imagine their lives without a mobile phone or outside a virtual social network.

In the case of teacher education, it is important to understand how this change will affect the educational process when these learners become the teachers. Besides, I completely agree with Michel Serres (2018, p. 11) when he says that “before teaching anything to anybody, it is necessary at least to know who our students are.”

The motivation to begin this study was the difficulties some of my students, who are (future) teachers, encounter in following simple written instructions. At first, I believed that this difficulty had to do with their lack of concentration and therefore difficulties to read long instructions, but I have noticed that they face this same kind of difficulties when reading very short exercises or exam rubrics.

Therefore, this study consists of a participatory action research (Brandão & Streck 2006; Thiollent 2006, 2011) based on the Exploratory Practice theory (Allwright 2002, 2003, 2008; Given & Miller, 2008); the complexity theory (Morin 2006; 2015; 2017) and reflective teaching (Liberali 2015). It is an attempt to answer the following question: *Why do some future teachers find it so difficult to follow written instructions?*

2. Objectives

The main objective is to better understand these learners reading skills and how they affect the activities which depend on instructions. Another point to be discussed is how far we can still consider the differences between the *connected generation* and the other generations, as we have all become in a way or another deeply influenced by modern technology, and in some cultures (cases), even addicted to it. By developing a collaborative study with other teachers, these future teachers and other learners, they will have the possibility of experiencing the exploratory practice and the participatory action research and hopefully become more critical, collaborative and reflective teachers in the future.

3. Connected generation

In the text “Developing a new generation of connected teachers” (Cardoso 2013), I already mentioned that “it was worthwhile to analyze the characteristics of these new generations”. There was much study on Generation Y learners, but these learners were becoming teachers and probably they would face some problems at work (Cardoso 2013, 2015). One characteristics pointed by the research was that these learners (future teachers) would read less and less well. Nowadays I would change the sentence. I do not believe the quantity, but the quality of the reading that is different. They read a lot what they really like. The fanfiction is a good example. Maybe the problem with written instructions lies exactly in that. Perhaps, they only consider instructions important when they have been unable to do what they were supposed to do. That is, when they feel the importance of the instructions. Another characteristic of these learners is that they are often exposed to visual stimuli, making it more difficult for them to imagine a picture based on a written or oral text. This dependence on visual stimuli may also be responsible for the difficulties following written instructions.

These children inhabit the virtual. The cognitive sciences have shown us that using the Internet, reading or writing messages (with the one’s thumb), or consulting Wikipedia or Facebook does not stimulate the same neurons or the same cortical zones as does the use of a book, a chalkboard or a notebook. They can manipulate several forms of information at the same time, yet they neither understand it, nor integrate it, nor synthesize it as do we, their ancestors. They no longer have the same head.” (Serres 2018, p. 19; Serres 2015)¹

Serres (2018, p. 19) goes deeper saying that they no longer inhabit the same space nor speak the same language. After these affirmations, Serres (2018, p. 25) asks three questions: What to teach? To whom? And how? The problem is that Serres, or at least the translator, uses the term “transmit”, keeping the sense of the idea that teaching is simply the transmission of knowledge. I do not agree with this definition of teaching, but I believe we, as educators, have to get to know these learners better. Besides, this new generation of teachers “will have to deal with teachers, coordinators and principals from other generations (Cardoso 2013, p. 17) so they will have to communicate to work together. Therefore, it is important to understand these learners’ singularities and to make them reflect about the diversity they will face.

4. Complexity theory

The language learning process is complex. There are many factors internal and external to the learners and the teachers that may affect directly or indirectly the process. Ellis (1994 apud Cardoso 2016, p. 40) as for Naiman (1995 apud Cardoso 2016, p. 41) mention individual and social factors, such as the sociolinguistic context, learners’ characteristics (e.g. age, motivation, intelligence, aptitude, etc.), the environment, the teaching and other aspects.

Allwright (2008, p. 13) says that applied linguistic is moving from a more simplistic way of looking at the world, trying to find the best method of language teaching for all learners, all teachers, all the time, towards “a recognition of the essential and irreducible complexity of the phenomenon of classroom language learning and teaching. He adds that

part of this recognition of complexity meant that it was no longer worth looking for general solutions to general problems, because all ‘problems’ are reducible, ultimately, and in practice to ‘local’ ones, and so require ‘local’ solutions, solutions that respect the uniqueness of all human situations, and all humans. (Allwright 2003 apud Allwright 2008, p. 13)

For Morin (2006; 2015; 2017) complexity means that we have to stop considering just to one or another aspect of our lives: local or global, unique or multiplicity, process or product. For him, all the aspects should be considered: *uniduality* (brain, mind and culture; reason, emotion and impulse). Human

¹Translation by Daniel W. Smith from the English version of the book (Serres 2015).

beings are at same time unity and diversity, so we must consider the individual, the society and the species. At the same time, we should respect the diversity, we have to learn how to live together in the social level. Morin (2006) the global as being composed by parts (the relation between the whole and the parts). In this way, the local knowledge is as important as the global one. He also mentions the uncertain knowledge – the more we study about a specific topic, the more we understand that we now less about other areas. Therefore, different experts should work together. We have to consider many aspects of the same problem, to understand how it works. He proposes that instead of teaching content (information), we should teach the understanding of each other, the human condition, the earth identity, and how to confront the uncertainties. Therefore, Morin goes beyond the level of the classroom and believes that the whole earth becomes part of the educational environment. We may think global but act local.

Gieve & Miller (2008, p. 8) also mention the complexity of classroom when mentioning reflective practice and action research to teacher development, by mentioning Breen' article (chapter 10 of the same book).

The potential of both reflective practice and action research to teacher development are examined and their basis in the rationalization of personal experience is questioned in the light of the complexity of classroom life and the limitations of enquiry restricted to teacher's own immediate work. The potential of a collaborative critical reflection approach is outlined, Allwright's proposal for Exploratory practice as a means of understanding the quality life of the classroom... (Gieve & Miller 2008, p.8)

5. Methods

5.1. Research participants and questions

As stated in the title and explained before, the main objective of this exploratory practice project is to try to answer the following *puzzle* (Allwright 1991): Why do some future teachers find it so difficult to follow written instructions?

As mentioned before, the idea is not to find a solution to the problem, but to understand it and to make learners aware of this fact. The first phase of the research will take place in the first semester of 2019, about 100 learners will be invited² to answer the following questions (in class or online):

- (a) Why do you believe some university students find it so hard to follow written instructions?
- (b) Have you ever faced this kind of problem as a teacher or student? If so, what happened?
- (c) Could you mention a situation in which you got into trouble because you failed to follow some instructions? What kind of trouble was it? What did you do? Why didn't you follow the instructions?

They are all university students (undergraduate and post-graduate) from a public university in Rio de Janeiro. At first, we thought about using only the questionnaires, and we expected to receive about 50 questionnaires back. The questionnaires would be analyzed by other teachers and even some students. The idea was to try to find similar answers or some interesting/creative ones. However, in accordance to the Exploratory Practice Theory, we found more interesting, to use a more classroom-centered research. There will be two kinds of activities one to be developed in class and the other online.

In class, the idea is to develop a poster session, in which groups of learners try to answer the question (a) about them, their students or other learners they know. When the posters are ready, they visit their colleagues' posters and compare the answers. Later, we have an open discussion about the *puzzle*. If they allow, this open discussion will be recorded.

For the online version, we will use an online questionnaire, and try to use the forum of a virtual environment for the discussion. In order to make these learners narrate what happened to them, the questions will be open. In this way they will feel more motivated to present reasons and/or tell their stories (narratives).

The study will take about four months (February-May) and the results will be presented at the END 2019 conference in June.

5.2. Research methods: Teachers as researchers

This qualitative research consists of a participatory action research (Brandão & Streck 2006; Thiollent 2006, 2011), but is based on the Exploratory Practice theory (Allwright 2002, 2003, 2008; Gieve & Miller 2008). In common these research methodologies have the view that the *practitioners* as the people who will conduct the most productive research in the field (Allwright 2008, p.15). The study was proposed by a teacher, who and not an external researcher and the participants include her students and other teachers. Thiollent (2011 sees the action research as a way of involving all the educational

²As this is an ongoing research, in this paper, sometimes the future tense or the present perfect will be used.

system (including teachers, coordinators and learners) in the construction or reconstruction of the educational system. These two research methods differ in the fact that action research is generally associated with solution of problems while the Exploratory Practice is more interested in the understanding of the situation, which may be considered more like a *puzzle*.

5.2.1. Participatory action research. This research in the educational environment and has as its main aim to better understand what is going on in this environment. The researcher is not an outsider, but the teacher who invites her students and other colleagues to take part in the research project, not as subjects, but participants.

Thiollent (2006) mentions that participatory action research differs from the conventional research because it consists of “social knowledge with the participation of different actors” (Thiollent 2006, p. 152). Knowledge is not produced to be shared later, but constructed during the learning process.

“The social construction of knowledge presupposes some interaction and some sort of cooperation between different actors. This participation may be implicit or explicit” (Thiollent 2006, p. 155). However, it is not enough to be based on interactive practice, the methodology needs to adopt other dimensions, in particular, has to be critical, reflective and emancipatory (Thiollent 2006, p. 157).

He mentions that participatory action research is participative, critical and reflective.

5.2.2. Exploratory practice. In action research, generally the participants expect a change as a future result, but in the case of exploratory practice projects, and that is the case of the present research, the change is not in the behavior, but in the “understanding of the practitioners’ own classroom” (Gieve & Miller 2008, p. 2).

The main aim of the Exploratory Practice is not to find “new methods,” but understand what is taking place in the educational environment. Bailey (2008) uses two metaphors (work and life) to explain the difference between some other kind of classroom-based research and Exploratory Practice. While in other kinds of research teaching/learning is seen as “work” and the researcher is looking for “efficiency”, in relation to EP, the teaching/learning process is seen as “life” and the search is for a better life quality in education.

Presenting Allwright’s ideas about research, Bailey (2008) mentions that classroom-centered research differs from other kinds of educational research because it does not concentrate on *inputs to* the classroom or *outputs from* the classroom.

It simply tries to investigate what happens inside the classroom when learners and teachers are together. At its most narrow view, classroom-centered research is in fact research that treats the language classroom not just as the *setting for* investigation but, more importantly, as the *object of* investigation. Classroom processes become the central focus. (Allwright 1983 apud Bailey 2008, p. XI)

She also mentions that the teachers’ role has been changing gradually from teacher as subject or *implementers* of treatments (experiments organized by other researchers – outsiders) to a broader view in which teachers are seen as *partners* in the research project, but Allwright and other researchers have advocated teachers as *producers* of research. This research is a good example of that.

By asking learners to answer to Why- questions, you invite the participants to think about their own reality. You assume that something is taking place based on your experience as a teacher and you ask for help to understand the problem. Even if we just use the questionnaire, learners will start to think about the *puzzle*. They may be unaware of the fact and the questions will help them consider the puzzle and it is clear that someone has experienced the problem and needs some help to understand it. There is no right answer, it works more like a brainstorm. If they have already faced the problem, probably they become aware that they were not the only ones. Transformation may or may not occur, but some kind of awareness will.

6. Final remarks

As the research has not been developed yet, it is impossible to present the results, but we can anticipate some possible developments. One of them is that by the end of the research, all the participants will have a better understanding of these learners’ reading skills and level of awareness that they have of the fact being studied. As mentioned before, the idea is not to solve a problem, but to understand what is going on. However, I do believe that by simply taking part in the study, these learners will rethink the way they deal with instructions. And the teachers involved in the project will also consider their learners’ characteristics when giving future instructions.

These learners, who are future teachers, will also be able to experience the Exploratory Practice as “a viable alternative to technicism” (Allwright 2008, p. 143) and the participatory action research as an alternative to more conventional research.

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AN INTRODUCTION TO THE AEPS-3 AND RESULTS OF A FIELD TEST STUDY

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Abstract

The AEPS, a curriculum-based, criterion-referenced programmatic assessment tool was developed to collect developmental progress information, primarily of children with disabilities, from birth through age five. First published in 1993 (birth through age two) and 1995 (age three through five) and again in 2003 (2nd edition), the tool was designed to determine a child's repertoire of skills and to identify next skills needed for developmental progress. One important aspect of the tool was the one-to-one correspondence of assessment and curriculum items. Needed skills identified in assessment, were then matched with the same curriculum skills and provided users with tiered strategies and suggestions to support the child with multiple activity-based practice opportunities. A variety of additional components were available to support using the AEPS and monitoring progress. Components' use was optional and consisted of the AEPS Family Report with both qualitative and quantitative questions, Progress Report, Assessment Activities, IFSP and IEP examples, programming steps, and Social Communication Observation and Summary Forms. Additionally, cut scores were established in 2006 that permitted use of the AEPS to corroborate eligibility, and in 2007 to determine eligibility for early intervention/special education services.

The AEPS is considered one of the most functional assessment tools published for use with young children with disabilities. The second edition consists of 455 items, with 248 in Level I (birth through two) and 217 in level 2 (three through five), with approximately 250 programming steps, for children making more incremental progress. Currently, AEPS 2nd edition has been published in Spanish, Canadian French, Korean, Finnish, and Traditional Chinese.

In 2007 a third edition of the AEPS was begun. Changes included consolidating levels into a seamless test (birth through six), adding literacy and math areas, including science items, refinement of test/curriculum items, thorough criteria, improved AEPS components to the 3rd edition, and importantly, a new curriculum. The AEPS-3 curriculum is divided into three levels; beginning, growing and ready. Each curriculum level includes numerous daily activities and routines with practice opportunities for all items.

The AEPS-3 was field tested by 125 teachers with prior AEPS experience, administered to approximately 300 children, to evaluate its psychometric properties; specifically, inter-rater reliability, utility, and concurrent validity. This presentation will 1) report the field study results and introduce AEPS-3's major components; and 2) discuss implications of using a technically sound tool with the diverse ethnicities and cultural backgrounds of children and their families.

Keywords: *AEPS, assessment, curriculum, children, progress.*

1. Introduction

Early childhood assessment procedures are guided by recommended practices from a variety of sources (Division of Early Childhood, 2014; Jiban, 2013; National Association for the Education of Young Children, 2009). Across sources, there is agreement early childhood assessments should be socially valid, use authentic assessment methods, allow for collaboration between families and professionals, have evidence that supports their reliability and validity, and be sensitive to child change over time. The type of assessment tools matching these recommended practices most closely are curriculum-based assessments (CBAs). According to Grisham-Brown & Pretti-Frontczak (2011), a *curriculum-based assessment* contains test items that are aligned with the curriculum so what is on the test can actually be taught. Many curriculum-based assessments are also *criterion-referenced*, meaning the test's purpose is to measure a child's performance over time by determining the extent to which a child meets the criterion or standard

for each item on the test. Curriculum-based assessments are primarily used to assist teachers/providers/interventionists in knowing what to teach. When working with young children who have disabilities, data from a CBA are used to identify individual goals or outcomes for the child's Individualized Education Plan (IEP) or Individualized Family Service Plan (IFSP) based on current and next skills. Moreover, CBAs show a child's progress over time, as children are compared to themselves and not to a normative sample of same age peers. CBAs have been used to report children's progress as part of state and federal accountability systems (Grisham-Brown, Pretti-Frontcak, & Hallam, 2008).

One early childhood instrument used by many early childhood providers is the *Assessment, Evaluation, and Programming System for Infants and Children Test* (AEPS). The AEPS, a curriculum-based, criterion-referenced programmatic assessment tool was developed to collect developmental progress information, primarily of children with disabilities, from birth through age five. Work on AEPS started in the 1970s. First published in 1993 (birth through age two) and 1995 (age three through five) and again in 2003 (2nd edition), the tool was designed to determine a child's repertoire of skills and to identify next skills needed for developmental progress. One important aspect of the tool was the one-to-one correspondence of assessment and curriculum items. Needed skills identified in assessment, were then matched with the same curriculum skills and provided users with tiered strategies and suggestions to support the child with multiple activity-based practice opportunities. In 2007 a third edition of the AEPS was begun. Changes included consolidating levels of the tool into a seamless test (birth through six), adding literacy and math areas, and including science items to the assessment and curriculum. AEPS is now in its third edition and includes the following areas:

- Math (new),
- Literacy (new),
- Adaptive,
- Cognitive,
- Fine motor,
- Gross motor,
- Social Emotional, and
- Social Communication

The AEPS-3 assessment is also linked to an early childhood curriculum for children birth to age six. The AEPS-3 curriculum is divided into three levels; beginning (infant/toddler), growing (toddler/preschooler) and ready (preschooler). Each curriculum level includes daily activities and routines with numerous embedded practice opportunities for all items.

AEPS-3 also offers a graduated scoring mechanism. AEPS-3 is designed to capture changes when used more than once and over time. A three-point rating scale allows the user to determine the level of skill acquisition for a wide range of items which includes: mastery, emerging, or not yet. An online data management system called AEPSi assists in the use of the curriculum-based assessment (Macy, 2010).

A variety of additional components are available to support using the AEPS and monitoring child progress. AEPS-3 components' use is optional and consists of the *AEPS-3 Family Report* and the *Family Assessment of Child Skills (FACS)* with both qualitative and quantitative sections, a *Child Progress Record, Assessment Activities* for both home and center-based services, IFSP and IEP examples, *Foundational Skills* leading to objectives and goals, and *Social Communication Observation and Summary Forms*. Additionally, cut scores are currently being established that permit professionals use of the AEPS to corroborate and determine eligibility for EI/ECSE services (Bricker et al., 2003, 2008).

AEPS Family Report and the Family Assessment of Child Skills enables collaboration between professionals and children's families and can be used as a portfolio to monitor progress. Accountability in EI/ECSE programs can also be monitored using the AEPS-3. The AEPS-3 *Ready-Set* is a tool for professionals to use as children transition into Kindergarten settings.

The AEPS is considered one of the most functional assessment tools published for use with young children with disabilities. The third edition consists of 407 items, with 225 foundational skills, for children making more incremental progress. The AEPS 2nd edition has been published in Spanish, Canadian French, Korean, Finnish, and Traditional Chinese. The AEPS-3 has, thus far, been translated and is being published in Spanish, Canadian French, and Traditional Chinese (see Implications and Future Directions).

2. Purpose

The purpose of the field test study was to evaluate the psychometric properties of the third edition of AEPS. Specifically, the study examined the inter-rater reliability, utility, and concurrent validity of AEPS-3.

3. Methodology

Subjects

• Teachers:

n=116 for interrater agreement;

n=11 for utility;

n= 8 for concurrent validity

Children:

n=23 for utility

n=50 for concurrent validity

children with and without disabilities

Procedures

• Utility:

Teachers completed AEPS-3 on 2-3 children and completed a utility survey consisting of items about Scoring, Items and Criteria, and Usefulness of AEPS-3 for Intended Purpose.

• Interrater Agreement:

Teachers were required to watch an online training on changes to AEPS. Following training, they watched 37 videoclips that contained 68 items from the AEPS-3. After observing the video, they were asked to score items using the 2, 1, 0 scoring system of AEPS-3

• Concurrent Validity:

Teachers, trained in both the *Battelle Developmental Inventory* (Newborg, 2005) and the AEPS-3 administered both assessments to the same children within two weeks of each other.

4. Results: concurrent validity

Table 1. Correlation Results for AEPS-3 Domain Scores and BDI-2 Domain Scores (N=50).

AEPS-3 Domain	BDI-2 Domain					Age (in months)
	Adaptive	Cognitive	Communication	Motor	Personal-Social	
Adaptive ($\alpha = .55$)	.40**	.46**	.57**	.33*	.41**	.92*
Cognitive ($\alpha = .66$)	.41**	.50**	.62**	.33*	.48**	.86*
Fine Motor ($\alpha = .39$)	.24	.31*	.45**	.32*	.36**	.65*
Gross Motor ($\alpha = .61$)	.34*	.46**	.57**	.44**	.38**	.72*
Literacy ($\alpha = .70$)	.50**	.60**	.65**	.44**	.50**	.89*
Math ($\alpha = .70$)	.41**	.55**	.62**	.32*	.42**	.87*
Social Communication ($\alpha = .77$)	.44**	.48**	.63**	.35*	.52**	.85*
Social Emotional ($\alpha = .63$)	.49**	.54**	.64**	.42**	.57**	.80*

Note. Reliability in () below each domain area.

* $p < .05$. ** $p < .01$.

Grisham-Brown, J., Waddell, M., Crawford, R. and Toland, M. (in press). Psychometric Properties of the Assessment, Evaluation, and Programming System for Infants and Children, 3rd Edition (AEPS-3)

5. Results: interrater reliability

Interrater reliability, results reveal teachers and experts agreement ranged from 66% to 100% with a mean of 89% (n = 116). Participants could take the test multiple times to meet the 80% criterion required prior to collecting AEPS-3 field test data; the majority of participants met the 80% criterion correct on their first try (i.e., 89.79%).

6. Results: utility

A utility study was completed prior to collecting any other AEPS-3 field test data. The purpose was to gather information about the tool from a small sample of field test participants (11) to: 1) gain an understanding of the utility of the tool from established providers in the field, and 2) ensure there were no concerns with AEPS-3 test content and scoring.

Utility study participants were required to complete AEPS-3 online training prior to collecting assessment data; each participant completed their assessment on at least one child. Together the 11 participants assessed 23 children between ages of 4 and 83 months. Assessment data were collected in each 12-month age interval, and observations took place in the child's home or classroom setting.

A Utility Survey, consisting of questions about scoring, dimensionality of goals in all developmental areas and usefulness of the AEPS-3 for its intended purpose, was completed by the 11 participants after conducting AEPS-3 assessments. The Utility Survey consisted of 3 sections: I) Scoring, II) Items and Criteria, and III) Usefulness for Intended Purposes. Questions were rated on a 4-point Likert scale with 4= Strongly Agree and 1=Strongly disagree.

Section I included 13 questions about the 3-point scoring options (2, 1, 0) and scoring notes (A = Assistance; I = Incomplete; C = Conduct; M = Modification; Q = Quality; and R = Report) of AEPS-3. Participants rated questions related to understanding score options (M=3.45) and if they permitted accurate rating (M=3.54). Participants rated scoring note options related to ease of understanding (M= 3.36) and enhanced accuracy in rating of child performance (M=3.18). Participants also rated clearness of each scoring option description and knowing when to add the scoring notes. All items were rated above 82% (Agree), and most items were rated above 91% (Strongly Agree).

Section II asked participants to rate all AEPS-3 goals from the 8 developmental areas on a 4 point Likert scale on four dimensions: functionality, teachability, easy to understand goal and easy to understand criterion. Participants rated the majority of AEPS-3 goals as strongly agree or agree across all four dimensions. Four developmental areas met this criteria on all items: Adaptive, Literacy, Social-Communication, and Social-Emotional. The remaining four areas (Fine Motor, Gross Motor, Cognitive and Math) each had one item that fell below the Agree criteria.

Section III asked participants, using the 4 point Likert scale to rate the AEPS-3's intended purposes for use (authentic environments, information for summarizing strengths and present levels of development, reporting to state and federal agencies, monitoring child progress, and use of scoring notes I -incomplete and/or A – assistance for scoring 1), its use for progress monitoring, time needed to complete the AEPS-3, and their perspective on the strengths and weaknesses of the tool. For all Section III questions at least 9 participants indicated strongly agree or agree that AEPS-3 is useful for its intended purposes.

Based on participant survey results, no changes were made to the 3-point scoring options or the scoring notes. More examples of the scoring notes were provided in the training materials. Few changes were required in AEPS-3 items: one item was removed from the Literacy area and eight items were revised across Developmental Areas. Additionally, examples were revised or expanded to help further clarify test items. Specifically, the findings from the utility study showed that participants found the AEPS-3 useful from assessment and program planning to intervention and progress monitoring.

7. Implications and future directions

Future directions of AEPS could focus on: (1) increasing cultural and linguistic diversity, and (2) exploring the utility of the new areas –literacy and math. In terms of improving cultural and linguistic diversity, current AEPS items and examples are flexible for adaptations; however, some practitioners have reflected certain examples reflect “western culture.” Thus, more non-cultural specific examples, as well as recommendations for cultural and linguistic adaptations are included in the new edition to help users from diverse backgrounds. Further directions could examine intervention strategies best matched to the AEPS-3 (Johnson et al, 2014).

Considering the diverse ethnicities and cultural backgrounds of children and their families in the U.S., and for countries that encounter challenges in finding a technically sound assessment tool, one solution is to select from existing tools with well-established psychometric properties and make culturally appropriate adaptations (Bornman, Sevcik, Romski, & Pae, 2010; Heo & Squires, 2012). Currently, AEPS has been published in Spanish, Canadian French, Korean, Finnish, and Traditional Chinese. The Simplified Chinese translation is under development. The Canadian French version has five studies examining its psychometric properties (Dionne, Bricker, Harguindéguy-Lincourt, Rivest, & Tavarès, 2001; Dionne et al., 2015; Lemire, Dionne, & McKinnon, 2014, 2015; Nader-Grosbois, Dionne, Rivest, & Boutet, 2010). The Korean version has one study (Noh & Park, 2008) where researchers examined how AEPS helped improve the quality of IEP goals and objectives.

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INVESTIGATING NON-ACADEMIC CORRELATES OF GOAL COMMITMENT FOR ACADEMIC ACHIEVEMENT AT HIGHER EDUCATION LEVEL

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Abstract

Academic performance is dependent not only on personal traits but also on non-academic factors such as personal, socio-cultural, political, or economic (e.g., Poropat, 2009; Stoet & Geary, 2015). These factors, referred as psycho-social contextual influences (Richardson, Abraham, & Bond, 2012), are significant determinants in academic performance at particularly higher education level. In this respect, the present study attempts to explore university students' goal commitment to academic achievement by focusing on social, economic, and political factors playing role in their determination to engage in academic studies. The data, gathered through semi-structured interviews and focus-group discussions with 116 university students, was analyzed qualitatively following open coding procedure. The results indicated that economic and political influences are among frequently reported factors, which could be significant determinants in their level of academic engagement. The findings suggest that such psycho-social contextual influences need further consideration in the context of defining and assessing achievement at higher education level in addition to instructional, academic, or personal factors. Therefore, any attempt towards understanding and enhancing learners' academic performance should also involve consideration of psycho-social contextual determinants.

Keywords: *Higher education, non-academic factors, goal commitment, academic achievement, psycho-social context.*

1. Introduction

Academic success of the learners is mostly associated with academic traits either related to the learner; such as intelligence, cognitive and metacognitive skills, individual learning strategies, and so on, or to the teaching context; such as teaching practices, materials, the teacher, assessment procedures, etc. However, research on the exploration of the significant predictors of academic achievement of learners has often demonstrated incomplete or inconsistent findings, which may indicate that these variables are insufficient in explaining or predicting learners' academic potential (Poropat, 2009; Zwick, 2004). Although it is as important to investigate the combination of these traits in order to optimize the conditions of learning situations for an increased learner engagement, it is equally crucial to consider non-academic factors such as socio-cultural, economic, or political conditions under which a specific learning situation exists.

A large body of research has identified various strong predictors of academic achievement that are not directly related to the capacities of the learner or to the learning task itself (e.g., Adenike & Oyesoji, 2010; Cheng & Kaplowitz, 2018; Li, et al., 2018). Studies focusing on such psycho-social contextual influences on academic success have reported various variables that are significant determinants in academic engagement and in the degree of learner resilience. For example, Cheng and Kaplowitz (2018) investigated close social relations impacting academic success and concluded that family economic status and cultural capital were significant determinants in academic achievement. The findings reported in other studies conducted in different contexts report similar findings emphasizing the stronger effect of family income or socio-economic status on learners' academic success than the learning resources provided (Acemoglu & Pischke, 2001; Li, et al., 2018; Richardson, Abraham, & Bond, 2012).

Similarly, studies focusing on the impacts of socio-political context have indicated strong non-academic predictors such as racial or ethnic discrimination, terrorism, or wars in academic engagement and success (Adenike & Oyesoji, 2010; Conger & Atwell, 2012; English, Lambert & Ialongo, 2016). Moosmann, Roosa, and Knight (2014) investigated the effect of 'immigration paradox'

in the context of Mexican immigrants in the U.S. on the academic performance of the learners. The findings indicated that perceived discrimination was a strong determinant correlating negatively with academic achievement.

In this respect, the present paper aims to report the preliminary findings of the study being conducted to investigate psycho-social contextual influences on the goal commitment to academic achievement of university students in Turkey. Due to the space limits, the present study presents the results related to economic and political factors playing role in learners' determination to attain higher achievement.

2. Method

Qualitative in nature, the study was conducted following grounded theory, which is defined by Strauss and Corbin, (1998) as "a qualitative research design in which the inquirer generates a general explanation of a process, action, or interaction shaped by the views of a large number of participants". As the present study aims to reach a general pattern of interacting factors affecting learners' academic achievement, Charmaz's (2006) constructive approach for grounded research design was followed in order to obtain and interpret the opinions, experiences, feelings, and assumptions of the participating students. For the analysis of the data, open coding procedure was applied. The open coding procedure was conducted in three stages: (a) analysis of the data for forming the main categories; (b) segmentation of the data for forming subcategories within each category; and finally, (c) identifying the themes emerging under each subcategory.

2.1. Data collection procedure

The data for the study was gathered through semi-structured interviews and focus-group discussions with university students studying in different departments. Upon receiving consents of the students to participate, they were interviewed by the researcher. All interviews took place at the campus each lasting around 10 minutes. The semi-structured interviews included six questions directed towards three main aspects: the student's demographic information (e.g., age, gender, family background); their perception of self academic achievement level; and the factors playing role in their academic achievement. The interviews were recorded and transcribed by the researcher. Subsequent to the analysis of the data from the interviews, the participants were grouped according to the type of the influencing factors they stated as personal, social state of the community, economic state of the community, and the political state of the community. However, due to the space limit, only the findings related to the economic and political state of the community will be discussed in this paper.

In the next step, focus group discussions were held with each group. As a form of qualitative research method, focus group discussion differs from one-to-one interviews with the participants in a way that allows participants to interact with each other on a given issue or issues instead of just answering the researcher's questions (Wong, 2008). As the aim was exploring the participants' views on the factors influencing their academic engagement based on their shared context, group interaction would yield more in-depth opinions and experiences voiced by the participants themselves without the interference of the researcher as an outsider. As some students were in more than one group, four group discussions were organized on separate days. For each group discussion, there were between 18 and 24 students joining. All discussions, which lasted between 72 minutes to 96 minutes, were recorded and transcribed verbatim.

2.2. Participants

The study was conducted with the participation of 116 students at a state university on a voluntary basis. Their demographic information is displayed in Table 1.

Table 1. Demographic Information on the Participant Students.

	Gender		Age			Department		
	F	M	19-20	21-25	26-30	Education	Engineering	Tourism
%	51.7	48.2	50.8	32.7	16.3	53.4	26.7	19.8

Of the participants, 60 were female and 56 male students aged between 19 and 30. They were studying in the faculties of education, engineering or tourism at a state university. When asked for their family socio-economic status, none of the participants stated that they were from high-income families; but mostly from middle-income families (80.1 %).

Table 2. Family Background of the Participant Students.

	Economic Income			No sibling	Number of Siblings			
	Low	Middle	High		1	2-3	4-5	6+
%	19.8	80.1	-	23.2	23.2	43.1	14.6	12.9

The findings indicate that 23.2 % of the participants had no siblings and the majority (43.1 %) had 2 or 3 siblings. The number of the siblings varied between 1 and 6 and more.

3. Findings

The analysis of the data gathered from the interviews shows that the majority of the participants consider themselves as academically successful (78.8 %). When asked the level of their academic success, most of them identified themselves as high achievers (39.6 %) followed by average (28.4 %) and poor (12.9 %) academic levels.

Table 3. The Participants' Perceptions on their Academic Success.

	Academically Successful		Level of Academic Success				
	Yes	No	Very High	High	Average	Poor	Very Poor
Total	77.8	22.1	1.7	39.6	28.4	12.9	5.1

When the participants were asked whether non-academic factors affected their academic involvement, the majority of the responds were affirmative (87.9 %) and the rest of them stated that no factors outside academic life impacted their involvement (12 %). Table 4 presents the non-academic factors reported by the participants.

Table 4. Source of Non-Academic Factors Affecting Goal Commitment.

Factors	Education	Engineering	Tourism	Total
	%	%	%	%
Personal Factors	67.7	45.1	56.5	59.4
Immediate Social Environment	58.0	38.7	60.8	55.1
Social State of the Community	32.2	41.9	69.5	42.2
Economic State of the Community	35.5	58.0	82.6	54.3
Political State of the Community	30.6	35.4	52.1	32.7

Accordingly, personal factors were the most influential in their success (59.4 %), followed by immediate social environment (55.1 %), economic state of the community (54.3 %), and social state of the community (42.2%). Despite having considerably high rate of responses, factors related to political state of the community were the least frequently stated ones (32.7 %).

Formed based on their choice of factors, the participants were invited to join the group discussions. During the focus group discussions held with the participant students, their views and experiences of the factors they had stated influencing their academic success were explored. The themes emerging as a result of these discussions are presented in Table 5 and Table 6.

Table 5. Responses for the Economic State of the Community.

Factors with Negative Influence	%
Insufficient scholarships and funding opportunities for university students	88.2
Expensive accommodation for students (dorm/flat/guesthouse, etc.)	84.4
Inequality in economic income and financial opportunities	79.6
Expensive educational materials (books, laptops, resource books, etc.)	77.4
High unemployment rate for university graduates	77.2
Having lots of families with minimum wage income	71.4
Insufficient support to academic / university studies in the country	56.6
Not enough part-time job opportunities for university students	54.6

When participants were asked to indicate the factors related to the economic state of their country and state how they impacted their academic success, no response was recorded indicating positive effect. According to the participants, the economic state of the country was not supportive of their academic studies. The most frequent response was directed to insufficient funding for university students. The students also mentioned about the inequality in economic income as an influencing factor. As one student put it: “If you are from a rich family, you study at private schools, get the best education and become even richer than your family. But, if you are from a poor family, you are destined to stay poor all your life”. Being from low-income families was yet another negatively influencing factor: “My family has difficulty in supporting my studies here. I have two other siblings at secondary school as well. They think when I graduate I will be able to support them and they will be comfortable. But I am not sure if I will ever find a job”. For others, university graduation did not guarantee a job and therefore, studying at a university was unnecessary: “School is waste of time and money in my country. Education is not necessary to be rich. You need to know the right people or to have a rich family. That’s it”

As the second influencing factor focused on in the study, the impact of the perceived political state of the country was explored in the focus group discussions. The emerging themes are presented in Table 6.

Table 6. Responses for the Political State of the Community.

Factors with Negative Influence	%	Factors with Positive Influence	%
Having too many political conflicts	86.2	Feeling that my country needs me	46.4
Having Syrian refugees	84.6	Feeling responsible to defend my country	44.6
Feeling worried about my country’s future	80.4	Having a strong government motivates me	28.6
Having unfair appointment system	78.6		
Having poor legislative system	78.4		
Feeling under political pressure/oppressive attitude	74.8		
Having instable political state	72.4		
Having wrong political and educational system	70.4		
Having bad reputation in the world	64.4		
The fear of terrorism	58.6		
Ethnic and political discrimination	46.4		

The analysis revealed three positively influencing themes: feeling needed by the country (46.4%), feeling responsible for the country (44.6 %), and having a strong government in the country (28.6 %). As one student explained: “I use all the problems happening in my country and the surrounding countries as forces to motivate me to study more. If I am strong and educated, I can defend my country”.

However, the majority of the responses were under negatively influencing states. The highest frequencies were having political conflicts, or refugees in the country as well as being worried about the country. An excerpt by a participating student exemplifies the psychological state of some students: “You cannot expect people to study and to be successful when there is a war in your country”. Also, having unfair appointment system and poor legislative system seemed to demotivate some students as voiced by the following excerpts: “Bribes, inequalities, privileges, injustice, ignorance and so on. Why do I need to study more?”. “Since whatever the people that govern us say has to happen in my country, I don’t think my academic achievements will make a difference”.

Some of the participants, on the other hand, felt hopeless about the future: “Thinking that I am silenced in my country affects my studies and makes me hate everything. For example, giving so much power to the police and the security forces in my country and not being able to have a say on anything demotivates me. Then I think studying more won’t change anything”. “Every day I hear people appointed to different jobs and earning huge amounts. There are too many preferential treatments in life. Why study, I don’t know”. “Not having a fair political system destroys my hope for the future in every way”.

4. Conclusion

This paper introduces the preliminary findings of a large scale study that aims to explore non-academic correlates of university students’ academic achievement. As a country going through substantial political, social, and economic changes, Turkey presents a challenging context for educators and students. In addition to theoretical and instructional dimensions involved in teaching-learning situations, learners’ wider context including the psycho-social contextual influences need to be considered in order to be able to support and guide learners more effectively. As the findings indicate, the majority of

the university students reported that non-academic factors impacted their goal commitment to academic involvement and achievement negatively. Thus, attempts towards understanding, planning and enhancing learners' academic involvement and performance need to involve consideration of psycho-social contextual determinants, particularly at higher education level.

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CULTURAL MODELS OF DISABILITY. AN EXPLORATORY QUALITATIVE STUDY ON THE PRE-SERVICE TEACHERS' ATTITUDES AND SOCIAL REPRESENTATIONS

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Abstract

Attitudes towards disability and inclusion are the result of the representations that people create and share during social interaction: they are an individual interpretation of a collective belief (Salès-Wuillemin, 2006; Ramel, 2014). Starting from this perspective, the paper shows the results of a study conducted between 2017 and 2018 on representations of disability and on the fears of a group of pre-service teachers. From the aspects highlighted by the study, emerges the need to continue to insist on the study of representations and attitudes of teachers, also in view of the complexification of social scenarios and the cultural approach to differences at school.

Keywords: *Representations, disabilities, inclusion, pre-service teachers.*

1. Cultural representation of disability

The Italian cultural approach to disability was started more than forty years ago by the laws on school integration (L. 118, 1971; L. 517, 1977; L. 104, 1992) and recently enriched by the ministerial indications on Special Educational Needs (Ministerial Directive, 2012; Ministerial Circular n. 8, 2013).

In recent years, ideas began to positively change about special teaching and education. Attitudes continued to change, because teachers began to see the transformative value of education.

In response to this, there is a growing body of literature which argues that teachers' attitudes and representations regarding disability and inclusion play a central and predictive role for the promotion and management of school inclusion (Chong, Forlin & Au, 2007; Lambe & Bones, 2007). There appears to be broad consensus that teachers' attitudes toward inclusion is critical in implementing the ambitious goal of inclusive schools for all. Teachers' positive attitudes towards disability are one of the most important factors that determine and facilitate inclusive practices and processes. Attitudes towards disability are the result of the representations that people create and share during social interaction: they are an individual interpretation of a collective and cultural belief (Salès-Wuillemin, 2006; Ramel, 2014). They are the result of the representations that people create and share during social interaction (Ramel, 2014). Social representations are subsystems conditioned by broad ideological systems, while attitudes are single interpretations of a common reference system, and therefore are in a lower level of analysis, an interindividual level (Doise, 1989; Râteau, 2000). According to Rouquette (1996), in fact, ideology constitutes the matrix of representations, which are the matrix of attitudes. Although with an object of very broad analysis, the theory of social representations (Moscovici, 1961, 1984) offers a remarkable contribution to the study of perceptions and attitudes on disability, as it allows reflection on the social dimension of knowledge and on the processes of interpretation and co-construction connected to it. The representations "make familiar" (Moscovici, 1984) and socially shareable what we perceive and which is still little known. Disability can be represented through two processes: *anchoring*, which allows us to understand what is not familiar, putting it in relation with the categories possessed and *objectification*, which translates into images difficult concepts. Complex and abstract ideas are objectified through *personification*, use of people to represent an idea, *figuration*, use of concrete images and *ontologization*, the use of physical properties to represent an idea.

The various studies that have analyzed the contribution of social representations of disability in the educational setting (Savarese, 2009; Consiglio, Guarnera and Magnano, 2015) and in relation to the teachers' perceptions (Federici & Meloni, 2009; Samsel & Perepa 2013; Ramel, 2014; Savarese & Cuoco, 2015; St-Onge & Lemyre, 2016). Teachers' representations and the attitudes that derive from them carry out a key role for the realization of a culture of inclusion at school. Among the representations of

disability and inclusion there is mutually conditioning link (Lamontagne-Müller & Gygax, 2009). As other recent studies confirm, often the representations of the teachers in formation appear very close to the common sense, mostly stereotyped and prototypical (Fiorucci, 2018, Ramel, 2014), and often influenced by the fear of disability (Disanto, 2015). The didactic-educational practice is largely influenced by the opinions that the teacher has of the nature of disability (Jordan, Schwartz & McGhie-Richmond, 2009). Furthermore, the decisive role played by the experience of contact with disabled people should also be considered (Falanga, de Caroli & Sagone, 2011; Wong, 2008; Fiorucci, 2018). On a more general level, studies show a growing tendency to recognize to people with disabilities the right to be educated in common contexts (Forlin, 2011; Sharma, Forlin & Loreman, 2008), thus considering Italian school integration a virtuous model to strive for (Kanter, Damiani & Ferri, 2014). In Italy, according to the perception of teachers, the effectiveness of inclusion lies above all in the social elements, rather than on a real improvement in the development of the person with disability in the school context (Ianes, Demo & Zambotti, 2011). Even if inclusion appears as an inalienable right and an inalienable social justice project that interests everyone, the progressive establishment of the scholastic communication of medical-specialist language, replacing the pedagogical language (Medeghini, 2007), supports the stigmatization process, which reduces the complexity of the person "with" disability to the diagnosis and certification of his/her deficit (Fiorucci, 2016; TreeLLLE Association, Caritas Italiana & Fondazione Agnelli, 2011).

2. Research design and methodology

Scientific literature indicates as important variable pre-service teacher training (Chong, Forlin & Au, 2007, Lambe & Bones, 2007), because it influences the teaching effectiveness and the educational relationship (Sharma, 2012): teachers who have taken part in specific training courses are closer to scholastic inclusion. Training is an important opportunity to guide future teachers to reflect, evolve, change their attitudes towards disabilities and inclusion. Starting from this perspective, this article reports the results of a descriptive-exploratory study¹, conducted between 2017 and 2018, that investigated representations of disability of pre-service teachers involved in the Support disabilities specialization Course (CS) and Primary School Teacher Training Course (SFP) at the University of Salento (Lecce, Italy).

2.1. Participants

The research involved 167 participants from Puglia (southern Italy region), mostly women (91%) and members of the CS (79%), with an average age between 25 and 50 years. The order of school that collects the largest participants is the one related to the first degree (29.9% childhood and 28.7% primary CS, 21% childhood and primary SFP).

2.2. Procedures and data analysis

The research uses portraiture and narrative inquiry methodology to examine a range of issues around pre-service teachers' knowledge and understanding of disability representations and the implications of these understandings on their teaching practice. We have made use of focus group technique, a particular type of group interview that aims to produce data on a specific analysis topic, by comparing the participants: 14 group discussions of 70 minutes were planned, made up of about 12 people, each of them belonging to the same school order and professional status (CS or SFP). On the narrative corpus, was carried out qualitative analysis aimed at identifying the cultural repertoires, interpreted through the anchoring and objectification processes by the Social Representations Theory.

2.3. Results

From a general point of view, it is possible to highlight that the emerged representations are highly recurrent and superimposable within the focus groups, with slight differences found in the comparison between the different school orders. The perceptions of future teachers on disability (table 1) take as their starting point not the processes of marginalization and school exclusion, but the medical and individual condition of disability. The focus of attention is diverted on the deficit, on the diagnosis, on its lack, on the mal-functioning of the person. All this emerges from highly medicalized and medicalizing discursive modalities, which seem to prefer diagnostic labels that multiply and differentiate according to the different etiologies examined, to a pedagogical and educational lexicon.

¹The study is part of the research program "Cultural models of difference and promotion of inclusion at school", scientific director Professor Stefania Pinnelli at Department of History, Society and Human Studies, University of Salento.

Table 1. Representations of disability.

	SFP	CS childhood-primary school	CS secondary school
<i>Anchoring</i>	hearing impairment vision impairment motor deficit diagnosis/certification SEN	Down syndrome autistic syndrome diagnosis/certification SEN	hearing impairment vision impairment intellectual deficit motor deficit diagnosis/certification
<i>Figurations</i>	wheelchair chains cage support barriers dead end	wheelchair disabled parking triangle-rumble dark room cage stumbling block silkworm land to grow	wheelchair disabled parking dark cage wall open bridge closed door labyrinth toy without batteries
<i>Personification</i>	pupil with disabilities acquaintance disabled artist or sportsman	pupil with disabilities relative acquaintance	pupil with disabilities acquaintance
<i>Emotions</i>	sadness anger discouragement	fear anxiety	solitude exclusion

The radicalization of a typically bio-medical look in a group of non-professionals, pre-service teachers, as well as diverting attention from the person universe causes re-proposed diagnostic and hoary labels (for example, the "deaf-mutes", the "mentally handicapped"), often spoiled by stereotypes and easy generalizations. Among the most recurring figures we find the image of the wheelchair which has now become the emblem of disability (fig. 1). The symbol also returns in the stylized image of the person in a wheelchair on a blue background, the one invented by Koefoed in 1968, mentioned by the participants as a symbol for road signs, for the handicap parking permit and, in general, to indicate services or accessible places for the disabled.

Figure 1. Representations of disability.



On a more abstract level, the disability representations convey meanings that further exacerbate the medical-individual vision already emerged, associating images that recall the sense of limitation, of constraint, of the absence of a pathway. In the image of the cage that segregates, of the blocking wall, of the labyrinth that disperses, of the open bridge that does not communicate, of the door that prevents passage, of the triangle and the rhombus that have edges, the images present in most of the participants add to the key word "deficit" those semantically closest: limit and obstacle. In confirmation of the traced picture, the representations are in line with the emotions and the negative feelings expressed by the teachers in formation. In the other direction, instead, the images of a silkworm, of a toy to which the batteries must be added, of a land that must be made fertile are favorably directed to recognize the presence of a potential to be cultivated. Finally, from the analysis of the representations emerges the personification of disability images, evident from the need expressed by the participants to draw from their professional experiences and life, leading them to fathom their memories. The representations now

take on the face of a friend, of a student, sometimes of a person absent-mindedly met on the street, thus making their images less abstract, realistically more familiar.

In addition to the representations, the teachers' fears also emerge. The fear of not being able to face the problems linked to the deficit and integration of their pupils is more evident, a renouncing attitude and not always inclined to try to change the course of events. It is an attitude related to the perception of the self that does not feel able to exercise any control over the events, with possible drifts on the self-efficacy and self-esteem of the future teacher. To the fear of not making the acquired cultural preparation expendable, the teacher has the fear of not being sufficiently prepared and competent; not knowing how to exercise good and functional didactic mediation. Fear of failure is also expressed in the relational area: there are growing concerns about not being able to make the classroom climate truly inclusive, not knowing how to concretize the school-family co-responsibility pact, of not being able to activate a good collaboration between colleagues, be empathetic and welcoming with their disabled pupils. But the fears that most frighten future teachers are those of resignation, of not feeling gratified, of not seeing progress in their work of educational care. Regarding the specific disability, the participants of the primary school are worried about not knowing the communication codes for the deaf pupil and for the braille code for the blind student. Participants in secondary education are afraid to exercise more assistance than teaching, or, in the presence of intellectual disabilities, they are afraid not to calibrate the teaching intervention or not to make accessible learning content.

3. Conclusion

The picture that emerges from the research is complex. Stereotyped and prototypical images of disabilities emerge. This is proof of the anchoring of perceptions to a culture of the fragment-deficit, to a bio-medical view of disability marked also by a certain degree of commiseration and resignation. It seems, in fact, that among the participants there is a "diagnosis hunt" (Pinnelli, 2015), that there is a sort of epidemic of the SEN at school. Often, we use the one that Goussot (2015) defines as "the lens of clinical diagnosis", that gaze that puts the accent on the symptoms, on the inability and on the problems. In this way the indissociable unit person disappears, that entirety emphasized by the biopsychosocial perspective of the ICF (WHO, 2001). Emerges first is the deficit and then the person, first the wheelchair of the disabled person and after the disabled person. The disability picture is completed by images that recall the sense of limit and obstacle, a picture that becomes even more complex to the extent that you look with prejudice and fear what you would never want to become. The relationship with disabled person is not entirely easy and natural, indeed, destabilizes, is scary. It is the fear of difference, the fear of the myths surrounding people with disabilities, the fear that comes from that "tyranny of normality" of which, according to Kristeva and Vanier (2011), one is slaves. Like a broken mirror (Sausse, 2006), the person with disability still represents an image that is scary and from which we often prefer to look away. The biggest fear, even greater than the complexity of the deficit, is another: that of failure. The refiguration of difficult situations causes feelings of anxiety, of loss, of impotence to emerge, but also the desire for continuous change, not to stagnate in excessively complex situations that reduce the role of the teaching mediator in an assistant to the person. The fear of disability is associated with not being able to support the difference of one's pupil, but also that of not being able to bear the difference that a supporting educational-educational role imposes. The stereotypical and medicalized views of disability, as well as the fears of future teachers have a function that is to say the least fundamental, because they highlight the fragility of a difficult job, as that of supporting the person with disability, showing aspects not only content but above all emotional-relational and experiential on which we should focus more.

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SOCIAL NETWORKING FOR LIFE-LONG-LEARNING WITH QUALITY MANAGEMENT ASPECTS IN TECHNICAL TEACHING

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Abstract

The following paper has to be seen in connection with some well-known authors' statements asserting that in today's "knowledge society" individual knowledge and especially collective knowledge become more and more important. If knowledge is assumed to be part of a set of expectations held by today's social system, this new societal formation is less characterized by an increase of knowledge as a consequence of accumulating dates and information than by a basic change of people's meta-preferences. This is due to the fact that all societies are based on the knowledge of cognitive expectations. For this reason, the world or the knowledge society, respectively also appears to be a risk society. According to the system-theoretical approach knowledge can be seen as an emergent cognitive structure of social systems or as expectations directed towards the environment and its norms. These expectations have to be changeable if required. Disappointments or failures are observed and interpreted, thus creating so called structural effects that can also be referred to as learning. Empirical economic studies attempting to explain the determinants of investment in social capital have generally been limited in their definition of what constitutes an individual's social capital. The focus has almost exclusively been on participation in formal organisations, ignoring informal networks to which individuals belong. We discuss social capital investment which has been extended to also include measures of investment in social networks such as networks of family, friends and neighbours, and the relationship between learning groups in organisations. Social capital seen as a contemporary concept of social sciences cannot be reduced to a kind of social network of relations but has to be regarded as a communication structure of relations based on social systems. Thus, knowledge and norms are only a partial aspect of emergent structures of social systems. The new aspect on lifelong learning is how to build a social group with a sustainable new WE-feeling.

Keywords: *eLearning, social capital, social networking, life-long-learning, community of practice.*

1. Introduction

As the spatial and temporal conditions of knowledge continually change, new requirements concerning the social systems evolve. Such requirements imply for example the necessity to remain flexible and adaptive which partly clashes with modern habits and conditions of the success of formal organisations. Therefore, organised social systems aim to stabilise communication through decisions and to standardize their members' expectations of the social systems. Due to this fact and to a minimum of not changeable structures organizations will take on a lasting identity while at the same time our environment demands an increasing flexibility going hand in hand with a heightened willingness to learn. Some case studies in Germany in 2003 (cf. Kauffeld/Grote, 2000 p.95) have shown that there is a relationship between flexible organisations and the competences of the employees (i.e. self-organisation and social competences).

2. Materials and methods

This paper deals with possible learning structures taking place in the context of the degree study course Internet Technology and Management and its special programme Software Design which is primarily based on eLearning elements (in this case a blended learning environment is used). The learning structures are analysed in connection with their social background which can be interpreted as an attempt to create a phenomenology of how learning takes place in groups in a digital environment. Additionally, the conditions of social learning in groups are examined. The assumption that group dynamics in a real

learning environment are equivalent to those in a virtual (eLearning) environment is theoretically dealt with. This assumption will finally be called into question by looking at it from a phenomenological, systemic and pedagogical point of view (cf. Rombach, Luhmann, Benner, Gruber, Böhnisch). Great importance is placed on the above mentioned learning groups because they encourage students to also communicate informally and even personally with each other. Thus, emotions besides cognitions are also recognised as an integral part of social structuring. In this case feelings supposedly serve as an immune system of disappointed expectations and as a mechanism that substitutes organisational formalizations in order to reduce the complexity of learning processes within an organization.

The demands on real and virtual learning groups are numerous and to a certain extent also contradictory. At times, one could even get the impression that the idea of social learning groups is propagated as an almost universal solution for unresolved problems of traditional organizations in our knowledge society.

Within all organizations, there exists a formal structure that is described by boxes, arrows, documented policies and procedures. This formal structure may be contrasted with a less formal environment that is more based on self-organized group interactions and individual relationships. Behind every organization chart lie informal clusters and networks of employees who work together — sharing knowledge, solving common problems and exchanging insights, stories and frustrations. When appropriately supported by the formal organization these “communities of practice,” as they are often called, play a critical role: they are the major building blocks in creating, sharing and applying organizational knowledge.

To create, expand, and exchange knowledge, and to develop individual capabilities are according to Wenger the characteristic tasks for “Communities of Practice”. Thus, most of these groups are also “Keeping Communities”, in other words, they represent a platform of geographically distant but still present knowledge to solve problems. Through *legitimate peripheral participation* they support and assist their members in the socialisation process. This means that the learning group in the process of gradually acquiring knowledge also takes on the role of a so called “Innovating Community” that supports and further develops ideas. In order to establish a useful and realistic frame of reference for eLearning it is important that the community is seen as a characteristic entity which differentiates itself from traditional social fabrics. The aim of this theoretical understanding is to develop and form in the context of education and knowledge acquisition a virtual room of possibilities which is also close to reality.

Social capital refers to the social resources individuals within a community draw upon and provide value to themselves and their organizations. These social resources include common identity, familiarity, trust, and a degree of shared language and context among individuals. These resources manifest themselves in a variety of ways, including reducing the time it takes to locate an expert within an organization, minimizing the costs associated with validating expertise and reducing the time and effort associated with developing and monitoring an agreement between individuals in an organization. All of these activities enable an organization to better manage its knowledge resources. Much like financial or human capital, social capital can be fostered and tapped as needed to enable individuals to perform their jobs more efficiently and effectively. In this paper, we hypothesize that social networks for life-long-learning are valuable to organizations because they contribute to the development of social capital, which in turn is a necessary condition for knowledge creation, sharing and use.

The social learning group which is pursued within the scope of the degree study course Internet Technology and Management and its part-time programme Software Design does not only relate to the lecturers working on particular topics. The lecturers are also supposed to initiate communities for their students in order to generate an evolutionary process concerning the groups as well as the topics.

The formation of a social network as an organism that acquires knowledge is thus be seen against a very diversified and multi-faceted background. This is especially true if the (continually developing) stock of knowledge is embedded in the context of work, social and systemic structures, social assets and the fact that the identity of the learning individual changes.

While having a network of individuals is a critical part in developing social capital, equally as important are the interpersonal dynamics between individuals within the network. This relational dimension addresses issues around trust, shared norms and values, obligations, expectations and identification that are critical in developing a social network among members of a group. Francis Fukuyama states, “Trust is the expectation that arrives within a community of regular, honest and cooperative behaviour, based on commonly shared norms on the part of other members of that community... Social capital is the capability that arises from the prevalence of trust in a society or in certain parts of it. It can be embodied in the smallest and most basic social group, the family, as well as the largest of all groups, the nation and in all the other groups in between. Social capital differs from other forms of human capital insofar as it is usually created and transmitted through cultural mechanisms like religion, tradition or historical habit.”

3. Results

The phenomenological analysis of the phenomena observed during the eLearning sessions of the virtual degree programme serves as a basis for the understanding of a virtual and social frame of reference. Thus, a Community of Practice is created (cf. Rombach). On the other hand, it is also important to try and reduce the complexity of systemic procedures if a useful reduction of social processes should be developed (cf. Luhmann).

We assume that the presence of the WE-feeling as a kind of social capital in a learning group has a greater positive impact on knowledge creation when the members believe in the WE-feeling. Using the three dimensions of real and virtual learning groups - structural, relational and cognitive - we would like to illustrate how the circle around the WE-feeling – in all three dimensions - in the social networks plays an interdisciplinary and multidimensional role in the development of social network for life-long-learning.

3.1. Structural dimension

Individuals develop a network with persons who have similar interests – this works the same way in traditional and in virtual groups. First, they serve as an intra-network clearinghouse by identifying those with relevant knowledge and helping individuals within the learning group make connections with one another. This is particularly valuable as the organization goes “virtual” and individuals find it increasingly difficult to know “who knows what.” Second, they act as a reference mechanism, quickly enabling individuals to evaluate the knowledge of other members without having to contact each individual within the network. Third, they connect individuals from outside the network – other teachers and other students - to those who are already identified as community members. We interpret this as the first step to create the WE-feeling. Therefore, it is necessary to connect our two communities (virtual student’s community and the virtual trainer’s community) to an informal social group and then build a virtual team together. If this team exists longer than the necessary learning circle (that means: after the examinations) the WE-feeling in a virtual social network has begun to work.

3.2. Relational dimension

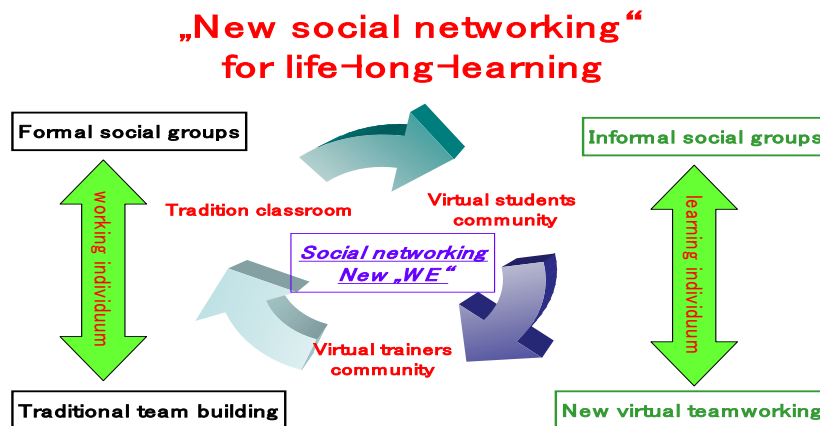
By being able to bring people together to create and share relevant knowledge, the community creates the condition where individuals can be an individual in a group. So this is a process taking place in a certain period of time and is, like Fukuyama named it, an “informal currency” in the learning group with norms and values that are generally accepted. The individuals can develop empathy for the situations of others and can establish rapport with individuals in the community.

3.3. Cognitive dimension

Communities of practice help shape the actual terminology used by group members in everyday work conversations. In addition, they generate and share the knowledge objects or “artifacts” that are used by community members. The virtual learning group generates stories that communicate the norms and values of the community and of the organization as a whole. These stories also generate the new WE-feeling in the members of the social group. After some time the group has its own memory that perpetuates itself long after the original community members have departed and we hope so long after the degree study will be ended.

The objective of our virtual learning communities is to form and develop a group identity in terms of the new evolutionary “WE”. Time, space and content are significant parameters that differentiate these knowledge communities from traditional social fabrics; none the less it seems that the development of such communities corresponds to a large degree to socio-genetic formations if the frame of reference also creates a field of sense (cf. Rombach, 287). It is a field of sense that has been formed creatively and that has also matured to become an ontological authenticity.

Figure 1. Social Networking.



After closing the circle between traditional team building and new virtual team working it will be possible to do social networking with a sustainable WE-feeling for the lifelong learning process. By continually referring to the subsystems the creation of a common knowledge oriented and content oriented structure of conscience which is seen as an individual formation of identity and as part of a social fabric should preserve, reinforce and further develop the solidarity to the community.

eLearning (eLearning in our context means blended learning with 60:40 (traditional: virtual)) within a social network is regarded as a cyclical interplay of social substructures of knowledge and their own characteristic identities. A prerequisite for this interplay is that the traditional learning environment becomes a Community of Practice in which both the “Community of Virtual Trainers” and the “Community of Virtual Students” work together. In this case the Communities of Practice are less a part of the formal social systems the learning individual is part of, but rather an integral part of informal social learning structures. The tasks, which in this case are the learning objectives of the community, forms the consciousness of the Communities of Practice within the learning structure. The collective individual that is also a changeable parameter within this lifelong process of learning has the opportunity to finally identify with this consciousness. This must be seen as a continuous improvement process in the eLearning quality management system.

The human being in its role as a social individual adapts itself during this lifelong learning process to the changing environment (in our case the learning environment or the medium of learning). The individual as part of the learning community whose sole purpose is no longer just to acquire knowledge in order to satisfy social expectations requires in addition to some informal also some personal, emotional and affective communication. These human and interpersonal factors are major conditions for forming social learning groups. The learning individual needs to find a representation of its social structures in the virtual world in order not to be degraded to a functioning monad in an “education of usability” (cf. Gruber).

The part-time programme Software Design of the degree course Internet Technology and Management tries to support and develop a Community of Practice as a social system which is primarily based on communication and which is in some parts self-referential and auto-poietic (cf. Maturana and Varela). In this sense, our communities are regarded as group structures that do not end up in formal organisational structures but that will rather outlive them as far as content and continuity are concerned. By doing so a lasting relation to the group, the educational institution FH JOANNEUM and the subject matter IT that goes beyond the duration of their studies should be achieved. This kind of relationship of individuals to and within the Communities seems to be a factor that accompanies the lifelong process of learning, especially if we emphasize the importance of affective and emotional tensions. We interpret this gap between knowledge acquisition / processing and social needs according to a humanistic world view and proceed on the assumption that these, from an evolutionary perspective, early mechanisms contribute a lot to the latency of these communities.

The communicative approach and the development of key qualifications that are necessary for these communities but that still need to be cultivated are major concerns of the degree study course Internet Technology and Management and its part-time programme Software Design. In this context it has to be pointed out that due to our innovative teaching methods (eLearning) the average age of the students of Software Design is decisively higher than that of the fulltime programme.

4. Conclusion

Communities of practice play a critical role in the day-to-day activities of organizations. One of their key functions is to build social capital among organization members, which in turn enables community members to more effectively manage their organizational knowledge. This paper has illustrated the most important connections between communities of practice, social capital and social networking. We are certain that these thoughts will help learning organizations and learning groups to manage their knowledge and lead to improved socialized learning processes for life-long-learning.

The aim of this paper is to present and explain our experiences in a virtual learning and teaching environment. The observations made during the two years of running the part-time programme Software Design enable a detailed analysis of our eLearning environment. This process of analysis was accompanied by evaluations carried out among students and lecturers and the developers of our eLearning and communication platform (Moodle or eNcephalon). The platform is supposed to accompany the learning process and to serve as a permanent room for the Communities.

The research field of social networking as well as the significance of the impact of eLearning on social networks forms a counterpoint to the technical and technological research work of the degree study course Internet Technology and Management and its special programme Software Design. It is assumed that social capital in form of confidence or solidarity within a group stabilises its relations and forms a social room which protects its members against negative influences of any kind. On the one hand side, this would lead to a better learning climate and a heightened innovative and experimental behaviour of the students. On the other hand-side, established traditions and approved ideas would be preserved and finally passed down to the next generation of students and lecturers. A better understanding of these interactions seems to be best achieved by a continuous process of observation carried out by the lecturers as well as the students.

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OOPS! THE CRITICAL ROLE OF RISK-TAKING AND FAILURE IN EDUCATIONAL CHANGE AND TEACHER EDUCATION

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Hacking Education (Israel)

Abstract

Traditional educational systems need to change. They need to be more innovative. However, innovation carries a risk—it sometimes fails. Qualitative research conducted with teachers who changed and implemented their pedagogy in innovative ways (“hacks”) in their classroom formed the foundation of a new framework to meet this need—teachers as “hackers.” These teachers’ characteristic habits and behaviors contribute to their success in creating islands of change in public schools. The participants volunteered their stories of pedagogical failures—class plans that flopped, technological tools that fizzled, and projects that fell short of their learning goals. They not only shared their cases, but also approached those failures as a natural and inherent part of becoming adaptive educators. This paper explores the role of failure and risk-taking in educational settings with the aim to encourage rethinking and opening our practices to development by making mistakes. As one participant described innovative pedagogy, “You have to be willing to fail in public.”

Keywords: Risk-taking, change, failure, innovation, education.

1. Introduction

In lectures, conferences, and educators’ professional development sessions where current research regarding teachers who hack their pedagogy is discussed, the issue of risk-taking and failure is often the most controversial. It raises questions and evokes emotional discussion. Attendees verbalize, for example, “We do not have a culture of risk-taking in schools” and “How can we discuss failure when we discuss education? We’re talking about kids’ lives.” The goal of this paper is to shed some light on that intersection of innovation, risk-taking, failure, and learning in public education settings.

1.1. Innovation, risk-taking, and failure

Failure is a complex phenomenon (Edwards & Ashkenazy, 2018). It used to be described as the end of things; now, it is part of the way forward (Loscalzo, 2014). In our constantly changing world, we are slowly shifting from talking about successes toward discussing failures (Loscalzo, 2014; Wang et al., 2018) and the often-opposing relationship between error and innovation (Bauer & Harteis, 2012). For instance, in the entrepreneurship field, most innovation studies are still based on success stories despite indications that “the experience of failure may be a substantial source for the improvement of entrepreneurship knowledge and skills after a failure” (Atsan, 2016). Clearly, as Loscalzo (2014) explained, “Failure has at least as important a role in our experience, education, and professional development as success—if we would only learn from it.”

A discussion of failure is also about learning, developing, and improving future outcomes (Atsan, 2016; Edwards & Ashkanazy, 2018; van Woerkom, 2012). “Errors can be seen as a natural by-product of active learning: As learners actively explore the environment, errors will inevitably occur. Conversely, the dogma of zero-error tolerance that exists in many organizations may unintentionally promote risk avoidance” (van Woerkom, 2012, p. 130).

In 2012, an organization in Mexico founded “Fuckup Nights,” events that have since spread internationally (Birrane, 2017). During these activities, individuals from diverse backgrounds share their stories of professional failure. These tales both inspire the audience and support the idea that any change or innovative action—as in *any* action in an age of uncertainty—risks failure. Such events, as well as other means that emphasize learning from failure, transform failure from something hidden and shame-ridden to a legitimate outcome. Once failure is legitimized, it is possible to learn from and improve upon it.

1.2. Risk-taking and failure in non-educational fields

In the high-tech industry, risk-taking often permeates the cultural organization and is built into job descriptions (Edmondson, 2011; Grossmann, 2014). Demonstrating the growing interest in learning better from failures, teams from over 50 technology-industry firms recently participated in Wang et al.'s (2018) study in Beijing, China to explore learning from failure, as well as issues of shame related to failing. Wang et al. measured learning from failure as well as professional commitment and shame. They recommended that support, enhanced sense of belonging, and as guidance regarding how to deal with shame and negative feelings after failure can create an organizational culture of learning and development.

Studies in the medical field found organizational and personal factors related to learning from failures. For example, Edmondson (2004) reported, “Interpersonal climate often inhibits speaking up with questions, concerns, and challenges” (p. ii5) and that the professional culture tends to have quick fixes to problems instead of supporting root cause analysis and systematic learning from mistakes. Edmondson also demonstrate how consistent work to create a blame-free work environment and teams that learn and develop from mistakes improve healthcare and save lives. Taking this concept a step further, Loscalzo (2014) wrote about the education process for medical students and claimed that we should not ignore failure, but celebrate it. Even if *celebrating* failure sounds like a big step to some of us, we can all understand that it carries opportunities to learn, develop, and promote change in complex systems.

1.3. Risk-taking and failure in education

An Organisation for Economic Co-operation and Development report, which focused on driving innovative and equitable change in complex education systems, devoted a full chapter to failure, entitled, “Learning to Fail, Not Failing to Learn” (Burns & Köster, 2016). It emphasizes the dichotomous relationship between innovation and error—some policies pressure the education system to change and innovative, while other regulatory forces pressure them to reduce failure. Indeed, exploring innovation and change in education systems reveals a conundrum: On one hand, leadership and policymakers encourage innovation in their education systems. On the other hand, these same administrators seek to maintain the status quo and avoid errors (Brown & Osborne, 2013; Burns & Köster, 2016). The message seems to be, “Innovation is fine, but only if it succeeds.”

Stakeholders in the education arena (policy makers, teachers, researchers, parents, and, of course, students) face a range of risks with a variety of approaches (Blanchenay & Burns, 2016). Brown and Osborne (2013) described—and then criticized—the common approaches to this junction of innovation, education systems, and risk-taking. The first approach is *risk minimalization*, meaning avoiding risk and thus its connection to innovative processes. The second is *risk analysis*. They claimed that this approach’s aim of minimizing risk consequences does not fit complex systems such as education (Blanchenay & Burns, 2016).

Instead, Brown and Osborne (2013) introduced two approaches to risk-taking and failure that offer a system of managing the risk of new actions, as well as highlighting the risk of inaction. They offered to develop a governance system to learn from failures as well as from successes. In what they termed *transparent risk governance*, “risks are openly acknowledged to all relevant stakeholders” (Blanchenay & Burns, 2016, p. 208). However, imagining such an approach in a school setting seems almost impossible—imagine parents’ reactions when you tell them, “We will try to teach algebra in a flipped classroom model, but *it might not work*.”

Similarly, Blanchenay and Burns (2016) emphasized two optional actions: “Through experimentation, i.e. the testing of innovative programmes in a limited magnitude and scope; as well as by developing a governance system that can learn from failures as well as successes” (p. 207). Their study inquired into pedagogical risks within a classroom but also provided insight into associated risk approaches, attitudes, and behaviors at broader segments, such as the school, district, or countries level.

2. Research design and general results

The participants of the current “Teachers as Hackers” study were eight public school teachers from Massachusetts who had more than 1 year experience in the profession, worked in the classroom, and demonstrated pedagogic innovation. The participating teachers came from a variety of school environments, subjects, professional backgrounds, and years of experience. Each had explored new ways to teach or incorporate nontraditional methods—such as innovative class design, project-based learning, new assessment tools, interdisciplinary perspective, or technology integration—into their teaching. These innovative actions and pedagogical explorations were individual efforts and not part of a broader reform. The data were collected using qualitative methods, primarily interviews.

The study results indicated a general profile of teachers as *hackers*—that is, teachers implementing their pedagogy in innovative ways. In general, teachers who hack are ideological and passionate about education; teaching is not only their passion but also part of “who they are.” They are highly motivated to improve their teaching processes and use their diverse backgrounds to influence their practice. They are self-reflective, constantly exploring ways to improve their pedagogy. In addition, they appreciate learning in communities of practice and try to be part of a physical or virtual professional learning community. Teachers who hack do not necessarily have more resources (e.g., time, space, or technology); instead, they utilize their limited but available resources wisely and effectively. The two most surprising themes that emerged from the qualitative analysis were their propensity for risk-taking and overcoming fear of failure. Simply stated, teachers who act as hackers follow a need or a problem, use creativity and playfulness, and take risks doing something they had never before tried in the classroom.

3. Results: risk-taking and failure

Teachers who hack are driven to explore new ways of practice. In this process of exploration and improvement, they take risks and wisely use the resources around them to reach their goals. For example, one participant talked about other teachers and the risk of not being able to adopt technology: “They get worried, ‘What if I do something wrong?’ I just don’t think about it in that way.” Indeed, teachers who hack are willing to act in the face of uncertainty and to let go of the need to know everything. One recalled, “When I launched into it . . . I didn’t know what I was doing.” Another participant reflected about the broader challenges of taking risks: “Almost everyone talks about fixing middle school, almost no one wants to do it with their own child. It is a big risk, especially if you are in a relatively successful affluent community. [Parents feel] the status quo worked well enough for [them] and so it is very scary to go away from that.”

These teachers understand that there are many possible answers to the question of how we should conduct education in the 21st century. As one stated, “A lot of people I have interacted with feel worried where[as] I definitely grew up thinking, ‘You just try it and if it doesn’t work, you try something else.’” Teachers who hack accept failure as part of the improvement process and acknowledge that technology offers endless possibilities to change their pedagogy. They are unashamed to share their failures. As one described, “I’ve made far more mistakes in the process than I have right decisions, and being open and honest in learning about that was probably the best.” Nevertheless, they reflect constantly: “It’s by no means as successful as I wish it was.” Finally, these teachers also see the educational benefits of making mistakes. “It’s good for students to see adults grappling with problems like that... I can remember as a kid, I thought teachers just knew everything—you grow up and you know it all.”

One teacher’s statement about his own attitude change summarizes the study participants’ openness about how natural it is to fail when aiming to change and innovate in education and their willingness to embrace uncertainty: “I’m embracing that myself. Getting over the idea that it’s going to be perfect or all done at once. It’s a multi-year project and I have to accept that.”

4. Discussion and recommendations

Risk-taking behavior connects well with pedagogy, innovation, and failure. In addition to a personal inclination toward taking risks, risk-taking by teachers who hack seems to increase with their experience and professional confidence. Although traditionally not considered a quality of good teachers, risk-taking dominates change theory (e.g., Heifez, Linsky & Grashow, 2009).

Robinson (2009) showed that fear can prevent people from entering a situation in which they feel threatened; thus, they lose a possible learning experience (Jarvis, 2012). Mezirow (1994) referred to similar emotions and claimed the first phase of a learning process is a disorienting dilemma. However, the tendency to be ashamed and to avoid or hide failure is natural.

Human beings are also inherently reluctant to acknowledge their failures, disappointments, and misadventures—largely because of the fear of shame and embarrassment among important others. The desire to be seen as capable and competent is especially important in the workplace, where successes are typically rewarded and failures punished. (Edwards & Ashkenazy, 2018, p. 169)

This natural inclination makes the fact that all study participants shared their failures without being asked even more impressive.

Van Woerkom (2012) found team members more likely to suggest new ideas in an environment that has a healthy approach to problem-solving mistakes than in an atmosphere of blame. However, in practice, discussion of the risks of *inaction* is almost nonexistent. In an era of uncertainty, the status quo is often perceived as “good enough,” but the reality is more complex. If we want our schools to change, we

need to let risk-taking and failure enter the gate. We need to acknowledge—if not celebrate—failure as much as we celebrate success. Embracing failure is a key factor to transforming education. We can experiment at the individual, as well as the policy, level (Blanchenay & Burns, 2016). “Policy experimentation aims to improve the system by explicitly testing new policy options and assessing which could be successfully generalized” (p. 168). Other complex public sectors, such as health care and economics, have already implemented such policy options.

A related issue is the level of autonomy that individuals and teams have—an autonomy that can encourage them to deal with failure and learn from it appropriately.

It is crucial for education systems to anticipate those risks, both in terms of establishing a process for governing risk and developing a transparent and reactive way to make decisions about the kinds of risks that are acceptable in any given situation. But there is another element of the process that is equally important: education systems must accept that taking risks (in experimentation and indeed in any kind of innovation) means that there is a possibility of failure. (van Woerkom, 2012, p. 213)

The cases described in this “teachers who hack” study are local, and the participants who implemented the innovations claimed they had not been able to scale them up to an entire school or even a department. Blanchenay and Burns (2016) explained this phenomenon, claiming that “in a complex system, bottom-up initiatives cannot be scaled up to the broader system without at least some level of centralized discussion” (p. 173).

Despite the shift from talking about successes toward discussing failures (Loscalzo, 2014; Wang et al., 2018), much work is still needed to create a culture of constructive learning from mistakes (van Woerkom, 2012). Thus, my paradoxical recommendation is to devote more research to the somewhat neglected area of innovation risk management in the public sector—a recommendation with inherent risks. “At the micro-level, formative work is required to explore the processes through which individual users, citizens, politicians, service professionals, and other stakeholders will engage in risk governance for innovations in public services” (Brown & Osborne, 2013, p. 204).

5. Summary

Who wants to talk about failure? It may be nicer to cut ribbons and celebrate success—but there can be no ribbons if we do not manage risk and transform it with more transparency. Risk-taking is becoming a core skill (Rolfe, 2010). When discussing risk-taking, we must bear in mind the underlying risk that exists every day in schools—the risk of *inaction*, of *not* changing, of keeping the status quo and failing daily without acknowledging the failures (Blanchenay & Burns, 2016).

We should promote an organizational culture that breaks the connection between failure and negativity (Wang et al., 2018). If we want innovative education, we need to be open for possible innovation failures (Wizel, 2018).

Although this paper may seem devoted to failure, it embraces that risk-taking also offers the satisfaction of success. As one participant shared, “I have to tell you that this one, from the first run, it just exploded and everything was far beyond my imagination how well it went.”

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COMBINING LANGUAGE AND CULTURE LEARNING IN TEACHER EDUCATION AT MARTIN LUTHER UNIVERSITY HALLE WITTENBERG

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Abstract

At Halle's Martin Luther University the federally funded KALEI project is concentrating on future teachers' cultural assumptions and beliefs. In a two-fold approach it foresees on the one hand to increase the international mobility of students and on the other hand to develop a varied range of different courses to raise the students' intercultural awareness by explicitly combining language and culture learning. Within the almost exclusively mono-lingual German education system this is an innovative approach, which not only appreciates the various languages and their respective speakers but also acknowledges and underlines the emotional and symbolic component of languages and cultures.

Among the recently established courses is "Arabic in classrooms", which was set up in cooperation with the Institute for Oriental Studies. With a great number of Arabic-speaking pupils in schools, a course, that acquaints future teachers with the Arab language for classroom situations and provides knowledge on the history and cultures of the region, is very popular among students. The course ends with a certificate and is now a permanent part of the supplementary course program for our students wishing to become teachers.

Another innovative format combining language and culture aspects, open to prospective teachers of all subjects, is a number of sessions where students talk to international PhDs about their individual school experiences outside Germany. Every session goes by the tag-line "What school is like in ..." and features very personal insights into the cultural dimension of school, education and growing-up in another country.

In every-day school life language learning is not limited to the language classes. Teachers of all subjects have to have profound knowledge in the field of teaching German as a target language. The course "Teaching German as a target language" aims at facilitating students with the knowledge how teaching German along with the subject matter. With a multi-disciplinary team of lecturers with very diverse backgrounds (German Studies, Cultural Studies, Special Needs Education) the course deals with all questions of language learning, such as alphabetization, word formation, grammar, but also looks on the pupils' side addressing special needs, learning difficulties and psychological preconditions. Over the duration of the course every student will develop a learning material to be tested and employed in participating schools.

The accompanying research on all measures is addressing prospective teachers' cultural assumptions and beliefs. In particular, it is focusing on an increased intercultural awareness through situations of culture contact and cultural learning.

The oral presentation will focus on the measures, their content and range, the effect and on-going research.

Keywords: *Teacher education, intercultural professionalisation, culture and language learning, German as a target language, cultural assumptions and beliefs.*

1. Introduction

To deal with cultural and language diversity is considered to be one of the most important skills for prospective teachers, making it indispensable to culturally diversify teacher education.¹

In Halle, the federal state of Saxony-Anhalt's teacher education for schools of general education is concentrated at the University's Center for Teacher Education (CTE, German: Zentrum für

¹Cf. Bohl, T. et al. (2017). *Umgang mit Heterogenität in Schule und Unterricht. Grundlagentheoretische Beiträge und didaktische Reflexionen*. Bad Heilbrunn: Verlag Julius Klinkhardt.

Lehrer*innenbildung, ZLB). It is responsible for about 3300 students in degree courses for all German school types.

The Center's team "Internationalisation of Teacher Education" has devised a dual approach, that foresees on the one hand to increase the international mobility of students ("Internationalisation Abroad") and on the other hand to develop a varied range of different courses ("Internationalisation At Home") to raise the students' intercultural awareness by explicitly combining language and culture learning. This is an innovative approach within the almost exclusively mono-lingual German education system, as it not only appreciates the various languages and their respective speakers but also acknowledges and underlines the emotional and symbolic component of languages and cultures.²

Figure 1. Project visualisation Internationalisation of Teacher Education.



2. Internationalisation abroad

During the last decades, numbers of students engaged in international mobility have been very marginal at the universities involved in teacher education throughout Germany.³ Through focused advertisement for international mobility and information on funding possibilities, uniform recognition of stays abroad and the holistic coaching approach before, during and after field experiences abroad, numbers of students going abroad should be increased. At the University of Halle, the completion of various field experiences is an obligatory part of teacher education, thus opening most of these field experiences to be completed abroad was a logical decision. This kind of strategy was successfully implemented in collaboration with the Center's Office for Field Experiences. On the CTE's side work was required to strengthen ties with the Uni's International Office and to reactivate existing international partnerships, also to gain new foreign pedagogical institutions as partners and to continuously foster co-operations with partner institutions worldwide.⁴ The result of these actions was an increase of more than 100% in international mobility for students.

² Cf. Dirim, İ. et al. (2015): *Impulse für die Migrationsgesellschaft*. Münster: Waxmann.

³ For statistics on international student mobility cf. Stifterverband (2015). *Hochschul-Bildungs-Report 2020 Bericht 2015*. Retrieved March 7, 2019, from <https://www.stifterverband.org/hochschul-bildungs-report-2020-bericht-2015>, 52-55.

⁴ See for cooperations and activities: https://www.international.uni-halle.de/international_office/.

3. Internationalisation at home

Aiming at complementary offers for intercultural professionalisation at the home institution, a second project area⁵ was established. It focuses on teaching offers that combine culture and language learning and expose students to different ideas of school and learning. The courses, lectures and learning elements are open to all students studying to become teachers in either German Gymnasien, secondary, primary schools or special needs education. Underlying is an approach of dual professionalisation⁶ – consisting of factual knowledge and experiential know-how –, that spans the different teaching formats:

- Certification course on language and culture learning (“Arabic In Classrooms”)
- Supplementary course on learning and education in other cultures (“What school is like in ...”)
- Certification course “Teaching German As A Target Language” for heterogeneous settings

3.1. Arabic in classrooms

Through our evaluations in teacher education we have found that a great number of teacher trainees feels poorly prepared for pedagogical actions in culturally diverse teaching and learning situations. On the one hand this is due to a lack of knowledge concerning the apparent multilingualism among pupils and on the other hand due to little experience in cross-cultural environments. Both results in a narrowing of the options for the individual teachers’ professional actions. To address those shortcomings the CTE, in cooperation with Martin Luther University’s Institute for Oriental Studies, has initiated a 40 hour certification course “Arabic In Classrooms”. The course structure aims at providing students with a basic competence of Arabic (mostly listening and speaking and focused on the Syrian-Lebanese dialect as a prevalent and easily accessible variety). It also offers orientational knowledge regarding the languages and cultures of the Arab-speaking world. Conversations with immigrant and displaced pupils from German schools stimulate a change in perspective and further increase the learning yield. The course is held by Arabic native speakers that have a distinct teaching profile in higher education. “Arabic In Classrooms” has proven to be very popular among teacher education students and is being offered once per semester. The course’s format is easily transferable to other languages and a similar course focusing on Farsi is in development.

3.2. What school is like in ...

In order to initiate a personal engagement and individual insights into the cultural dimensions of school, education and growing up in another country, a new supplementary course has been established. This course goes by the tag-line “What school is like in my country” and opens a dialogue between prospective teachers and international PhDs and researchers from abroad. It functions in the form of a biographical interview between students and the speaker, who gives otherwise neutral figures and numbers a human face. We ask our guests to talk about their personal school experiences, growing up and generally being a young person in another country outside Germany. By now, relatively young speakers (25 to 38 years) from countries such as Albania, Benin, Brazil, Cameroon, Colombia, Kenya, Lebanon, Peru, Serbia and Syria have contributed. They can be referred to as peers for students – which represents a decisive trait of our course concept, based on the positive link between knowledge acquisition and the formation of affectionate relations.⁷

With the intent to share parts of the format with a broader public and to adapt it to new target groups (such as teacher educators and in-service teachers), we also have conducted guided video interviews with all of our speakers. Interview questions focus on beliefs and attitudes towards education and learning outside Germany. In the research process, findings will be contrasted by using the documentary method.⁸

3.3. Teaching German as a target language

In school life language acquisition and language learning extend beyond language classes⁹. Of course, tomorrow’s teaching staff needs to have extensive knowledge on the German language and its appropriate use throughout all subjects. Thus, in first place, this course grants all students the linguistics

⁵ Inner boxes, framed by the parenthesis.

⁶ Cf. Oevermann, U. (1996). Theoretische Skizze einer revidierten Theorie professionellen Handelns. In A. Combe & W. Helsper (Eds.), *Pädagogische Professionalität* (70-183). Frankfurt a.M.: Suhrkamp.

⁷ Stürmer, S. (2008). Die Kontakthypothese. In L.-E. Petersen & B. Six, *Stereotype, Vorurteile und soziale Diskriminierung* (283-291). Weinheim: Beltz.

⁸ Cf. Bohnsack, R. (2011). *Qualitative Bild- und Videointerpretation: Die dokumentarische Methode*. Stuttgart: UTB 2011.

⁹ Cf. Ahrenholz, B. & Oomen-Welke, I. (2017). *Deutsch als Zweitsprache*. Hohengehren: Schneider.

and methodology necessary to teach German along the subject matter.¹⁰ However, beyond this, factual knowledge in several different other fields is required:

- (1) Psychological preconditions and special needs education,
- (2) Cross-cultural mediation in schools,
- (3) (Re-)design of learning materials.

An innovative feature is the inclusion of University staff from different faculties (such as German Studies, psychology and sociology), who cooperate with the Center for Teacher Education (responsible for the part on cross-cultural mediation). All lecturers have hands-on experience in teaching pupils with migration background in different schools. The course schedule foresees a kick-off meeting to be held in a school and with the different teachers being present. It is the chance for students to engage in a discussion and get a first idea of the challenges ahead and the nature of the learning material that is asked to be designed or created. Most of the sessions are held as evening or full-day workshops on the weekend. The closing event features a teaching material exchange of the GATL-materials¹¹ that our students have developed and that were tested by them, some teachers and pupils from our partner institutions.

4. Conclusion

The underlying concept of the Internationalisation of Teacher Education as designed by the CTE aims to increase intercultural awareness through situations of culture contact and cultural learning. It blends language and culture learning in order to offer an effective means to counter the (still) prevalent monolingualism in the German education system.

The accompanying research on all activities addresses prospective teachers' cultural assumptions and beliefs, which are crucial for their future pedagogical actions as multipliers in a plural, globally networked society¹². The ideal of school mirroring the open society, which can only be fulfilled through these kind of multipliers, becomes increasingly important in today's Europe with its tendencies towards exclusive and populist agendas. In this complex situation, institutions of teacher education more than ever carry the responsibility to constantly motivate students and ultimately teachers-to-be to appreciate cultural heterogeneity.

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¹⁰ Cf. Lütke, B. et al. (2017). *Fachintegrierte Sprachbildung: Forschung, Theoriebildung und Konzepte für die Unterrichtspraxis*. Berlin/New York: De Gruyter.

¹¹ To access all materials of past courses see: <https://cloud.uni-halle.de/index.php/s/XWXg7coJ9SnBPBw>.

¹² Kultusministerkonferenz (2013). *Interkulturelle Bildung und Erziehung in der Schule*. Retrieved March 7, 2019, from https://www.kmk.org/fileadmin/Dateien/pdf/Themen/Kultur/1996_10_25-Interkulturelle-Bildung.pdf, 2.

BENEFITS OF CLASS TESTS AND CONTINUOUS ASSESSMENT IN HIGHER EDUCATION MATHEMATICS

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Abstract

There is a general interest in providing a wide range of forms of assessment in order to improve the performance on metrics such as the National Student Survey (NSS) and the Teaching Excellence Framework (TEF). Hence, there has been a growing pressure on staff to innovate on teaching and learning in general. This paper considers the option of continuous assessment and its impact on student's performance, attendance and workload based on a quantitative and qualitative analysis.

A study-case based on undergraduate students of Mathematical Sciences will be presented. In a two-semester module, we used the compulsory logbook component to change its assessment method for each semester, and compared continuous assessment throughout the second semester versus single-submission at the end of the first semester.

We analysed the correlation between exam results, logbook marks for each semester, class test and written assignments and student attendance, and we examined student views from a survey distributed at the end of the year. The results show that the weekly logbook helped students' revision and distributed their workload throughout the semester, whilst it made a significant positive difference in performance for students with high attendance.

Keywords: *Continuous assessment, workload, attendance, coursework, teaching and learning.*

1. Introduction and literature review

Thinking about assessment in higher education, there are mainly three viewpoints to consider: the students, the lecturers and the educational institutions. With an increasing pressure of expectations from lecturers, there is the need to improve the working conditions of teaching staff, like limiting the number of students per group, counting teaching hours comprehensively by including all preparation, etc. (Coll et al, 2007). This will ensure that the quality of university teaching increases and gets sustained.

There is no doubt that the implementation of continuous assessment brings additional workload for academics, due to the ongoing feedback to students involved (Trotter, 2006). However, this is an essential part of continuous assessment in the form of formative assessment, and it has been proven beneficial to support student learning (Hernandez, 2012). One of the reported benefits to lecturers, is that it informs their teaching, making it more adaptative to student's needs (Coll et al, 2007).

At the same time, learners have the opportunity to make an informed decision on what are the subject areas they need to work more on, in response to the feedback given. Hence, high student involvement is required and the amount of time dedicated to the subject ends up being higher than the average (Coll, 2004; Mawhinney et al, 1971). Thinking in particular about the study of Mathematics, it is accepted that continuous formative assessment improves student learning and helps to distribute the content more appropriately by making the learning more frequent and spaced (Loucks-Horsley, 1996; Myers and Myers, 2007). In addition, it is a good predictor of students' exam results, and students taking this kind of learning in Mathematics outperform students who do not (Shorter and Young, 2001).

Regarding the relationship between formative and summative assessment, some texts report that it is advisable to validate formative assessment with a summative one, in the form of an exam that would test student independence (Yorke, 2003; Soler et al, 2004). However, this second instance might bring the known difficulty of students giving more importance to marks rather than to the written feedback, and sometimes even ignoring the feedback altogether (Yorke, 2007, QAA, 2007).

Having all this in mind, our purpose with this paper is to come to an informed decision about what formats of assessment are more effective for the learning of our students of mathematics in higher education.

2. Background and motivation

The sample consisted of 21 students from a second-year undergraduate programme in Mathematics of a university in the United Kingdom. This study focuses in the results of formative and summative of one of the compulsory modules of the degree based on Linear Algebra and Mathematical Analysis which runs for 24 weeks – 12 weeks in the first semester and 12 weeks in the second semester. In each week, there are three consecutive teaching hours which are generally structured as 2 hours for lectures and one hour for a practical class.

The module is assessed using a wide range of forms:

Assessment in Semester 1

- Assignment 1 (10% of the final grade): set of exercises to be submitted within a given deadline, usually three weeks. Students have to work on their own.
- Logbook 1 (5% of the final grade): a logbook is understood as a compendium of evidence of the student's work throughout the semester. In this case, students had to submit a summary of all the material taught in the first semester by the end of the semester. There are no checks on whether the student does the work weekly.

Assessment in Semester 2

- Class test (10% of the final grade): this is an exam of the same format as the final exam containing only material of the first semester.
- Assignment 2 (10% of the final grade): set of exercises on the material taught during Semester 2 to be submitted within a given deadline, usually three weeks. Students have to work on their own.
- Logbook 2 (5% of the final grade): during the semester 2 and for the purpose of this study, we considered a different structure from Logbook 1. Each week the lecturer would ask for some homework and will check on the following week, in class. The lecturer checks whether the work has been completed, and provides verbal feedback to the answers. Students were encouraged to ask additional questions that the lecturer would solve on a one-to-one basis.

Final Exam (60% of the final grade): exam of two hours covering all the material of the module.

Given the different forms of assessments on this module, the authors pose the following questions:

1. Which form of assessment, and in particular which type of logbook helps students to perform better in the final exam?
2. Which form of assessment is preferred by students?
3. Which assessment components imply a larger workload for lecturers?

3. Quantitative analysis

In order to answer these questions, we will carry out a quantitative and qualitative analysis of the sample. The quantitative analysis will consist on analysing the results obtained in each of the assessments and measure the correlation with the final grade in the exam. We will choose the Spearman and Kendall's tau correlation coefficients as the most adequate statistic to measure the relationship between the grades of each of the assessment components due to the lack of normality in some of the cases. Although Spearman's rho is the popular measure on the literature, there is evidence that Kendall's tau is more statistically robust (Croux and Dehon, 2010). Furthermore, we will test the null hypothesis *there is not a significant correlation between assessment component A and assessment component B*.

Table 1. Non-parametric Spearman Correlations ($n = 21$).

	Assignment 1	Logbook 1	Logbook 2	Class Test	Assignment 2
Logbook 1	0.380				
Logbook 2	0.358	0.565**			
Class Test	0.597**	0.640**	0.358		
Assignment 2	0.234	-0.131	0.291	-0.099	
Exam	0.437*	0.602**	0.205	0.772***	-0.369

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 2. Non-parametric Kendall's tau Correlations (n = 21).

	Assignment 1	Logbook 1	Logbook 2	Class Test	Assignment 2
Logbook 1	0.289				
Logbook 2	0.269	0.488**			
Class Test	0.450**	0.494**	0.289		
Assignment 2	0.127	-0.075	0.197	0.650	
Exam	0.302	0.448**	0.162	0.609***	-0.242

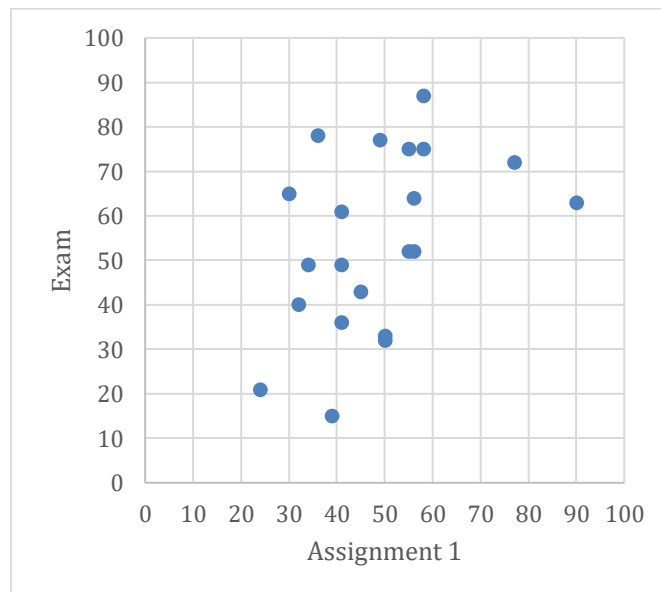
*p < .05, **p<.01, ***p<.001

With these results, we can provide an answer for questions 1 and 2. Regarding question 1, from Table X and Table X we can see that in both cases there exists a statistically significant positive correlation between Logbook 1 and Exam (Spearman's rho = 0.602, Kendall's tau = 0.448) what implies that students with higher marks in Logbook 1 also had higher marks in the final exam. The same can be deduced for the Class Test and the Exam with a p-value smaller than 0.001 for both Spearman's rho correlation's test and Kendall's tau correlation's test. The only difference between both correlations is the relationship between the Assignment 1 and the Exam. In this case, the correlation test happened to be significant for the Spearman's rho test but not for the Kendall's tau test. Therefore, further research is required and for this purpose, we plot a scatter plot with both variables.

From this scatterplot, we can notice the appearance of two apparent outliers at the very right-hand side of the diagram. Should we neglect the two points the data appears to be structure on a vertical column for which there is not a clear line of best fit. Therefore, it is not possible to conclude that there is clear evidence on the relationship between the performance on the Assignment 1 and the Exam. Both outliers correspond to students that performed well in both. From the remaining group of students, some of them could have well pushed to study more during the second semester and improve the results from the previous semester.

Consequently, we can conclude from the data analysis that the Class Test and the Logbook 1 were the forms of assessment that significantly contributed towards the exam grade.

Figure 1. Scatter Plot (n = 21).



4. Qualitative analysis

A simple survey was run to understand student preferences and perceptions of the different forms of logbook. The response rate was 6 out of 21 students, 29%, therefore, it is important to be cautious about the generalisation of this qualitative analysis. The survey consisted of the 4 following questions:

1. Did the Logbook 2 help you to revise weekly?
2. During the last two weeks of semester two (when the logbook was not due anymore). Did you still solve the exercise sheets after each lecture?
3. Did you prefer Logbook 2 over Logbook 1?
4. Why? In your opinion, what are the advantages and disadvantages of a weekly logbook versus an end of semester logbook?

Students strongly agree that the Logbook 2 helped their revision. Some comment that it makes their workload more manageable in general, except when it clashes with assignments from other modules. Regarding what logbook format they preferred there are mixed opinions, but they lean towards the weekly one. One comment mentions that the assessment of the logbooks did not reward the individual effort.

From a lecturer perspective, checking weekly entails spending some of the practical time checking whether students have done the corresponding tasks whereas submitting a big chunk at the end entails not spending time on lectures but adding extra time on marking for the lecturer. In both cases, both lecturers agree that there are often situations of plagiarism with assignments and logbooks. If the lecturer checks the work weekly, then, it is hard to spot plagiarism in detail whereas with an assignment submission the lecturer has more time to detect this sort of issues, resulting, however, in more time of workload for lecturers.

With the increasing pressure for having an excellent student experience, high position on university rankings and the fierce student market competition, student feedback is thoroughly considered. This is where there are usually issues with clashing deadlines regarding the nature of the assignments.

There is not an easy win in the choice of the assessment format. Nevertheless, from the quantitative study, it seems that class tests contribute towards a better performance in exams. Furthermore, the use of logbooks helps revising weekly, although it causes clashes and sometimes burden for lecturers. Therefore, it makes sense to consider a mixture of both methods such as a series of class tests with the following characteristics:

- one class test every certain number of weeks,
- every class test will contain all the material of the module up to the date,
- if a student improves the grade on a later class test, then that test overrides previous tests.

This format of continuous assessment has been tested for the first time in a different module with similar teaching hours in order to improve the results and the retention of the students. The cohort consisted of 40 students, the results from the first two class tests showed that the average grade improved from 51 marks to 61 preserving a similar standard deviation of 30.5. Moreover, 70% of the students improved their grade. These are the results from the first semester and further research will continue to analyse this assessment format in depth.

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ORAL ASSESSMENTS: ENCOURAGE STUDENTS' MATHEMATICAL AND STATISTICAL TALKING

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Abstract

Take a moment to recall assessments in mathematics and statistics, memories of written tests and final examinations may surface, particularly, those questions that you simply could not start or could not understand. Sometimes, the recollection may be the time you were astonished as you received full marks for a solution when you would readily admit to the absence of any “real knowledge” of the topic. A written solution may not fully reveal the true thoughts and reasoning behind its construction, thus masking whether a concept is fully understood or a solution is the result of a template. Conversations may reveal more evidence of mathematical knowledge than a written solution alone, and as such it may provide a valuable tool to enhance the learning and assessment process.

The promotion of “mathematical/statistical talk” requires students to be comfortable to suggest ideas and more, importantly, be less fearful of saying the “wrong thing”. This can be achieved by working in groups of three or four standing at whiteboards and even if students are passive, initially, this is still preferable to staring at a blank sheet of paper totally alone.

The structure of the class is adapted to include inquiry-based learning activities with an emphasis on vocal explanations concurrent with a written solution on whiteboards. Emphasis will be on the ability to formulate questions effectively, to discover individual mathematical strategies, to be able to link mathematical and statistical ideas to produce well-constructed explanations and the capacity to start a solution. These implicit skills will hopefully aid the students during tertiary studies and beyond into employment.

The oral presentation assessment allows students to feel free to be creative mathematically/statistically whilst demonstrating concepts and skills which may not be experienced when writing an answer to a question in a test or examination.

This exploratory qualitative paper will show the constructive alignment process by referencing Structure of the Observed Learning Outcome (SOLO) taxonomy in two pathway courses leading to entry to first year Engineering and Information Technology degrees. In this style of class, educators ask for talking noise rather than the sound of silence.

Keywords: *SOLO taxonomy, oral presentation, constructive alignment.*

1. Introduction

When teaching, at any education level, the spoken word is the primary conduit for conveying concepts, ideas and solutions. Assessments in mathematics and statistics consist of written format for the most part rather than employing the oldest form of skill evaluation, oral (or viva voce) (Huxham, Campbell, & Westward, 2012). Doctoral thesis, the legal moot court and many postgraduate medical programmes utilise oral examinations in their final assessment component (Joughin, 2007). This approach is to evaluate the reasoning and understanding behind the prose and as interpreted by the author.

Oral evaluations may reveal more knowledge than a written solution, allows for demonstration of a broader range of skills and placing an emphasis on oral communication at university encourages the development of this graduate attribute. Tertiary students will read the course outline concentrating on the assessment tasks with the expectation of written tests followed by a final examination. They will pay particular attention to what is involved, when it is due and how much it is worth and the focus will be an accumulation of marks rather than an accumulation of knowledge. The tutorials and assessment are conducted in the same style: students work in groups at whiteboards around the room, in the style of a “flipped tutorial” (Seaton, King, & Sandison, 2014). Weekly oral-based tutorials provide an opportunity

for peer teaching and peer learning through teaching. It is essential that an assessment is aligned with the teaching style, so that students are being assessed in the same mode as they are being taught. Since, the students are accustomed to discussing problems in groups in tutorials each week, the assessment style is aligned. Please note that this not excluding written tests as assessments, but rather an accompaniment assessment.

2. Design of tutorial

The first impressions (or should that be fears?) when the phrase ‘Oral Presentation’ is mentioned in any situation not just an educational setting may include ‘I will look like an idiot’, ‘I will say the wrong words’, ‘I will embarrass myself’, ‘I don’t know the topic that well, what if I cannot answer a posed question’ and many more. The emphasis firmly placed on ‘I’ and it is the ‘solo aspect’ of mathematics learning that requires addressing here. The mathematical and statistical learning environment experienced at most primary and lower secondary is a ‘social group approach’ at solving problems and collaborating on ideas and solutions. However, when high stake examinations approach at secondary level, the learning environment becomes more ‘solo’ than previously encountered. At tertiary level, this ‘solo’ aspect may be more pronounced and can be a little alienating for weaker students. This tutorial style has been around for over thirty years, originating from La Trobe University of Melbourne, Australia and hence is, often, referred to as the ‘La Trobe Method’ (Seaton et al, 2014). The tutorial has evolved to suit physical environments and specific topics, but the one constant element is the students actively drive the tutorial by participation in whatever manner or role each time. The ideal environment is to have a room where whiteboards are integrated into the walls, though portable whiteboards may be used just as effectively with a wobble or two! Different coloured whiteboard markers, magnets and board dusters together with the previously unseen question sheet are supplied by the tutor.

2.1. The ambiance of first tutorial

It is essential that the initial tutorial creates an atmosphere of community and sets the tempo for the rest of the semester. Often, students are unaware that they will be gathering around whiteboards discussing problems rather than sitting at tables individually completing questions. Tutors have to adjust and may need guidance since questions and queries may not be as predictable as before and the relinquishing of control of the class flow to groups is not always easy. Simple gestures can frequently be overlooked in the schemata of learning. A welcoming smile with words of encouragement can quickly change a cold tutorial room into an amenable learning environment where nerves and apprehension are traded for introductions and chatter about questions. (Sadeghi, Ofoghi, Hamidi, Niayfar, & Babaei, 2016)

Just as that first day at kindergarten, where to sit after entering the room or choosing the colour of the whiteboard marker are the first major decisions that students confront. It appears to be an unwritten rule in life (in many different situations) that if other seats are available at an empty table then this seat is preferable to joining a table with a stranger. My first active role is to guide students to creating tables of four as they enter the class and encourage conversation. As the students approach the whiteboards, where the questions have been placed, they will be apprehensive in initiating conversations about suggestions, but the audience is now smaller (just three other people).

2.2. The question

Discussion of mathematical ideas, concepts and strategies are usually the domain of the educator not that of the student so anxiety levels may increase concerning revealing lack of knowledge and mathematical communication abilities. The following quote is useful in providing the students with an insight to the pathway the semester will follow; ‘We learn more by looking for the answer to a question and not finding it than we do from learning the answer itself’ (Alexander, 1964). Students have access to any online material or lecture notes as the questions are modelled to promote discussion rather than a quick solution.

With the magnets holding the questions in position, students can approach the question in whichever manner they feel appropriate. Sometimes, a student may decide to choose to work on one solution with the individual commentating on a specific method, and then another student may repeat using another method. Students may discuss the merits of each solution and even discover another approach. Students may suggest an approach and proceed to produce a solution, others may interject to add or amend at various points in the solution on the whiteboard. Thus, within one main solution many alternatives are entwined so students have the opportunity to see mathematical and statistical strategies without extra effort. It is surprising how quickly all inhibitions disappear as the semester progresses and friendships with a community spirit emerge. The groups are not homogeneous in terms of mathematical or statistical ability and this creates a symbiotic relationship within the group where knowledge is exchanged through queries and explanations.

3. Structure of the observed learning outcome (SOLO) taxonomy

Students believe and quote learning mathematics and statistics as a mixture of recapitulating lecture materials, rote memory of facts and methods with never-ending repetition of examination-type examples regardless of their chosen major (Sheryn & Ell, 2014). The following quote from Barton (2011) is an indication that this cycle is endemic at all levels of mathematics education:

The tyranny of examples is at the heart of the interaction between mathematics as a subject and pedagogical pressures. Many lectures focus on doing exercises rather than teasing out problems, asking open questions, or exploring deep understanding. The dominance of exercise mode, and the perception (enhanced by assessment practices) that successful mathematics means solutions to exercises, is an enduring phenomenon in schools and universities. (Barton, 2011).

Students can be reluctant in appreciating and acknowledging the level of their own knowledge and understanding of a topic. This, often, produces the dichotomy of 'I know how to answer questions on this topic or I don't know how to answer questions on this topic'. Standing around the whiteboards, even if only observing rather than contributing, has a prospect of illuminating a possible strategy in an easier fashion than with individual work. Weaker students may feel less self-conscious as ideas can be captured seamlessly rather than visibly interrupting an individual who is working.

Structure of the Observed Learning Outcome taxonomy (SOLO) helps students to grasp the fact that progress in understanding is happening, no matter how small, while aiding educators to discover the scope and growth of the comprehension of a particular topic. The act of reviewing students' solutions as a group is less intimidating and frequently the nature of the question is one to obtain more topic information rather than the correctness of the answer. The complete worked solution, correct or incorrect, reveals the depth of understanding of how they have inter-related and organised the individual parts.

There are five levels starting at the lowest level, Pre-structural, Unistructural, Multistructural, and Relational through to Extended Abstract (Biggs & Collis, 1982).

3.1. Pre-structural level

This is an important stage since every journey starts with a small essential step in order to find the final destination. Recognition and collection of information from question in order to solve the problem is important and students need to be made aware that this is progress! Usually this will consist of unconnected information snippets with no overall pattern of organisation. Students will transcribe symbols and formulae from lecture notes or web sources onto the whiteboard, but no particular direction to a solution is involved.

For example, a contextual question concerning basic differentiation, students will have written numbers, expressions and/or equations that have been explicitly stated in the question. No obvious links are noticeable from the workings on the whiteboard.

3.2. Unistructural level

This stage is similar to the previous stage so students may not comprehend that improvement in understanding is occurring so recognition, at this point, can improve confidence in their ability. Hopefully, this will lift the thinking from 'not knowing what to do' to 'an idea of where to go but not sure of the path to take'. Modest links are made between the question and required information essential to proceed to the solution. The relevant information is recognised, but not clearly understood to how to use it to progress further in the solution.

For example, students recognise that differentiation will play some role in the solution, but how and why still eludes students. The whiteboard will show $y = \text{expression}$ with a mention of dy/dx but no workings.

3.3. Multistructural level

Now, connections are made, but their significance to each other and the pathway to the solution is overlooked. The layers are visible, but how and why the aspect of the understanding to continue has still to be developed.

For example, students understand that $y = \text{expression}$ needs to be differentiated and has basic mechanisms to proceed to a certain point in the workings, but fails to recognise that another rule or strategy is necessary to get to the final answer. The whiteboard will show $y = \text{expression}$ with correct placement of dy/dx with the basic correct derivatives though, did not use product or chain rule which is required to progress to the correct solution.

3.4. Relational level

This stage is where all the pieces are understood and are now accompanied with an appreciation of all the inter-relationships. The question is read, comprehended, and a plan of action decided as to a pathway to the correct solution.

For example, students will holistically view in the context of question the differentiation aspects in relation to the given expression and possess all the algebra competencies to complete the correct pathway. The whiteboard will show $y = \text{expression}$ with dy/dx (and all rules) used contextually correctly within the question rather than just algebraically correct. A logical progression and understanding is witnessed in written and verbal form.

3.5. Extended abstract level

This is the final stage where students will desire to go beyond the aura of the solution and transfer the information and knowledge to other areas and conditions. Here, students will understand the rules, strategies and algebra necessary to differentiate the given expression and how to interpret the result as a practical application.

For example, students will have the whiteboard as described above in Relational level, but will go one step beyond. The optimisation question may have not specifically asked for optimal dimensions of a cuboid, but students deduce the next steps without being explicitly asked in question or by tutor. The mathematical journey involved, crafting the given situation into algebraic formulae, followed by an appropriate differentiation manoeuvring through to the practical realm and ultimately to the numerical dimensions required.

4. Discussion

It is very easy to jump to conclusions that this tutorial style would not suit the shy student, individually motivated, or overall weaker students. Students are practical and often without explicit guidance quickly pool resources, facilitating elevation or extension of their insight of the concept or topic. Students use the whiteboards in whichever manner suits them and the question, often little departures from the solution lead to the cementing of concepts. Azmitia, Fawcett & Garton, and Schwartz & Okita found that learning occur when observing how others solve problems, explaining one's thought processes as you proceed through a problem and the act of teaching your peers (Azmitia, 1988, Fawcett & Garton, 2005, and Schwartz & Okita, 2013) These practices occur each tutorial whenever the group tackles a problem even though, students' contributions may differ. The experience described through this paper has been at the tertiary level whilst practitioners of this style of tutorial in earlier education levels have introduced some rules for students. Pairs of students have to take turns in writing and explaining the solutions and the reason may be associated with age and maturity of students rather than tutorial design fault (Forrester, Sandison, & Denny (2017).

At the tertiary level, classes usually involve a mixture of students differing in age, life and job experiences, stage of degree courses, and of course, mathematical ability. The initial weaker student, who may have failed a written test, can now demonstrate the ability to construct and write a solution with a clear verbal explanation (Taylor, & McDonald, 2007).

The benefits of this style of tutorial beyond just the mathematical content, skills such as a team player, co-operative, good communication skills, ability to learn, adapt and use initiative may be the key to keeping your position and attaining promotion in a company. The conversations flow from the theory to methods and calculations through to practical applications, thus mathematics becomes more than just numbers. Any oral assessment usually fills students with panic as just writing with no understanding will no longer be sufficient. Students appreciate that the tutorials each week have been a preparation and this assessment, although still nerve-racking, is not unknown territory. Presenting in front of the class is not as daunting as impromptu rehearsals are performed each week in one sense.

5. Conclusion

The interactions of writing and talking amongst students each tutorial create opportunities for adaptations of strategies to be personalised by individual students. Some of the immeasurable, at least on a written test, graduate attributes which employers find desirable students can improve by using this style of tutorial. The overall ambiance of the tutorial is learning via activity, conversation, idea construction, consolidation of concepts and enjoyment. Students can give a fuller account of their solution with more scope than just the stroke of a pen on paper thus allowing tutors to appreciate, understand and assess their solutions more clearly. The oral assessment encapsulates not only knowledge needed for a particular solution but additional requests can reveal more understanding which would have been hidden if only in a written context. This paper has concentrated on the journey and preparation of students towards the oral assessment and not the marking rubric or skills needed on the day.

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PROSPECTIVE CHILDHOOD PEDAGOGY SPECIALISTS' EXPERIENTIAL LEARNING TRENDS IN PRACTICAL STUDIES AT THE UNIVERSITY

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Abstract

Learning from one's experience is directly related to the prospective childhood pedagogy specialist's motivation to act thoughtfully, enabling oneself to continuously improve, taking responsibility for one's actions and decisions. The aim of the research is to disclose the trends of experiential learning of students who have chosen childhood pedagogy studies (pre-primary, pre-school and primary education) during their pedagogical practice. The study was attended by 119 prospective educators in the senior years of study who have chosen study programs of pre-school and primary education and childhood pedagogy at 4 universities of Lithuania. Research data were collected using structured survey, applying structured modified research instrument – the questionnaire made of concrete statements.

Research results reveal the peculiarities of experiential learning in practical studies at the university, highlighting the very student's autonomy and independence trends during practice. The aspects of students' practice objectives and assignments to be performed as well as of usefulness of practice assignments and their importance for future professional activities are assessed. The aspects of the student's practical activity while reflecting on personal experience as well as of experiences undergone during practice in the relation with other participants of the educational process and oneself as a trainee are revealed.

Keywords: *University, childhood pedagogy, experiential learning, practical studies.*

1. Introduction

The change in the system of education, new societal needs determine initiation of change in the education system, in the teacher education area. Challenges in higher education are also related to new challenges and requirements raised for the teacher to continuously learn and improve, acquiring abilities corresponding to new professionalism requirements that are directly related to the future pedagogical activity. Learning from one's experience is directly related to the prospective pedagogy specialist's motivation to act thoughtfully, enabling oneself to continuously improve, taking responsibility for one's actions and decisions through learning from one's experience and reflective practice (Harrison et al., 2005; Huntley, 2008; Sellars, 2012; Gao, 2015 and etc.). The higher education institution puts emphasis on two structural parts of the study process, namely: the transfer of the basics of the profession in a theoretical way (acquisition of knowledge) and formation of the necessary professional abilities, employing practical activity trends (in the auditoriums and educational institutions) and methods. Pedagogical practice is a compulsory part of studies, intended for the development of professional competencies, implemented at the practice institution, grounded on an integrative-systemic approach, which emphasizes the unity of theory and practice, providing students with the possibilities to participate in various types of practical activities (reflection and learning from one's experience, research-analytical, observation and assessment of the educational environment, organizational-managerial and the like). The scope of childhood pedagogy studies practice at higher education institutions of Lithuania is not less than 30 study credits. Practice is done at educational institutions and (or) non-governmental organizations implementing educational programs, which provide possibilities of integrating practical training and studies and ensure the necessary assistance to the trainee student (Teacher Training Regulation, 2018). Pedagogical practice is based on students' direct participation in the professional pedagogical activity. The purpose of pedagogical practice is to create conditions for the student to seek unity of theory and practice by helping the future teacher to acquire professional, general and special competencies and experience necessary for practical pedagogical work throughout the whole study period. Practical studies preparing teachers cannot be based solely on basic knowledge of the subject and pedagogy. The results of studies conducted by many researchers demonstrate that it is necessary to develop the teachers' ability to

constantly analyze and reflect on his professional activity (Caires et al., 2012; Thaba & Kanjere, 2014; Kelemen, 2015; Winterbottom & Mazzocco, 2016; Kwenda et al., 2017; Yeigh & Lynch, 2017). It is important to create possibilities for learners to explore and discover on their own so that ideas and knowledge result from real solutions related to learners' personal experience.

The aim of the research is to disclose the trends of experiential learning of students who have chosen childhood pedagogy studies (pre-primary, pre-school and primary education) during their pedagogical practice.

2. Research methodology

2.1. Sample

The study was attended by 119 prospective educators in the senior years of study who have chosen study programs of pre-school and primary education and childhood pedagogy at 4 universities of Lithuania. The respondents were selected applying targeted-criterion selection method; i.e., students in their second, third and fourth year of study who have done at least one pedagogical practice, encompassing the entire population. All respondents who participated in the study were women. The average age is 22,9 years. By the year of study the data were distributed as follows: students studying in year two made up 35,3 percent; year three, 41,2 percent; and year four – 23,5 percent.

2.2. Research methods

Data were collected using a modified questionnaire¹. It contained 22 statements reflecting university students' learning peculiarities and the significance and importance of the students' experience in this process. Questionnaire statements that did not satisfy statistical reliability indicators were not applied for the data analysis. The survey was conducted meeting the respondents and by electronic means. The collected data were analysed performing statistical analysis (using SPSS 21.0 software): a) quantitative descriptive statistics of the research data; b) the multidimensional statistical method – factor analysis, based on the analysis of the correlation between the variables and transformation of the initial space of the variables to the space of smaller measurements (factors). To process the research data, an exploratory factor analysis was used, which establishes the number of factors and the variables constituting a factor, while the latter help understanding what these factors mean.

3. Research results

Having performed the factor analysis of the data on future childhood pedagogy educators' learning trends at the university, four factors were distinguished. The identified factors reveal the trends of future specialists' experiential learning, directed to cognition of the study area through cooperation, adaptation in the profession, performing the assigned tasks and combining theoretical and practical knowledge during practice. The data of the factor analysis and the rating of the suitability and reliability of the scales are presented in Table 1.

Table 1. Factor variables and statistical validity indicators.

Name of factor	Number of statements	Factor weight (L)	Descriptive distribution of the factor (%)	Cronbach α
KMO = 0,86				
Practice tasks as a tool promoting successful adaptation in the profession and experiential learning	6	0,57-0,80	21,7	0,84
Trends of learning from one's experience, reflecting and combining theoretical and practical knowledge during practice	5	0,52-0,78	19,4	0,78
Students' pseudo-reflectivity as a result of pointless actions and assigned tasks	4	0,66-0,82	14,3	0,79
Cognition of the study area, learning from experience through observation and collaboration	3	0,65-0,80	12,8	0,69

¹ Some of the statements given in the questionnaire in previous studies were presented to other groups of respondents. For more information, see: Bubnys, R., Gudonis, V. (2009). Prospective Special Educators' Reflection on Personal Experience and its Integration in Practical Studies in Higher School. *Special Education, No. 2* (21), 91–98.

The coefficient 0.86 of the Kaiser-Meyer-Olkin (KMO) scale shows that the matrix suits the factor analysis well. The distribution typical for the scale 68.2% (from 21.7% to 12.8%) shows that all factors explain not less than 10% of the distribution and can be interpreted. Internal consistency coefficient of the factors of the scale (subscales) Cronbach alpha (α) fluctuates between 0.84 and 0.69, this shows that the scale is homogeneous. The variables of all factors satisfy the condition $L \geq 0.5$ and are solid from the point of view of methodology.

The first factor “Practice tasks as a tool promoting successful adaptation in the profession and experiential learning” reveals the value of practice tasks as the tool promoting experiential learning, seeking to successfully adapt in the profession in future (see Table 2).

Table 2. Practice tasks as a tool promoting successful adaptation in the profession and experiential learning.

Variables of the factor (statements of the questionnaire)	Completely agree		Agree		Don't know		Disagree		Completely disagree	
	No.	%	No.	%	No.	%	No.	%	No.	%
Many tasks that I had to do, writing the practice report, created possibilities to learn from my experience	22	18,5	48	40,3	23	19,3	19	16,0	7	5,9
Tasks that I had to do to account for practice will help me to adapt to new conditions in the future more successfully	13	10,9	56	47,1	27	22,7	18	15,1	5	4,2
Doing practice tasks, I found answers to my questions	16	13,4	49	41,2	31	26,1	17	14,3	6	5,0
I know the purpose and benefit of notes that have to be filled in during practice	20	16,8	53	44,5	33	27,7	11	9,2	2	1,7
Prepared practice tasks promote learning of new things	18	15,1	57	47,9	24	20,2	13	10,9	7	5,9
In many practice situations, I could successfully apply knowledge acquired in my studies	29	24,4	60	50,4	15	12,6	11	9,2	4	3,4

The results show that most students involved in the study agree that assigned practice tasks enabled them to learn from their experience outlived during practice. The majority of them state that in many practice situations, they could successfully apply knowledge acquired during studies, while the tasks promoted to learn new things. It is noteworthy that during practice, more than a third of students found answers not to all questions they had, part of them found it difficult to understand the purpose and benefit of the notes that had to be filled in during practice.

The second factor “Trends of learning from one’s experience, reflecting and combining theoretical and practical knowledge during practice” emphasizes the possibilities of learning from experience in practice, reflecting on the activities that had to be performed, combining theoretical knowledge acquired at the university in practice (see Table 3).

Table 3. Trends of learning from one’s experience, reflecting and combining theoretical and practical knowledge during practice.

Variables of the factor (statements of the questionnaire)	Completely agree		Agree		Don't know		Disagree		Completely disagree	
	No.	%	No.	%	No.	%	No.	%	No.	%
During practice, I had time to think over how it would be possible to behave better in one or another situation	24	20,2	78	65,5	10	8,4	5	4,2	2	1,7
During practice, I would think over those activities that I had to do	36	30,3	68	57,1	8	6,7	7	5,9	-	-
Going to do practice, I knew its aim and what I should learn	43	36,1	57	47,9	8	6,7	10	8,4	1	0,8
During practice, I could successfully apply the knowledge and novelties which I was introduced to in my studies	31	26,1	64	53,8	14	11,8	9	7,6	1	0,8
I applied knowledge that I gained while studying in practice	20	16,8	71	59,7	20	16,8	8	6,7	-	-

The majority of students indicate that during practice, they were provided with conditions to reflect how it would be better to behave in one or another situation. It should be noted that before starting practical studies, the aim of practical studies and the results to be reached were not clear only for a small share of students. It can be assumed that students' activity during practice was not impulsive and spontaneous, because almost all students involved in the study would think over the activities they had to perform. The results demonstrate that during practice, most students were able to successfully apply knowledge and novelties which they were introduced to during university studies. A similar number of students applied knowledge acquired during their studies in practice.

Table 4. Students' pseudo-reflectivity as a result of pointless actions and assigned tasks.

Variables of the factor (statements of the questionnaire)	Completely agree		Agree		Don't know		Disagree		Completely disagree	
	No.	%	No.	%	No.	%	No.	%	No.	%
Many things that had to be done during practice were pointless	12	10,1	38	31,9	16	13,4	35	29,4	18	15,1
During practice, I applied only general problem solving principles, without trying to select them according to a concrete situation	17	14,3	31	26,1	23	19,3	34	28,6	14	11,8
Practice tasks that had to be done were "vague"	21	17,6	42	35,3	18	15,1	31	26,1	7	5,9
Many things in my practice diary are "the result of fantasy"	12	10,1	33	27,7	8	6,7	39	32,8	27	22,7

The data of the latter factor reveal quite contradictory results. About half of the students involved in the study agree or hesitate about meaningfulness of many things that had to be done during practice. It is likely that many activities that had to be done during practice were not related directly to practice tasks that had to be done and presented in the reports. There is a trend that students still find it difficult to realize the uniqueness of every situation in the practical activity and therefore apply only general problem solving principles.

Table 5. Cognition of the study area, learning from experience through observation and collaboration.

Variables of the factor (statements of the questionnaire)	Completely agree		Agree		Don't know		Disagree		Completely disagree	
	No.	%	No.	%	No.	%	No.	%	No.	%
After practice, I began to perceive my study area more clearly	45	37,8	57	47,9	5	4,2	10	8,4	2	1,7
Observing practitioners of my area in practice, I could learn a lot from them	47	39,5	54	45,4	9	7,6	6	5,0	3	2,5
During practice, professionals were interested that I learn from their experience as much as possible	36	30,3	55	46,2	15	12,6	10	8,4	3	2,5

Although previous results revealed that not all practice tasks were understandable, the majority of students indicate that after practice, their studied area became clearer for them. Professionals whom students met during practice and from whom they could learn a lot also contributed to that. The results reveal that the environment in which the student was present was supportive and collaborative, which resulted in more effective processes of learning from one's experience.

4. Conclusions

Addressing the issue of lifelong learning, it is necessary that the higher education institution should educate the student as the reflective practitioner who constantly develops competencies required for successful learning and performance of the future professional activity. Studies at the university and at the practice placement are two structural parts of the study process that are interrelated and complement each other. The results of the conducted study demonstrated that during practice, future teachers who have chosen childhood studies at the university had possibilities and conditions to learn from their

experience. Practical experience was not limited only to technical skills and impulsive actions; during practice, students successfully applied knowledge and novelties that they acquired studying at the university. On the other hand, mostly applied general problem solving principles alone show that, improving the study process, it should be worth paying more attention to integration of reflection on practice and theoretical studies at the university, which is the essence of learning from experience, linking theory and practice.

It should be assumed that, performing the assigned tasks, quite stereotyped problem solving ways, which do not promote not only experiential learning but also successful problem solving, are still applied. The evaluation of meaningfulness and clear understanding of practice tasks shows that this area requires more attention during studies, placing more emphasis on the analysis of the purpose and benefit of practice notes while studying together with students.

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CLAP HANDS, TRAINING PROFESSIONALS TO PROMOTE DISABLED PEOPLE LABOR INCLUSION IN ARTS AND CULTURE

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Abstract

Introduction: The CLAP HANDS “Creative Lab: Access to Profession for persons with Handicap” is a project financed by the ERASMUS+ Programme in 2 years (2017-2019), under the key action “Cooperation for Innovation and the Exchange of Good Practices”.

Consortium: The project it has been coordinated by Institut Régional du Travail Social (IRTS) Languedoc-Roussillon- (FR) with 3 more partners from (FR), two from (ES), one from (PT) and one from (SE)

Objective: The main objective is to provide training to professionals who assist and work with people who have mental or physical disabilities, in order to contribute to their labor inclusion by developing their creativity and, on the other hand, to increase employer’s awareness to the need of a more structured approach to the professionalization through arts and culture.

Expected results:

1. Focus groups

Each partner country has implemented 3-4 focus group discussions, in order to discuss crucial topics to be included in the Clap course. Participants of these focus groups were professionals within areas of arts, healthcare, and or had worked with artists with disabilities. The main discussion concerned what type of skills and competencies should the Clap course offer the trainees who work with persons with disabilities in order for them to contribute to their labor inclusion and professionalization through arts and culture.

In conjunction with the focus group discussions, each partner country interviewed 8-10 artists with various types of disabilities in order to gain knowledge and recommendations for institutions and other persons with disabilities who would like to become a professional within arts.

2. Best practice guide

Is a compendium of best practices and success stories of how organizations as well as individual artists create successful strategies to foster the development of art as a profession for persons with disabilities. A compendium to inspire artists and institutions that give them support from other EU members states to include disabled artists in the active population and contribute to enhance the cultural expression of the country with their unique talent.

3. Clap course

4 editions (1 x country) with 60 trainees (15 x country) of a specialized training module for professionals who supervise persons with disabilities in artistic activities and in the capacity of accompany towards professionalization processes in the crafts and culture, will be built from the contributions obtained by the other project productions.

Keywords: *Disabled, competencies, training, arts and culture, labor inclusion.*

1. About the project

The CLAP HANDS “Creative Lab: Access to Profession for persons with Handicap” is a 2 years (2017-2019) project financed by the ERASMUS+ Program, under the key action “Cooperation for Innovation and the Exchange of Good Practices”.

1.1. Consortium

The project is coordinated by Institut Régional du Travail Social (IRTS) Languedoc, Roussillon- (FR) with three more partners from (FR): ESAT La Bulle Bleue and Passeport Europe, two from (ES): Foro Técnico de Formación and Artistas Diversos, one from (PT): COFAC and one from (SE): STIFTELSEN KURSVERKSAMHETEN VID U-AUNIVERSITET

1.2. Context

Europe has 80 million citizens with disabilities, or 1/6 of the population (source Eurostat). Their employment rate is 50% (72% for the general population) and their poverty rate 70% above average, partly because their access to employment is limited. The European goal of HORIZON 2020 to employ 75% of people aged 20 to 64 cannot be reached if these people are not taken into account. Accessibility and professionalization are among the top priorities of this strategy that targets inclusive strategies and improved access to employment.

As early as 2003, a European declaration set accessibility as the guarantee of integration of people with disabilities into crafts, culture and the media. These sectors are a pool of professional opportunities. Creative practices are many in medico-social settings but often limited to therapeutic, rehabilitative approaches (occupational therapy), or occupational with a weak opening on the "ordinary" social world. Beyond a better affirmation and participation of the person, the creativity opens on the professionalization. Across Europe, there are experiences events, networks or support, for professional purposes, but these initiatives are relayed poorly at the national level, let alone at the European level. On the contrary, it is in these institutions that these educational mediation practices are the most numerous. And, the least inclusive because they have no or few actions directed towards the ordinary environment of life. Concerning professionals (social workers interested in art or artists interested in social work), there is an initial and continuing qualification gap to better support individualized career paths towards these professions.

1.3. Objectives

1.3.1. Main objectives. CLAP aims to qualify professionals to contribute to the professional inclusion of people with mental disabilities or psychic:

- To train, to qualify the supervisors of these practices to develop the creativity of the accompanied persons, to sensitize accessible trades and thus move from the occupational to a professionalization dynamic
- To identify and valorize the best practices of professionalization of these publics but also all initiatives to reinforce their access to job and activity trails
- Network, share, and capitalize on the achievements of existing practices and experiences to create access to good practices, identify reluctance and obstacles to this professionalization
- Sensitize the professional world of culture (places, networks, groups ...) but also the public authorities on the professionalization in sectors targeted at good practices and their deployment.

1.3.2. Operational objectives. Initiate a European network of social and medico-social organizations, training institutes or universities involved in professional insertion through art and culture but also professionals from the "ordinary" world of culture and entertainment living

- Collect and promote the best practices in terms of inclusion (ergonomics, accessibility, reception equipment, mediation, existing experiences ...) and to better know and communicate about accessible trades, particularities and types of writing artistic, creative practices...
- Build and validate a training device for professionals (social workers and artists) accompanying / training people with disabilities in creative activities and cultural production.
- Create the required environment based on new technologies and social networks but also on workshops multidisciplinary approaches to support the action research process - Identify the criteria for pre-professionalization, professionalization and conditions of access to the trades
- Animate the system by involving all stakeholders (including local authorities in their cultural competence) to anchor this collaborative culture and define the criteria for modeling and transferability transnational approach

2. Expected results

2.1. Focus groups

2.1.1. Implementation of Focus groups and artist interviews. During the period of spring 2018 – winter 2019, each partner country implemented 3-4 focus group discussions, in order to discuss crucial topics to be included in the Clap course.

Participants of these focus groups were professionals within areas of arts, healthcare, and or had worked with artists with disabilities. Further, each partner country discussed within the focus groups, the state of the art of existing supports, activities, possibilities and institutions welcoming artists with

disabilities in respective country, and what improvements needs to take place regarding respective area. The main discussion concerned what type of skills and competencies should the Clap course offer the trainees in order for them to contribute to the labor inclusion and professionalization of persons with disabilities in the field of arts and culture.

In order to gain knowledge about possible existing barriers (internal as well as external) on the way to get to where they are today, each partner country interviewed 8-10 artists with various types of disabilities. The interview touched the subjects of inclusion in the arts as of perceived by the artists, and recommendations for institutions and other persons with disabilities who would like to become a professional within arts.

2.1.2. Recommendations and improvements after the focus groups. Professional cultural workers who want to work with people with disabilities should present their pedagogical attitude rather than their own artistry. Inclusive education and healthy approaches are the smallest common denominator for education.

- Knowledge acquisition and development
- Pedagogy and the ability to make others grow in their knowledge.
- Adaption in working method, communication. For example, artistic teams: learning adaptations for theater rehearsals: recording the manuscript so the actor can learn while listening instead of reading.
- Access to mainstream integration devices such as identification of skills and implementation in professional situation (in France this is one of the roles of "Pôle emploi or Cap Emploi") It is only partially open to disabled people in protected areas.... Simplifications must be done to these separations.
- Professionals who can liaise the artistic aspects and the aspects of psycho-social support are needed. In order to support a professional project and a life project in knowledge of the existing actions on the territory. Moreover, with a good knowledge of devices to support the path of people with disabilities.
- They need to be attentive to the great diversity of disability situations. Although major concerns are common (including the dimensions of recognition), the questions do not arise in the same way depending on the disability: motor, sensory, cognitive deficiency, psychic disability...

2.2. Best practice guide

2.2.1. Objectives. Understanding of the local and European environment of disabled community in general and of artists in particular.

- Health support: analyse existing sanitary services to improve quality of life of this community.
- Basic therapeutically art training, and detection of talent in order to give professional training,
- Mentoring support from different agents: administration, local organization, art centers, galleries and well-known artists, etc.
- Sanitary system - tools and services to care for the health of the community with disability in Europe
- Mechanism for social inclusion – personal environment, social and political organizations
- Barriers that artists have to develop professionally – in each country of the partnership. For example: action on Change.org to make the barrier and exclusion visible and collect signatures to try to eliminate these barriers. Other initiatives the Partners may suggest.
- Working activities – different types of tasks that artists can do in different types of companies. Identifying different ways to develop independent labor and professional life.

2.2.2. Methodology. A European opinion research oriented to collect relevant information from the different countries on the issues focused by the project.

- Desk research- to collect as much information and best practices from as many countries as possible in order to share strategies that can benefit all parties.
- Set up a panel - of associations and institutions in the four countries of the partnership. Partners will invite organizations from other European member states in order to broad the scope of information.
- WAVES -four waves of sets of questions are sending to the panellists to collect their information, opinion and suggestion for each of the areas research by the project.
- Interviews - with agents in the different countries, as well as with artists to collect personal experience.

Six phases of research:

1. Desk research of the art and disability environment in the European Union and set up project panel
2. Support for this community: public and private sanitary services, legal, mentoring, other

3. Education and training: public and private training facilities to foster the development of art as a profession
4. Professional career: fields in which artists with disability can enter the work market and develop personally and professionally
5. Barrier: barriers and difficulties persons with disability may face in entering the work market in order to propose solutions to avoid discrimination and foster inclusion
6. Report: Final report and compendium that features the quality process toward art as a profession

2.2.3. Final report content

- Compendium of 4 Wave Reports
- Cases and best practices sent by panelists
- Interview made by all partners during the collection of information for the GUIDE to broaden information.
- Suggestions to improve quality of support and to prevent discrimination and foster inclusion of persons with disability in the artistic fields and professions

3. Clap course: Technicians of labor inclusion of people with disabilities in artistic and cultural environments (April-May 2019)

3.1. Introduction

Specialized training module of 20 hours, in face to face modality, for professionals who supervise persons with disabilities in artistic activities and in the capacity of accompany towards professionalization processes in the crafts and culture, will be built from the contributions obtained by the Best Practice Guide and by the Focus Groups recommendations, for the following professionals:

- Specialists in initial training
- Social workers in continuing education
- Professionals/coach / supervisor of people with disabilities
- Associated artistic teams
- Trainers supervising activities training in the training of social workers
- Trainers (from the sector of protected work, art and culture)
- Managers
- Responsible for the animation of the disability sector
- Coordinators of artistic production and supervisor health and social care.
- Professional Artist

This training can be applied both in the initial training by integrating as an option in the regulatory programs (with an equivalent of ECVET) as in continuing education (skills approach)

3.2. Selection of participants

Will be 12/15 learners per country. Total 60

The method of selecting the participants will be (not exclusive)

- 1) By coincidence with the specified target group.
- 2) By origin: Professionals of the partners, professionals of the organizations that have participated in the rest of the intellectual products of the project, in the O2 interviews in the O3's workshops or professionals from other organizations
- 3) By order of request

We made a promotion through the desired channels, mail chimp, social networks, and partner's web site.

An informative PowerPoint presentation will be prepared for it.

3.3. Selection and preparation trainers

Not more than two or three per course.

They must be expert in labor inclusion of people with disabilities and/or in artistic and cultural environments, with experience in professional training and with experience in e-learning tutoring.

They must collaborate in the course resources, especially in the face-to-face session's documents (Power point presentations, etc...)

They must have already been selected (Nov-Dec 2018) from the technical team of partners or can be hired between collaborators, in each country, with part-time contracts.

We will be training them in our project issues, objectives, activities and products, and especially in our evaluation, plan and tools related to the O4 course, competencies evaluation mainly objectives

This training will be dividing into 3 main areas knowledge: Relating to social competencies, to the skills of the artistic professions and to the specificity of people with disabilities knowing that these situations are very diverse and therefore require very diverse responses.

Two types of training modules can be defining: Elements of prerequisites (technical competencies) for social workers in initial training and more advanced content for social workers in post by mixing with the public artists interested in social work.

3.4. Competencies and contents

Table 1. Competencies and moduls.

TECHNICAL AND SECTOR COMPETENCIES	
UNIT OF COMPETENCY	MODULS
1. Information management, evaluation and guidance for training and employment	1. Updated location of available socio-labor and training resources, including possibilities for work practices
	2. Cultural and artistic activities
2. Support for qualification	3. Selection of the necessary training, registration and monitoring of the acquisition of skills and qualifications
	2. Cultural and artistic activities
3. Support for Integration, Maintenance and Reintegration in the Labor Market	4. Promotion of the insertion of people with disabilities and disabilities in the labor market
	2. Cultural and artistic activities
4. Post-placement support	5. Information, evaluation and guidance for qualification and employment
	2. Cultural and artistic activities
SOCIAL COMPETENCIES	
UNIT OF COMPETENCY	MODULS
5. Support singularity, capacity, personality and potential	6. Performance focused on people first, according to their needs in terms of ability
6. Get to know people through evaluation / discovery	
7. Promote the right as an integral part of the person	
8. Facilitate personal growth and development	
9. Develop professional relationships	7. Demonstrate professionalism
10. Exhibit professional behavior	
11. Activities of Education, Training and self-development	
12. Give active support to participation in this community	8. Be active and productive in the Society
13. Support employment, education and professional aspiration	

3.5. Evaluation and certification tools

- Participants (trainees) expectation questionnaire.
- Participants (trainees and trainers) satisfaction questionnaire
- Competencies evaluation by trainer at the start and at the end of course

Responsible: In every country the partner member of evaluation team

To obtain the Declaration of Attendance the student must attend the 75% of face-to-face sessions

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USING AN ASSESSMENT RUBRIC FOR FEEDBACK AND LEARNING: A CONCEPTUAL STUDY

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Abstract

Teachers in artistic disciplines have until recently enjoyed high levels of freedom without the use of any strict measurement model recommended in some other disciplines. Assessment and grading have largely drawn on tacit knowledge (Polanyi, 1958; Wenger, 2000) with limited opportunity for students to learn from their experiences. This paper emerged as part of an action research study aimed to establish explicit assessment criteria for grading vocal performances; however, the focus here is on the use of assessment criteria for educational purposes. Ideas emerged through collaboration with eight academy professors who explored the use of a rubric as part of their academy teaching. Assessing vocal performances draws on concepts that students may not be familiar with on entry to the academy; however, linking concepts with phenomena facilitates self-monitored learning processes.

Keywords: *Assessment rubric, criteria, feedback, learning.*

1. Introduction

Assessment is at the heart of the student experience, and given its centrality for learning, institutions spend much time and energy to get the process transparent, reliable and valid. In a strict sense, grades represent levels of achievement as documented in artefacts or at exams (Sadler, 2009); however, since this is not the occasion to delve into specific issues of grading, we rather consider the use of rubrics for learning. While vocal education is used as an example, the approach applies for artistic disciplines generally, and the study will therefore be of interest to those with a stake in formative assessment and learning in artistic disciplines. Feedback facilitates learning, and timely comments on students' performances can be an effective means to improve practices.

This study emerged from efforts aimed at developing an assessment rubric in vocal education (Gynnild, 2015). The project team assumed the application of explicit criteria would facilitate the grading process itself, and improve candidates' sense making of grades. There is indeed a long tradition to assess performances without the use of explicit criteria, drawing on experience and tacit knowledge of artistic performances (Polanyi, 1958). Still, the academy professors believed explicit criteria would improve the accuracy of grading by practicing more systematic and rigorous procedures (Kokotsaki, Davidson, & Coimbra, 2001).

Rubrics are frameworks to structure discussions on the nature and level of intended learning. Technically, rubrics consist of two dimensions, *standards and criteria*; however, in everyday language these are often termed "criteria". They refer to the nature of intended learning, while standards denote levels of achievement associated criteria. In the project referred to above (Gynnild, 2015), we found it harder to be explicit about standards compared with criteria. In fact, we did not manage to make standards explicit, which complicated the use of the rubric. While professors found it sensible to agree on criteria, grading largely relied on experience and tacit knowledge. Level of achievement would require separate criteria, and the use of them would be rather demanding.

This study argues in favor of criteria to support self-monitored learning. Self-monitored learning is here defined "as being able to understand and to control the doing while it is happening" (Sadler, 1998, p. 1). It ranks as a highly desirable educational goal since it aims to prepare for life-long learning. The process is cyclical, wherein the candidate starts with planning a task followed by monitoring of the process, and finally reflects on the outcome. This cycle is repeatable if the student makes use of his/her reflections to adjust and prepare. However, it is not a one-size-fits-all procedure, and needs to be adapted to context (Zimmerman, 2002).

2. Literature and research question

There is an abundance of studies on assessment across the spectrum of disciplines in higher education. However, studies of assessment and learning in vocal education are rare, probably due the complexity of the research topic, and assessment of vocal performances is complicated compared with instrumental performance evaluation (Wapnick & Ekholm, 1997). Characteristic features such as diction and transmission of emotional meaning of lyrics are unique to vocal performances, adding to the demands of professional judgment. A study at the Guildhall School of Music in London found that assessment criteria were implicitly rather than explicitly held; however, still with a shared code of judgment in operation (Davidson & Coimbra, 2001). Interestingly, assessors were not completely sure how their experiences and beliefs lead to a particular decision. Even though agreements on grades may indicate the presence of shared criteria, assessors routinely experience variation in the composition of grades, indicating different judgments of various artistic elements.

A study from France (Maugars, 2006) concluded that explicit criteria were not in use, which in turn prevented formative use of assessment data, since stakeholders possessed no information on criteria. This study examines the use of rubrics for learning purposes in vocal education: *What is the learning potential of criteria initially developed for grading purposes?* Data was collected rather informally by approaching 7-8 academy professors who volunteered to share their views in response to the research question. The idea of the study emerged on completion of a rubric for grading of vocal performances, as seen in the left column in Figure 1 below:

Table 1. Assessment rubric for vocal performances (from Gynnild, 2015).

Grades	A	B	C	D	E	F	
Grades converted into numbers	5	4	3	2	1	0	
1. Technique							Comments:
Posture, relaxation							
Breathing and support (energy, compression)							
Attack, air flow							
Vocal equalisation (evenness of timbre)							
Intonation							
Equalisation of registers (balance)							
Voice focus							
Vocal range							
Timbre							
Coloratura, trill, ornamentation etc.							
2. Language/text							Comments:
Articulation and textual enunciation (linguistic precision)							
Textual interpretation (understanding, independence and diction)							
Linguistic breadth (for exam concert)							
3. Musicality							Comments:
Understanding of style (stylistic differentiation)							
Phrasing/ legato							
Dynamics (variation, contrasts)							
Tempo (choice of tempo, stability of tempo)							
Rhythm (steadiness and flexibility)							
4. Ability to communicate							Comments:
Presentation (oral introductions)							
Communication (conviction, charisma, style)							
Scenic presentation and staging							

3. Rubrics and self-monitored learning

Students often enter higher education with the expectation of being taught, rather than engaging actively in learning themselves. Typically, first-year students often feel uneasy about being brought out of their comfort zones as passive learners; however, independent and self-monitored learning is a highly valued skill within and beyond vocal education settings. This motivated the study of the assessment rubric for learning purposes, and a distinction between holistic and analytic rubrics was made. Holistic rubrics provide a single score for the performance. This represents a quick and easy scoring method, but does not provide detailed information on how to improve. This method has a long history in music education, but fails to address particular strengths and weaknesses in order to improve. Contrary to this, analytic rubrics, as in our case, enable feedback along several dimensions including opportunities for students to self-monitor and self-assess own skills development as part of an ongoing learning process.

Engaging in such independent, high quality learning occurs only when there is a material end in view, or when students engage in learning as a self-rewarding experience (Sadler, 1998). The latter requires a power shift from professors to students in the sense that instructors act as facilitators of professional practice rather than transmitters of knowledge. The role of the professor is no longer to be judgmental, but rather to observe, listen, reflect and discuss along with students. This is likely to make interaction with professors less intimidating and more of a rewarding experience. Furthermore, it helps to get students familiar with the level of performance expected prior to final exams and grading.

All too often, summative assessment takes place with little learning as a result, with students unaware of criteria and their implications. The use of an analytic rubric involves the application of criteria to empower students prior to any summative assessment. However, this requires more than the mere exposition of criteria in verbal form. The most important part will be students' sense making of criteria, and their ability to create a coherent artistic performance. At a professional level, the integration of the entire range of criteria is necessary; however, this requires experience and maturity. The focus of this study is on early stages of vocal education, when students are about to familiarize themselves with the artistic vocabulary. The review of criteria, as seen in Table 1, offers an opportunity to get to grips with terms such as posture, attack, equalization, vocal range and textual interpretations. Only when such terms make sense, can students work systematically to improve and refine their performance.

Self-monitoring skills should not be an add-on to programs, but rather an integral part addressed already at the educational design stage, supported by a more even power distribution between students and professors. The purpose is to nurture and strengthen inherent capabilities as lifelong learners by boosting students' self-confidence to facilitate the pursuit of longer-term professional goals: "Students need to be inducted into the process – so they can learn and monitor and control the quality of their own performances and productions while their productions are in progress" (Sadler, 2015).

4. Discussion

Modern pedagogy emphasizes the importance of active learning methods. Rather than receiving instructions from an authority, students should engage in activities to give and receive feedback. The centrality of assessment makes it an interesting theme to explore, however, assessment for grading takes skills and experience beyond expectations of novice students. The approach introduced here; however, is formative. It aims to facilitate learning by introducing students to key performance criteria.

Summative and formative assessment refer to different realities. In a criterion-based assessment framework, standards refer to levels of achievement; however, verbal descriptions of absoluteness is hard to achieve. Words used in grade descriptions, such as *excellent* or *outstanding*, are comparative, referring to works of others. Attempts at disclosing standards routinely suffer from interpretation bias since we miss fixed anchors as reference points. Artistic expressions always carry a sense of creativity and individuality from the performer, implying that performances can be different, but still deemed of the same quality. Making such distinctions requires additional experience and assessment practice.

The more realistic aspiration of young students would be an extension of their familiarity with key assessment criteria; however, such ambitions need to be realistic with a view to future growth. We believe getting to grips with the abstract concept of a *standard* is an example of such progression. D. Royce Sadler has written at length to explore this critical construct; however, concluded that the use of verbal statements to judge academic level is futile. He rather argues in favor of a holistic judgment, and sees this as the primary act, while justifications aim to proclaim the grounds for the appraisal. This approach still justifies the application of criteria; they are the means by which arguments become valid.

Criteria refer to features of any performance; however, are by themselves insufficient to decide levels of achievement. Sadler (2015) rather argues in favor of what he terms "triplets" to decide on critical grade bands, and in the use of a range of "instantiations", each consisting of one triplet composed of the actual performance (1), the assigned grade (2) and the justification (3). Sadler argues we need to give the abstract concept of a standard some material form as seen in the use of triplets.

5. Conclusion

Vocal education draws on concepts beyond the vocabulary of everyday usage. In this study, the use of criteria as seen in an assessment rubric served as a gateway to essential features of vocal education. Its purpose was first to promote transparency, fairness and consistency in grading; however, the academy professors soon realized its potential for learning. Student active learning methods enjoy a lot of attention these days, and our project helped to facilitate the process without extensive costs and planning. Formative use of summative assessment criteria improved the design of the course by enabling constructive alignment, self-monitored and self-directed learning. Obvious gains were improved conceptual understanding among students combined with a power shift – from the professors to the students. They learned in groups and with peers, not just receiving instruction. Having said that, vocal education is a multifaceted and complex type of education in need of close collaboration between instructors and students. Becoming proficient in assessment and learning is a long-term project; however, academy professors are in a unique position to give it a smooth, yet solid beginning.

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ICT COMPETENCES FOR EDUCATIONAL INNOVATION: A TEACHER TRAINING PROGRAM IN COLOMBIA

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Abstract

The growing diffusion of technology in educational environments has raised the need to align Information and Communication Technologies (ICT) to the curriculum to promote innovative pedagogical practices in teachers. However, achieving this objective requires teachers to develop competencies for the effective use of these technologies. Under this scenario, the Ministry of National Education of Colombia implemented a teacher training program to strengthen six competencies associated with the use of ICT: technological, communicative, pedagogical, investigative, management, and design. The objective of the research is to understand the relevance of the program in strengthening each competence. The study analyzes the perception of a sample of 2160 beneficiary teachers of the program throughout 31 of the 32 departments that compose the country. A questionnaire was applied with 36 statements about the usefulness and use of the program for teaching practice. In general terms, the results showed that most teachers agree that the contents of the program are relevant to the development of competencies. Specifically, the results suggest that technological and pedagogical competencies were favored by self-directed, cooperative, and didactic learning strategies by using ICT that promote problem-solving skills in students. The communicative competence was associated with the learning of ICT tools that allowed to systematize and communicate significant experiences. Additionally, the research competence was related to the participation in communities of practice for the collective construction of knowledge with the support of ICT, the use of the information available on the web in a critical manner and the reporting of own research results using ICT. Similarly, management competence was driven by activities that required the explanation of educational policies on and with the use of ICT. Finally, design competence was related to the planning of teaching units to improve educational practices through the combination of existing methods and ICT. Findings are discussed in terms of the importance of the training program and lifelong learning for teacher's professional development.

Keywords: *ICT competences, teacher training program, professional development, lifelong learning, Colombia.*

1. Introduction

The growing diffusion of technology in educational environments has raised the need to align Information and Communication Technologies (ICT) to the curriculum to promote innovative pedagogical practices in teachers (Vaillant, 2013). Accordingly, the Organization of Ibero-American States (OEI) has highlighted in the Educational Goals 2021 the importance to integrate ICT into schools' education plans. (OEI, 2010). However, achieving this objective requires teachers to develop competencies for the effective use of these technologies (Fernández & Pérez, 2018).

Aware of this scenario, the Ministry of National Education (MEN, 2013) of Colombia implemented a teacher training program under a blended learning approach to strengthen six competencies associated with the use of ICT: technological, communicative, pedagogical, investigative, management, and design. The program is part of the policy to innovate in education using ICT aiming the lifelong learning for teacher's professional development. Therefore, the objective of this research is to understand the perception of teachers about the relevance of the program in strengthening each competence.

2. Framework

In Colombia, the Teacher Training in ICT Use Program aims to improve the teaching skills needed to successfully use ICT in teaching-learning processes. Competence is understood as the set of knowledge, skills, attitudes, comprehensions, and cognitive, socio-affective and psychomotor dispositions. This set facilitates the flexible, effective and meaningful performance of an activity in new and challenging contexts (MEN, 2006). Based on the current competency standards for Teacher Professional Development (MEN, 2013), the six necessary competencies are defined as shown below.

- Technological competence is the ability to choose and use various technological tools in a responsible and efficient manner (including the principles that govern them).
- Communicative competence is the ability to express oneself, establish contacts and participate in virtual and audiovisual spaces through various media and managing several languages synchronously and asynchronously.
- Pedagogical competence is the ability to use ICT to strengthen teaching-learning processes, as well as to identify the achievements and limitations of the incorporation of these technologies in students and in their own professional development.
- Research competence is the ability to use ICT for the transformation of knowledge and the generation of new knowledge.
- Management competence is the ability to use ICT in the planning, organization, administration, and evaluation of effective educational processes, both in pedagogical practices and in institutional development.
- Design competence is the ability to design learning environments and develop materials and conditions necessary for effective learning in creative, critical, strategic and artistic ways.

The current competency standards for Teacher Professional Development states that each competence is evidenced in different levels (explorer, integrator, innovator), the innovative character is the desired degree. This level highlights the ability to use ICT to create educational content, to express their ideas in different spaces and through multiple communication channels, to collectively build new knowledge and to construct novel strategies that allow them to reconfigure their practice and their pedagogical knowledge. In this regard, it is worth indicating the relationship of this approach with the UNESCO ICT Competency Framework for Teachers (UNESCO, 2011). It also has three similar categories by which progress is made gradually (Technology literacy, Knowledge deepening, Knowledge creation). However, the emphasis is placed on the third category where the acquisition of knowledge is given by the ability to create new knowledge.

3. Method

3.1. Participants

The study analyzed the perception of a sample of 2160 beneficiary teachers of the program throughout 31 of the 32 departments that compose the country. 43.57% of the beneficiary teachers were men and 56.43% were women. The age range was from 18 to 71 years. Regarding academic qualification, 1.4% reported having a high school degree, 17.01% college degree, 32.87% major degree, 46.75% master's degree, 1.83% a doctoral degree, and 0.14% Postdoctoral degree. Regarding the job position, 91.83% reported being teachers, 4.08% coordinators, 1.17% rectors, and 2.92% a different job position.

3.2. Instrument

To identify the relevance of the content of the teacher training program, an instrument was applied that included 36 items (statements) related to the use of ICT competences in the classroom. 18 items referred to whether the content received seemed useful for their process as teachers and the other 18 items referred to whether they actually use what they learned in their respective classes. The items were multiple-choice with a single response where each teacher could grade on a Likert scale from one to four according to their level of agreement (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree) in front of each statement.

3.3. Procedure and data analysis

According to the information above, the response options "strongly agree" and "agree" are integrated when analyzing the results. It is considered that both response options refer to the level of agreement of the competition and only changing the intensity level between them. In this sense, the results on the relevance of the content of the teacher training program (usefulness and use) will be presented according to each competency.

4. Results

The results shown in Table 1 indicate that there is a high perception of teachers about the usefulness and use of the contents of the program to improve the ICT competences in educational practices. It can be affirmed that most of the participants agree that the contents of the program are relevant to the development of each competence: design (95%), followed by technological (94%), pedagogical (93%) communicative (93%), research (89%), and management (84%).

The evaluation of the relevance of the content of the program allows suggesting specific connections. For example, the development of design competence was related to the creation of the planning of teaching units to improve educational practices through the combination of existing methods and ICT. Additionally, technological and pedagogical competencies were favored by self-directed, cooperative, and didactic learning strategies by using ICT that promote problem-solving skills in students. Furthermore, communicative competence was associated with the learning of ICT tools that allowed to systematize and communicate significant experiences. Moreover, the research competence was related to the participation in communities of practice for the collective construction of knowledge with the support of ICT, the use of the information available on the web in a critical way and the reporting of own research results using ICT. Finally, management competence was driven by activities that required the explanation of educational policies on and with the use of ICT.

Table 1. Teachers' perception of the relevance of the training program for the development of ICT competences.

Competence	Relevance	Percentage	Average percentage
Design	Usefulness	97%	95%
	Use	93%	
Technological	Usefulness	96%	94%
	Use	93%	
Pedagogical	Usefulness	95%	93%
	Use	91%	
Communicative	Usefulness	96%	93%
	Use	91%	
Research	Usefulness	90%	89%
	Use	87%	
Management	Usefulness	88%	84%
	Use	80%	

5. Discussion

The results of the design competence highlight the importance of creating teaching unit plans as tools to apply what has been learned in the classrooms. Products such as blogs are pedagogical creations made by teachers themselves that favor the design skills needed not only for teachers to improve didactic practices, but also to be agents and leaders of change in their communities and schools. In agreement with Clark and Mayer (2011), these creations are related to communicative competence since they function as a channel to record and store their productions (documents, notes, photographs, images), help teachers to record and follow their daily impressions, support the writing skills that any teacher should have and strengthen different channels and tools that must be used to transmit information to students in the educational context.

Additionally, technological and pedagogical competencies were favored by self-directed, cooperative, and didactic learning strategies by using ICT that promotes problem-solving skills in students. These results agree with the observations of Lu, Lajoie, & Wiseman (2010) about the blended-learning modality. The researchers state that Computer-Supported Collaborative Learning in the blended-learning approach promotes technological and pedagogical skills. While virtual sessions support self-regulated learning processes with predesigned learning tasks and resources, and with pair scaffolding, classroom sessions favor problem-based learning processes with guidance from an expert. However, when teachers do not have the necessary skills to design and implement technology-rich learning environments, the guidance from an expert must be combined with participation in learning communities to foster a highly effective teacher professional development model (ISTE, 2011).

In this regard, the results of this study suggest that participation in these communities may also favor the development of investigative competence. It is particularly useful for teachers to be connected with peers through networks and communities of practice where problems are shared, and solutions are collectively developed. In the words of Downes (2011), the idea of these connections is for the apprentice to understand a community of practice and to know first-hand the ways of doing what practitioners do, and through that practice, it resembles acts, thoughts, and values to the members of such a community. In this way, the connection becomes a community of educators who try to learn how they learn so that they can help their students learn with digital resources.

Finally, the results suggested that the management competence was driven by activities that required the explanation of educational policies on and with the use of ICT. However, the definition of this competence is broader, it includes the ability to use ICT in the planning, organization, administration, and evaluation of effective educational processes, both in pedagogical practices and in institutional development. Although this study shows that there is a high perception of teachers about the relevance of the program in the development of all competences, it is worth mentioning that management competence was the lowest (84%). This result is consistent with others in which they establish that the competencies of lower valuation are all those that are related to the ability to formulate and manage projects with the use of ICT (Afanador, 2017). An alternative explanation is that it may be that teachers associate this competence with the administrative functions of the principles of the schools.

6. Conclusions

The latest version of The Key Competences Reference Framework by the EU defines them as a “dynamic combination of the knowledge, skills, and attitudes a learner needs to develop throughout life, starting from early age onwards. High quality and inclusive education, training and lifelong learning provide opportunities for all to develop key competences, therefore competence-oriented approaches can be used in all education, training and learning settings throughout life” (European Council, 2018, p.12). However, one of the main drawbacks related to ICT training for teachers is that they feel that they do not have spaces for early and permanent professional development (OECD, 2009). Consequently, it is in their own free time when teachers practice their ICT skills more. Additionally, only one out of three students in Europe receive classes taught by teachers with mandatory ICT training.

Furthermore, according to Clarín (2013), most primary and secondary teachers do not feel capable of teaching digital skills effectively. According to Afanador (2017), 70% of teachers would like to learn to improve their skills in Information Technology and Communications Systems (STIC). Thus, teachers are demanding initial and ongoing training to face this challenge and improve their 21st century skills (Vuorikari et al. 2012). The question here is which ones and how they should be developed. Although there are national and international reference frameworks to define competences for training processes and evaluation systems and as an alternative for educational innovation, the reality of the current context of education is that the necessary competencies change radically due to the rapid diffusion of technology in the educational environment. The answer then is not in the ICT but in the user's own characteristics, in the generation of early and permanent spaces that encourage the development of digital skills, the articulation of ICT with the curriculum and teaching practice.

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PREVENTING SPECTATORS IN A GROUP-WORK: CIVIL TECHNOLOGY STUDENT'S PERSPECTIVE

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Abstract

Civil Technology is a subject which consists of content knowledge and practical work, of which one of the assessments requires group-work activity. Therefore, the problem encountered during group-work is that some of the students are concealing behind other claiming the vivid understanding of the work done. Group-work is one of the most imperative teaching and learning strategy which is underpinned by social constructivism, a theory that assumes that learning takes place through interacting with each other and through experiences. The aim of the study is to encourage common base understanding of content knowledge and practical work in a group-work learning, through problem-solving (Technological Process). However, the main objective was to evaluate the impact of group-work learning in Civil Technology content knowledge and practical work. While the main research question was, how does the positive impact of group-work learning assured in Civil Technology on content knowledge and practical work?

The research used a mixed method approach to collect data. The method of investigation included a literature review, empirical study by using the qualitative and quantitative method in the form of questionnaires and a semi-structured interview. The sample comprised of thirty-four (34) students both male and females from different cultural groups who are enrolled in Civil Technology III academic year. The findings of the study demonstrated that all group members in different groups successfully contributed and effusively participated in a group-work of Civil Technology teaching and learning.

Keywords: *Group-work, civil technology, technological process.*

1. Introduction

Group-work is one of the best teaching and learning strategy in Civil Technology as it promotes working together of students to attain a common social goal (Cohen and Lotan 2014:6). Doolittle and Camp (1999), state that experiential learning aligns with constructivism which posits that students construct meaning from their experiences learned from their peers. However, Civil Technology consists of different types of teaching and learning assessment techniques, which are aimed to prepare and evaluate them as the problem solvers (Mokhothu and Maimane 2017: 417).

While Khoza (2004) argue that lecturers who are teaching practical subject should determine the ways and the means to teach them as interesting subjects since they are practical.

2. The conceptualisation of the study

2.1. Group-work

Cohen and Lotan (2014:6) describe group-work as a structure where students working together in a small manageable group so that all group members can participate in a clearly assigned learning task. Amineh and Asl (2015:9) pronounce group-work as an element of social constructivism which is a theory of knowledge that examines the knowledge and understandings of the world that are developed jointly by individuals.

2.2. Civil technology

Civil Technology focuses on concepts and principles in the built environment and on the technological process. It embraces practical skills and the application of scientific principles. This subject aims to create and improve the built environment to enhance the quality of life of the individual and society and to ensure the sustainable use of the natural environment (DoE 2014: 10; Mokhothu 2015:17).

The aim of the subject Civil Technology is to develop the skills levels of learners from Grade 10-12 to such an extent that they will be able to enter a career pathway at a Further Education and Training College or a university immediately after obtaining the National Senior Certificate. Learners will be ready to enter into Learnerships or apprenticeships that will prepare them for a trade test (DoE 2014: 11).

2.3. Technological process

Mokhothu (2015) highlights that the Technological process is the main assertive factor behind subject Civil Technology. As addresses the following "creativity, innovation and ingenuity play a major role in developing the students' full potential in this field" to integrate the theoretical work and practical's in three specialisations of the subject (Mokhothu 2015:34; Van der Walt 2009:26; DoE 2008:7). Six steps of the Technological process used in Civil Technology:

Step 1. Identify: Make a meaningful summary of the problem from the scenario given or created

Step 2. Investigation

- Design brief describes a problem, how do you think you can solve it and draw free-hand three possible solutions,

- Write specification and constraints.

Step 3. Design: Formal drawing plan with full details using the scale and material list

Step 4. Make: Physically making your project using guided and corresponding with a formal plan

Step 5. Evaluation and Test: Compile a checklist for the project

Step 6. Communication: Presentation of the project (portfolio, project exhibition, and flow-chart

3. The aim of the study

The aim of the study is to encourage common base understanding of content knowledge and practical work in a group-work learning, through problem-solving (Technological Process).

4. The objectives

The main objective is to evaluate the impact of group-work learning in Civil Technology content knowledge and practical work.

5. Proposition

Group-work learning assures a positive impact in Civil Technology on content knowledge and practical work through the Technological process.

6. Methodology

6.1. The context of the study

The student attended formal classes of Civil Technology for theoretical content and practical work in the campus. The research conducted during the third term of their studies in Bachelor of Education SP and FET (BEd. SP& FET) four-year program. A practical assessment task (PAT) was used to evaluate students' responses to the curriculum covered even in group-work.

6.2. Participants

All participants were Civil Technology third-year students enrolled at one of University of Technologies in South Africa. The total number of participants was 34, consisting of 19 males (56%) and 15 females (44%), which confirms 100% of participants.

6.3. Measures

At the first stage all students were given a task to develop their own individual PAT applying all sixth step Technological process. and at the second stage participants were divided into four groups consist of 5 to 7 members to start their new PAT and each was presenting the work done from the first stage to group members, then working together with many of different ideas to develop one idea. Final stage the groups presented their complete PAT and other groups asked questions from the presentations.

7. Results and discussion

All the three tables below indicate the results from all the stages of assessment in the study.

Table 1. Individual assessment for PAT.

Stage	Individual (N)	Frequency	Percentage (%)	Average percentage
Stage 1	34	2	65	66%
		13	58	
		1	51	
		18	50	

Table 2. Group assessment for PAT.

Stage	Groups	Percentage	Average percentage
Stage 2	1	96	86
	2	89	
	3	79	
	4	79	

Table 3. Group model presentation assessment.

Stage	Groups	Percentage	Average percentage
Stage 3	1	80	82
	2	85	
	3	73	
	4	90	

The three tables above, shows the results of the study from stage1 to 3. Table 1 above reveals that student at stage 1 managed to achieve the average of 66%. Which indicate that, all students in this study can work well individual in preparation to meet other students to up lift their knowledge. While at stage 2 the results show highest average of 86%, which confirms that students can learn and express their excellence thinking, when they discuss and plan as a group. Table 3 indicate that student scored higher average of 82%, at these stage students were showing and presenting their group practical work. All the above information concurs with Amineh and Asl (2015:9) early in the study, when they pronounce group-work as an element of social constructivism which is a theory of knowledge that examines the knowledge and understandings of the world that are developed jointly by individuals. Moreover, this research has proven that, in order for the student to achieve and solve the problem they need each other as all have the role to play. Therefore, no Spector's allowed in Civil Technology group work.

8. Conclusion

In conclusion, Civil Technology students are interested on group-work as it allows them to engage and gain more knowledge from others with confidence. Technological process promote creativity as students managed to design and do their own PAT.

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SELF-ASSESSMENT THROUGH THE METACOGNITIVE AWARENESS PROCESS IN READING COMPREHENSION

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Abstract

In our study we investigate the relationship between adult self-assessment and the level of metacognitive awareness in reading comprehension. The sample of the research consisted of adults participating in a training program in order to obtain a certification of pedagogical competence, during the year 2017-2018. MARSİ (Mokhtari & Reichard, 2002) was used as a research tool and open - ended questions were distributed to the trainees. MARSİ contains 30 questions and provides an overall indicator of the level of awareness of metacognitive reading strategies as well as individual indicators of metacognitive strategies in reading. In our study we focused on the overall index and the metacognitive development of the trainees. The questionnaire was completed in two phases during the year 2017-18. Both quantitative and qualitative analysis of the data was conducted. The statistical process of the data revealed the existing high level of awareness of metacognitive reading strategies (about 70% of students were identified at a high level, ie $M > 3.5$), which is also in accordance with the high quality educational level of the trainees (49.6% had postgraduate / doctoral degrees) and their age ($M = 35$). Concerning the effect of training on their metacognitive awareness, there has been a statistically significant increase in the overall average of MARSİ, which indicates the positive impact of the training on a population of high educational level and of relatively older age than the normal trainee population. The qualitative analysis of the open questions revealed the enhancement of self-assessment among trainees as a dominant metacognitive skill, and significant conclusions were drawn regarding reading skills through the use of digital technologies, the way of study, the link between theory and practice, etc. It is of outmost importance the fact that the positive contribution of the training procedure to the metacognitive awareness of the participants appears to be focused only on those with pre-existing teaching experience in education structures who seem to have had been themselves more highly self-assessed. It is proposed to enrich such training actions with more self-assessment practices and techniques, when designing and implementing them in order to contribute to a further improvement of the metacognitive awareness of all the participants.

Keywords: *Self-assessment, metacognitive awareness, metacognitive skills, reflection, reading skills.*

1. Introduction

Metacognition was firstly introduced by Cognitive Psychologists in the 1960s and then transferred into Evolutionary Psychology represented by Flavell in 1976. Flavell defined it as “meta-memory”, after studying children’s and adolescents’ knowledge regarding the processes of memory. Thenceforth, many definitions have been raised for metacognition which reveal the deeper meaning of the word and correlate memory, learning and understanding. It is defined as “the knowledge and understanding that one has on the level and the possibilities of his thought, his personal information processing system and the construction of knowledge” (Koutselini – Ioannidou, 1995:48) or as “the people’s knowledge about what they know, remember and think” (Metcalf&Shimamura, 1994: xi). Furthermore, according to Kassotakis and Flouris (2006) metacognition is the awareness of knowledge conquered, the ways by which they acquired them and their results. In other words, it is one’s ability to develop strategies to be aware of the steps of “cognition”, to monitor and control these steps, and regulate them so as to effectively solve the specific problems that arise and assess results and the course of his thought. Meichenbaum, Burland, Gruson& Cameron (1985), still consider that metacognition is “the awareness we have of our cognitive mechanisms and how they work”.

According to Flavell (1979) “Meta-cognition is defined as the cognition of cognition” but there are many other approaches, such as “thinking about thinking”, “knowledge about knowledge” or “people’s knowledge about what they know, remember and think” (Metcalfe&Shimamura, 1994). The prefix “meta” of the word, characterizes the process of knowledge in a second level. This way, the cognitive and metacognitive skills get desegregated. Cognitive skills are perception, memory, performance, cognition, language, critical acumen, problem solving, decision making and critical thinking. The metacognitive skills on the other hand, “assist the understanding and awareness of the learning process and regulate the performance in terms of processing and assimilating new knowledge”. These are two interrelated processes that cannot be considered as separated parts.

In addition, according to Paris&Winograd (1990) “Metacognition introduces two key features: Self-assessment and self-management of mind. Self-assessment refers to the theoretical aspect of metacognition, and in particular to the personal reflections that people make about their mental states, motives and traits as traumatized. Such reflections refer to “what do I know?” Questions, like ‘how do I think?’” And “when and how can I apply specific learning strategies?” (Paris&Winograd 1990, p. 17)

On the other hand, self-management refers to the practical form of metacognition, namely the mobilization of the mental processes responsible for the orchestration of various aspects of problem solving process, the alternative designs that the laymen organize before dealing with a work, the adaptations they make while working on the revisions they make after completing their work (as above p. 18).

Baker & Brown recognized (1984) the important role of metacognition in understanding the content of a text by storing information in memory. Cross & Paris (1988), have highlighted the important role of metacognitive monitoring and control in achieving reading comprehension. Finally, Kolic-Vehovec, (2010) has shown that metacognitive awareness and the skills of reading strategies, when developed parallel to reading ability, can enhance reading comprehension, and it could be considered that metacognition can predict levels of reading comprehension.

2. Method

Both quantitative and qualitative analysis of the data was conducted. For the quantitative analysis of the data, the variable scales are described using the mean value, while the ordinates are referenced by the MARSİ total index. Parameter testing of t-test dependent samples (regularity analysis confirms the use of parametric methods). The qualitative study was considered appropriate because the researchers were keen on investigating trainees’ skills. The study maintained a particular interest for the metacognitive skills developed through the trainee participation in the Program. All recorded data was analyzed by thematic analysis (Creswell, 2000). This approach supplies a frame work for the thematic analysis of qualitative data and provides one way of thinking about how to manage themes and data; this process is likely to reflect the analyst’s awareness of recurring ideas and topics in the data (Bryman, p.587).

2.1. Participants

The sample of the research consisted of 245 adults participating in a training program in order to obtain a certification of pedagogical competence, during the year 2017-2018. The trainees were of different specialty, such as Nurses, Civil Engineers, Doctors, Teachers, Lawyers, Economists, Accountants, etc.

2.2. Instrument

MARSİ (Mokhtari & Reichard, 2002) was used as a research tool and open -ended questions were distributed to the trainees. MARSİ contains 30 questions and provides an overall indicator of the level of awareness of metacognitive reading strategies as well as individual indicators of metacognitive strategies in reading. A Metacognitive Awareness of Reading Strategies Inventory (MARSİ) was translated and validated to greek student population (Koulianou, Roussos, Samartzi, In Press). In our study we focused on the overall index and the metacognitive development of the trainees. It refers to a selection from a scale in statements related to the relative reading strategy, which took place during the reading process and consists of 30 questions. The self-report tool consists of three types of strategies: (a), problem-solving strategies (b) global and (c) support. Each of the strategies is associated with one of the three subcategories. Problem Solving Strategies (8 questions), Global Reading Strategies (13 questions), Support Reading Strategies (9 questions).

The questionnaire was completed in two phases during the year 2017-18, in the beginning and at the end of the training program. Of these 240 were complete, while in five of them qualitative questions were missing.

2.3. Objectives and Research questions

In our study we investigate the relationship between adult self-assessment and the level of metacognitive awareness in reading comprehension.

- What is the level of metacognitive awareness in reading comprehension of the trainees and how this evolves during their participation in the training program?
- How does the existing teaching experience of students affect the development of metacognitive awareness in reading comprehension?
- What is the relationship between development of the metacognitive awareness of reading strategies and self-assessment?

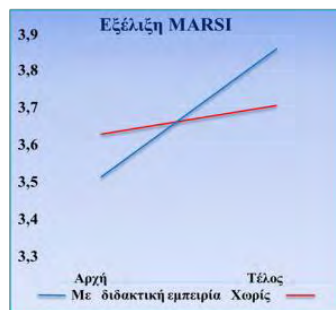
3. Results

As far as the level of metacognitive awareness in reading comprehension of the trainees and how this evolves during their participation in the training program is concerned, the statistical analysis of the data revealed the existing high level of awareness of metacognitive reading strategies (about 70% of students were indicated at a high level, ie $M > 3,5$), which is consistent with the high educational level the trainees (49, 6% holders of postgraduate / doctoral degrees), as well with the age of the trainees ($M = 35$, $SD = 7$).

The specialty of the trainees is related to the negative attitude towards reflection, something that is mentioned particularly in the department of Nurses (a very high percentage didn't answer at all and a very high percentage had a negative attitude towards the influence of the Questionnaire and the program. So, we have to further investigate the representations of the different specialties regarding reading and metacognitive skills and their contribution to the educational process.

Regarding the impact of the teaching experience on the metacognitive experiences of students participating in the program, statistic analysis did not reveal significant statistical differentiation in relation to the studies of the trainees. Of particular interest is the fact that positive differentiation is associated only with those trainees who have teaching experience in educational institutions or in non-formal education.

Figure 1. Evolution of MARSJ.



As far as the impact of the training program on the metacognitive awareness of trainees is concerned, there has been a statistically significant increase in the overall average of MARSJ, which indicates the positive impact of the training on a population of high educational level and of relatively older age than the normal trainee population. More specifically, although the level did not statistically significantly change [$Mdnpre = 3,0$, $Mdnpost = 3,0$ (where '3' = high), $z = -0,536$, $P = 0,607$] there was a statistically significant increase in the total mean MARSJ [$Mpre = 3,62$, $Mpost = 3,75$ (in the range 1 to 5), $t(243) = -2,507$, $P = 0,013$]

The qualitative analysis of the open - ended questions revealed the enhancement of self-assessment among trainees as a dominant metacognitive skill, and significant conclusions were drawn regarding reading skills through the use of digital technologies, the way of study, the link between theory and practice, etc. It is of utmost importance the fact that the positive contribution of the training process to the metacognitive awareness of the participants appears to be focused only on those with pre-existing teaching experience in educational structures who seem to have been more highly self-assessed.

Regarding the correlation of the improvement of reading skills with the use of digital technologies there is a positive correlation between the reading skills in comprehension during the implementation of the program and digital technologies. There was a variety in the terms they used to describe digital technologies such as: technologies, internet, computer, website, Wikipedia. Negative

correlation between specialty and digital technologies is noted only in departments of Nurses and Electrical Engineers, where there wasn't any mention of digital technologies at all.

Regarding the way of studying, we are led to the conclusion that the development of the metacognitive awareness changed their way of studying: *"Certainly it helped me understand some actions that I do unintentionally" "I will try to abolish the bad habit I have when I don't understand the meaning of a text, abandoning any effort. Now, I will insist on trying to understand the meaning."*

The trainees, also, learned to link theory with practice: *"I was more focused on how the theory is related to the practice and I gained a more critical judgment on the content of all the modules I have been taught." "I believe that things I made unintentionally, now I am able to put them in order and I will use some helpful ways of studying more consciously"*

The answers of the participants revealed the fact that although they used to use self – reflective processes in reading they didn't know the terminology of them. *"I didn't change my way of studying because I think it is effective. They only new thing I acquired from the program is the fact that I learned the terminology."*

The answers of participants, also, revealed the important role of metacognitive awareness in the real life and in professional development. *"I manage my time better, I do not postpone things for later. I will try to be more organizational and not postpone things in the future". "I stated to read having a specific goal in my mind and identifying the elements that were important for me as a student as well as a professional"*

As far as the importance of metacognition is concerned, the trainee leads to an epistemological and ontological assumption of great importance for education that "everything around us is Knowledge". *"I learned to read using keywords. In the second semester I was helped to understand that everything around me is knowledge".*

The trainee acquires a metacognitive awareness of the importance of associations, understanding the way we establish new knowledge in the long-term memory, a basic pedagogical and theoretical assumption of the processes that we use in order to learn. *"I have been collaborating to remember what I am reading and to understand in depth the meaning of the text".*

4. Discussion

The qualitative analysis of trainees' response data revealed that the trainees developed metacognitive skills in reading comprehension. More specifically, the trainees learned to monitor and control the Knowledge, something which is in accordance with Cross & Paris (1988), who have highlighted the important role of metacognitive monitoring and control in achieving reading comprehension.

The trainees in most of their responses stressed the importance of metacognition awareness for their life and their professional development. They developed metacognitive skills, as reflected in their responses to the transfer of knowledge to their future lives and similar situations. Furthermore, they developed the ability to dedicate their time to learning, autonomy, discipline, perseverance, and information management in the learning process, which are basic skills in the Deustro (2008) model, as well as in the (Binkley et.al., 2012) model.

According to the theory of Rosenblatt (1938/1970: viii-i) which refers to literary experience, reading experience is described as a kind of intense personal activity, a means of personal exploration, of nature, of mental and emotional abilities, of the outside world, as well as alternative ways of life.

Regarding the correlation of the reading skills with the use of digital technologies the findings revealed the improvement of reading skills during the implementation of the program with the use of the digital technologies. More specifically, in terms of computer use, they developed skills related to the use of text as well as other more specialized software and they realized the correlation between reading skills in comprehension and digital technologies, which are basic in the Deustro model (2008).

In Greece the MARSIS has been used in teenagers with or without learning difficulties, with satisfactory validity and reliability (Koulianou, Roussos & Samartzis, in issue). In our study, the innovation lies in the fact that the MARSIS was used in a population of adults with particular characteristics. Finally, they approached a higher level of reading comprehension during the implementation of the program and they developed critical thinking, as their answers revealed.

5. Conclusions

In general, the qualitative analysis of open - ended self-assessment questions revealed the enhancement of self-assessment as the most important metacognitive skill. It is of outmost importance the fact that the positive contribution of the training program to the metacognitive awareness of the participants appears to be focused only on those with pre-existing teaching experience in education structures who seem to have had themselves more highly self-assessed. So, it is proposed to enrich such training actions with more self-assessment practices and techniques, when designing and implementing them in order to contribute to a further improvement of the metacognitive awareness of all the participants. It is, also, suggested an analysis of the level of each different cognitive specialty. Finally, it is pointed out the need to further explore the representations of the different specialties for reading and metacognitive skills and their contribution to the educational process.

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THE ASSOCIATION BETWEEN BULLYING, MALTREATMENT, AND PERSONALITY TRAITS AMONG ADOLESCENTS FROM ARMENIAN SCHOOLS IN LEBANON

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Abstract

The aim of this study was to identify the association between bullying, child domestic maltreatment, and personality traits among adolescents within a group of Armenian schools in Lebanon. Participants were 185 students in grades 7 to 10, attending Armenian schools in Beirut and its suburbs. The study depended on the self-report method, where participants supplied demographic information and filled in three questionnaires: Illinois Bully Scale, International Child Abuse Screening Tool – Children’s Version (ICAST – CH) and Personality Inventory for DSM-5 Brief Form (PID-5-BF) Child Age 11 – 17. Results, calculated by using ANOVA and Pearson correlation, indicated a statistically significant difference at the level of physical abuse between “victim” and “control” groups. Also, there were significant correlations between the “antagonistic” and “disinhibition” maladaptive personality traits and being a bully. The outcome of this study indicated the necessity of promoting parental and school guidance for preventing physical abuse within school, as well as concentrating on identifying the bully personality implicated in antagonism and disinhibition maladaptive personality traits within adolescents attending Armenian schools in Lebanon. The study includes prevalence information on bullies and victims in these schools, gender differences among bullies and victims, and clinical and research implications.

Keywords: *Bullying, Lebanon, Armenian, child maltreatment, personality traits.*

1. Introduction

The negative consequences of maltreatment and bullying on children has been widely researched, and include such conditions as depression, posttraumatic stress disorder, health issues cognitive difficulties psychopathologic behaviors such as aggression, social problems, and externalizing behavior issues, and suicidal attempts (Björkqvist, Österman, & Berg, 2011; Fahlberg & Kershner, 2003; Lopes, 2013; and Olweus, 2003).

More recently, there has been a shift in emphasis from researching the prevalence and emotional consequences of bullying to examining the personality traits of the bully and antecedents of the bullying personality traits, namely domestic maltreatment, and its effects on maladaptive personality traits, mostly aggression, borderline and antisocial personality (Shields & Cicchetti, 2001).

Bullying is a universal phenomenon and is just as prevalent in Lebanon. Rabah (2006), and Zein (2001) identified alarming occurrences of bullying among students in private schools in Lebanon.

2. Background of the study

Family is the first place where children experience interpersonal relationships between their parents and siblings. In all families there is a member who is in a higher authoritative position allowing them to safeguard the well-being of those with less power (U.S. Department of Health & Human Services, 2003). When the more powerful member (i.e. parent) uses his/her power through maltreatment of the weaker members of the family (i.e. the child) this relationship is identified as child domestic maltreatment or “child abuse”; whereas when it occurs between peers then it is considered as “bullying” (Olweus, 2003).

The significance of such early relationship schema in the child's life can be traced through a large number of studies that have focused on the high association between physical maltreatment, sexual victimization, and neglect at home with being a bully and a victim at school later (Björkqvist et al. 2011; Hong et al., 2012; Mohr, 2006; Shields & Cicchetti, 2001). In other words, instead of using appropriate parental disciplinary techniques, child maltreatment is imposed, which, with time, is turned into the children’s own violent behavior (i.e. bullying). This confirms the existence of an association between maltreatment and bullying (Hong et al. 2012; Lopes, 2013). On the other hand, a handful of studies correlate

personality traits to the bully (USDHHS, 2003). These traits include: poor self-esteem, absence of impulse control, anxiety, depression, and tendencies of antisocial behavior (Ondersma et al., 2005; Putnam, 2003; Usta et al., 2008; & Valen Morgan, 2012).

3. The significance of the study

The study is an important contribution to the field because it addresses CDM, bullying and personality traits on a minority ethnic group in Lebanon, namely, the Armenian adolescents. Armenians living in Lebanon are a minority ethnic group representing 4% of the total Lebanese population (Central Intelligence Agency, 2014).

The aim of the study is to help increase the predictability of identifying bullies in schools that are struck by serious bullying issues, and inform the practice of educators and helping professionals in both early identification and treatment of bullies.

4. Hypotheses

The authors propose the following hypotheses:

Hypothesis 1: Bullies and victims will not differ on physical abuse but they will differ from control group.

Hypothesis 2: Bullies and victims will not differ on sexual abuse but they will differ from control group.

Hypothesis 3: Bullies and victims will not differ on neglect but they will differ from control group.

Hypothesis 4: There is a positive correlation between the Antagonistic personality trait and being a bully.

Hypothesis 5: There is a positive correlation between the Disinhibition personality trait and being a bully.

5. Methods

This study is quantitative research that employs a one-way ANOVA and correlation analysis in order to test the hypotheses and interpret the data obtained. It uses a convenient sample that includes 185 Armenian students between the age of 12-17, from grades 7-10 attending one of the four targeted Armenian schools in Lebanon. The response rate of this study was 92%. The gender distribution consisted of 79 males (42.7 %) and 106 females (57.3 %).

Family status distribution was as follows: father and mother together = 175 (94.6%), father and mother separated = 5 (2.7 %), father deceased = 3 (1.6%), and other = 2 (1.1%).

Besides the consent form and a demographic sheet, the participants answered the Illinois Bully Scale (2001), the International Child Abuse Screening Tool-Children's Home Version (2009), and the Personality Inventory for DSM 5 Brief Form (2013).

6. Results

6.1. Reliability testing

The internal reliability of these scales was computed by calculating the Cronbach's alpha of each scale and subscale, all showing high reliability coefficients per the table below.

Table 1. Cronbach's alpha for the subscales used in the research.

Scale	Previous Cronbach alpha	Current Cronbach alpha
Bullying Perpetration	0.87	0.779
Victimization	0.88	0.773
Neglect	0.83	0.709
Physical Abuse	0.77	0.637
Sexual Abuse	0.72	0.684
Antagonism	-	0.535
Disinhibition	-	0.659

6.2. Demographic and descriptive data for bullying and victimization

Out of a total number of 185 students, 10.8% (n= 20) were identified as bullies, 6.5% (n=12) as victims, 11.9% (n= 22) both who are bully and victim at the same time, 45.9% (n=85) as control group who are neither bullies nor victims (uninvolved), and 24.9% (n=46) as "borderline".

The cut off scoring of Bully and Victim subscales was used from prior research conducted by Juvonen et al. (2003), which was done as follows: Those students who fell 0.5 standard deviations above

the sample mean of the Bully subscale and below the sample mean of the Victim subscale were identified as “bully”; students who fell 0.5 standard deviations above the sample mean of the Victim subscale and below the sample mean of the Bully subscale were identified as “victim”; students who fell 0.5 standard deviations above the sample mean on both Bully and Victim subscales were classified as “both”; those who fell below the sample mean on both Bully and Victim subscales were identified as “control”; Whereas, the rest of the sample was considered as “borderline”.

6.3. Hypothesis testing

Hypothesis 1: Bullies and victims will not differ on physical abuse but they will differ from control group.

A one-way between-group ANOVA (Post Hoc, Benferroni) was conducted to explore the impact of physical abuse (punishment), sexual abuse, and neglect on bullying and victimization, as measured by Illinois Bully Scale (IBS). Subjects were divided into four groups according to their IBS score (Group 1: Bullies; Group 2: Victims; Group 3: Both; Group 4: Control).

There was a statistically significant difference at the $p < .05$ level in physical abuse scores only for the victims [$F(3, 135) = 8.9, p = .00$]. Post Hoc comparisons using the Benferroni test indicated that the mean score of the Victim ($M = 4.17, SD = 2.72$) was significantly different from Control ($M = 1.74, SD = 2.44$), whereas, Bully ($M = 1.80, SD = 2.12$) did not differ significantly from Control. Thus, hypothesis 1 is partially accepted.

Hypothesis 2: Bullies and victims will not differ on sexual abuse but they will differ from control group.

There was not a statistically significant difference at the [$F(3, 135) = 4.4, p = .06$] $p < .05$ level in sexual abuse scores between the Bully and Victim. Post Hoc comparisons using the Benferroni test indicated that the mean score of the Control ($M = .24, SD = .75$) was not significantly different from Bully and Victim. Thus, hypothesis 2 is rejected.

Hypothesis 3: Bullies and victims will not differ on neglect but they will differ from control group.

There was not a statistically significant difference at the [$F(3, 135) = 2.25, p = .085$] $p < .05$ level in neglect scores for the Bully and Victim. Post Hoc comparisons using the Benferroni test indicated that the mean score of the Control ($M = 2.86, SD = 3.30$) was not significantly different from Bully and Victim. Thus, hypothesis 3 is rejected.

Hypothesis 4: There will be a positive correlation between the Antagonistic personality trait and being a bully.

To test the association between the variables of personality traits: antagonism and disinhibition, and bullying and victimization, Pearson’s product-moment correlation coefficient analysis was conducted.

Hypothesis four was confirmed, as the results of the correlation indicated that Antagonistic personality trait is positively and significantly correlated with being bully $r = .407, p = .000$.

Hypothesis 5: There will be a positive correlation between the Disinhibition personality trait and being a bully.

Hypothesis five was confirmed, as the results of the correlation revealed that disinhibition personality trait was positively and significantly correlated with being bully $r = .229, p = .002$.

7. Discussion and implications

7.1. Association between child domestic maltreatment, bullying and victimization

Both results concur with other published studies such as Holt et al. (2007) research that concluded that both groups, the “both” (bully and victim) and the “victim”, reported significantly higher levels of physical abuse. In fact, Holt et al.’s (2007) study was one of the rare studies which reported similar results, specifically to the variables of physical and sexual abuse (neglect was not included in their hypotheses). When both studies were compared, no clear similarity was drawn except in the following: a) the same questionnaire of bully/victim identification, that is, IBS was used, b) the same method of identifying the groups of “bully”, “victim”, “both”, etc., was employed and, c) the sample used was also from an urban environment, i.e., adolescents living in an urban environment are usually expected to more exposed to violence and witness different kinds of aggression as compared to nonurban environments (environmental factor) (Holt et al., 2007). Further exploration is needed in order to identify the reason behind this similarity of results.

Additionally, this significant difference between the “victim” and the control group when it comes to physical abuse, is explained through the attachment theory where the connection between child maltreatment by an abusive parent or caregiver leads to the development of an insecure attachment (Koiv, 2012; Toth, Manly & Cicchetti, 1992; Shields & Cicchetti, 2001; Wolfe, Crooks, Chiodo, & Jaffe, 2009), which consequently plays a negative role in establishing maladaptive relationships with peers at school (Koiv, 2012; Hong et al., 2012).

The absence of a significant difference between the “bully” and the control group could be explained through the social-ecological model of bullying and existence of a healthy bonding between the

maltreated child and a caring non-abusive adult, like a teacher or a leader, who is able in buffering and preventing bullying incidents by encouraging a positive interacting environment for neutralizing the negative effect of the early experience that was established through insecure attachment to the parent or the caregiver (Hong et al., 2012). In fact, taking the family status of this study into consideration, where 94.6 % of the parents living together as a family and not divorced (low divorce rate), might be helpful in explaining the reason for not getting a significant result.

Another confounding variable could be the level of aggression broadcast on TV and the online social media, where the increase in the rate of violence broadcasting plays an additional role in elevating the level of aggression in children.

The "both" group (victims and bullies), however, which was not part of the predicted hypothesis of this study was found to be significantly different from the control group. This particular result concurs with other published studies where the bully/victim group reported significantly higher levels of sexual victimization (Holt et al, 2007).

As for the association between neglect and bullying, it was hypothesized that bullies and victims will not differ on neglect but they will differ from the control group. The results of this study did not find any significant difference between the bully and victim compared to the control group, which concurs with one study by Shields and Cicchetti (2001). In this case, too, the possible explanation for this outcome is again similar to the one given between the "bully" and the "control" regarding the physical abuse.

As for this research being conducted in a Lebanese Armenian culture, it did not add to the significance of the study. It seems that the main differences could be more explained through family and environmental factors that are not specific to the Armenian culture in particular.

7.2. Relationship between antagonistic and disinhibition personality traits, and bullying

In order to identify the bully, it was imperative to define the maladaptive personality traits that can characterize the bully. Thus, this study took into consideration two maladaptive personality traits, the antagonistic and the disinhibition personality trait and hypothesized a positive correlation between these two traits and being a bully. The results were in line with other studies that have indicated the presence of a positive relation between these two maladaptive traits and being a bully. In his study performed on 527 university students, Pontzer (2010) found a positive correlation between impulsive (disinhibition) trait and those who were categorized as a bully.

8. Clinical implications of the study

In this research the interest was on three levels: Parental level that is taken into consideration through CDM (home environment/nurture), School level through bullying (social environment/nurture), and Personal level through personality traits (nature). Thus, this study tackled these three vital levels that play a significant role in the life of the student and help the psychologists, school counselors, social workers, educators, and practitioners in creating successful prevention programs and curricula that take into consideration the interplay of these three levels. Furthermore, identifying the significant effect of physical punishment on victims and bully/victims of bullying, in addition to the significant effect of sexual abuse on bully/victims, can help clinicians, school counselors, teachers, etc. in investigating the occurrence of domestic physical abuse in victims of the bullying on one hand, and the occurrence of domestic physical and sexual abuse in bully/victims on the other hand.

9. Limitations and future research

A main limitation of this study is related to its generalizability beyond students in Armenian Schools in Lebanon. Future research could target more representative samples of the Armenian community in Lebanon in order to be able to generalize the results to the whole population, and to replicate the study within other communities within Lebanese society, including Armenians who are attending non-Armenian schools in Lebanon.

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THE INCLUSION OF CHILDREN WITH SPECIAL NEEDS IN EARLY CHILDHOOD: CHALLENGES AND DILEMMAS OF KINDERGARTEN TEACHERS

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Abstract

The philosophy of inclusion is anchored in the law of Israel, from 2002, stating that all children with special needs have the right to be educated in mainstream kindergartens. As a result of this policy, kindergarten teachers in the mainstream face a complex reality of trying to teach a group of children with very diverse needs that they may not have had any professional training for. This research examines the challenges and dilemmas that face the kindergarten teachers in their daily practices in trying to manage the kindergarten. The literature examines this subject in schools and what is the meaning of such policies from the aspect of schoolteachers and principals, but not from the aspect of kindergarten teachers.

The research is a qualitative study in which five kindergarten teachers in the North of Israel were interviewed. The data analysis was based on categories and show that the kindergarten teachers are facing similar challenges to those of school teachers, lack of specific knowledge on how to teach a group of children in which part of the population has special needs, lack of skills and self confidence in how to deal with such a reality. In addition to the difficulty and lack of self- confidence and lack of skills the kindergarten teachers indicated that they did not feel professional self-efficacy. The contribution of this research can be to rethink the curriculum of training programs for kindergarten to teachers to include the necessary knowledge and practical experience before becoming kindergarten teachers .In addition it is necessary to reexamine the supervisory roles to ensure that a kindergarten teacher who is in the field and has to deal with such a complex problem will receive the professional counselling and resources that is imperative to ensure successful inclusion of children with special needs.

Keywords: *Early childhood, kindergarten teachers, special needs, inclusion.*

1. Introduction

Philosophies regarding the ideas of integration of children with special needs in the educational mainstream have changed dramatically over the last twenty or so years. The idea of integration has been recently replaced by the concept of inclusion. In contrast to integration, inclusion demands the adaption of mainstream educational environments to accommodate to every child's needs (Avramidis, Bayliss & Burden, 2000).

The philosophy of inclusion stems from the philosophy of human rights and that every child has the right to be valued equally, treated with respect and provided with equal opportunities within the main stream system (UN Convention on the Rights of the child 1989 and the UN Standard Rules for the Equalization of Opportunities for Persons with Disabilities, 1993). In early childhood frameworks the policy of inclusion has been translated into different programs (Leatherman & Niemyer, 2005). Children with special needs attending kindergarten with children who do not have special needs, children with special needs who attend a kindergarten for children with special needs for most of the week, but for two days will attend a mainstream kindergarten with children who do not have special needs. Each program has its disadvantages and advantages.

One of the greatest advantages of kindergartens for children with special needs is the provision of all the necessary services that are required on site, as opposed to mainstream kindergartens where it is necessary to seek the treatments outside of the kindergarten and often during working hours of the parents, meaning a loss of work days or hours for the parents and the removal of the child from the familiar environment and disturbing their daily schedule.

According to the literature, factors that affect the success of inclusion practices are the quality of the social interactions and engagement that are facilitated by the staff through natural daily interactions, rather than imported programs (Brown et al., 1999; Malmskog & Mc Donnell, 1999; Salisbury Galluci, Palombaro, & Peck, 1995). Collaborative team work between all the professional staff involved in providing services to the children (Brown, Horn, Heiser & Odem, 1996; Bruder, 2000).

2. Teachers attitudes to inclusion

According to the research of Vaughn (1994) the majority of teachers, who did not implement inclusion practices in their classrooms viewed the idea of inclusion in a negative manner. The teachers identified a number of factors that according to them were problematic, class size, inadequate resources, lack of teacher preparation and the extent that the pupils would benefit from inclusion practices. In comparison, research that investigated attitudes of teachers who had actually experienced inclusion showed that the teachers favored the idea of children with special needs being educated in main stream frameworks (Villa et al. 1996). The conclusions indicated that the teacher's positive attitudes were a result of teachers feeling that they had gained professional skills to implement the programs.

In addition, research that was conducted in Australia investigated the daily experiences of mothers and early childhood professionals in an inclusive early childhood program indicated that there are serious limitations in the national policy concerning inclusion in early childhood centers. The few number of successful inclusions were due to the quality of the staff and not as a national policy or guidance for practice (Grace, R. Wedgwood, N., Fenech, M., Mc Conell 2008). In research conducted by Smith & Smith (2000) which investigated what were the perceptions of kindergarten teachers regarding successful inclusion, the themes that arose indicated a list of factors that are central in promising successful inclusion programs:

I. Training: which included undergraduate teacher preparation, graduate classes, and school district in-service training sessions. Class Load: which included class size, number of students with special needs, severity and range of needs of students, as well as extenuating circumstances, support: which included assistance provided by the regular education paraprofessional assigned to the classroom, by the special education staff, and by the building administration, time: which included the time needed for planning lessons, making adjustments to lessons, making or procuring materials for students with special needs, as well as time needed for collaboration with relevant personnel.

2.1. Kindergarten teacher's role in successful inclusion

Inclusion means providing an educational climate that allows each child to develop in all areas and feel supported, accepted and feelings of well- being (Bredkamp and Copple, 1977). Very often the mainstream kindergarten teacher does not have specific training for children with special needs and therefor needs to develop new professional skills ongoing. The kindergarten teacher needs to be responsive and sensitive to the variety of needs at the same time as well as organize a pedagogical program that is developmentally appropriate. Working with children with special needs also demands collaboration with paramedical staff and of course with the child's parents. Very often it is the kindergarten teacher who is the one to identify the child's difficulties and as a result have to support and understand the processes the parents go through, disbelief, anger, depression and eventually, acceptance (Lerner et al. 2003). The kindergarten teacher needs to empower, counsel and support the parents in very often difficult decisions. Placing a child into an inclusive setting is not sufficient to promise that the inclusion will be successful (Vakil, S. Welton, E., O'Conner, B. Kline, L. 2009).

Self- efficacy of Kindergarten teachers as a factor in promising successful inclusion

According to the theory of self-efficacy (Bandura (1997) cognitive processes are central in self-regulating behavior. He suggested that "cognitive processes mediate change, but that cognitive events are induced and altered most readily by experiences of mastery arising from effective performance" (Bandura, 1997, p. 191). Therefor it is imperative for an individual to have the necessary knowledge and skills in addition to feeling self- confidence and a feeling of competency in order to succeed in their efforts to be successful in the inclusion of children with special needs.

Self-efficacy refers to teachers' beliefs that they can bring about desirable changes in pupils' behavior and achievement (Guo, Y., Justice, L. M., Sawyer, B., & Tompkins, V. 2011). It has been shown in previous research that teachers' feelings of self-efficacy in inclusion situations affect teachers' attitudes, management classroom skills and the students' academic achievements (Ahsan, Sharma and Deppeler, 2012; Gibson and Dembo, 1984; Tschannen-Moran and Hoy, 2001). In a study conducted by Main and Hammond (2008) it was found that preservice teachers that reported high levels of self-efficacy were more successful in managing inclusive programs.

This research aimed to investigate the dilemmas and challenges facing kindergarten teachers in inclusive kindergartens and how the kindergarten teachers' attitude to inclusion effects the success of inclusion and whether the kindergarten teachers' way of coping with inclusion effects their feeling of professional self-efficacy.

Research Questions

1. What are the challenges and dilemmas facing kindergarten teachers in the inclusion of children with special needs in the mainstream kindergarten?
2. How does the kindergarten teachers' attitudes effect the success of the inclusion?
3. How does dealing with inclusion affect the kindergarten teachers' feeling of professional self- efficacy?

3. Method

3.1. Participants

The participants in this research were five kindergarten teachers in the north of Israel between the ages of 40-46. All five kindergarten teachers had trained as mainstream kindergarten teachers. Four of the kindergartens were secular and one religious. The number of children in the kindergartens ranged from 20-28. The population of the kindergartens included children with special needs. All kindergartens were in rural settlements. The children with special needs visited the kindergartens on a regular basis. One of the children was enrolled in a part time program at the mainstream kindergarten as well as being a student at the special education kindergarten. The interviews took place in the kindergartens.

This was a qualitative research, qualitative research allows the researcher to gain an insight into thoughts, feelings and personal experiences of the interviewees. The researcher used in depth interviews to enable her to understand the internal world of the kindergarten teachers and get a better understanding about their concerns and dilemmas in teaching children with special needs within a mainstream kindergarten. The data was transcribed and analyzed by content analysis.

4. Results

This research aimed to examine the dilemmas and challenges facing kindergarten teachers, the kindergarten teachers attitudes towards inclusion and the effect of inclusion on feelings of professional self- efficacy.

During the interviews the kindergarten teachers expressed their experiences and views considering the success of the inclusive practices and identified the challenges and dilemmas that they faced concerning the inclusion of children with special needs in mainstream kindergartens. The emerging themes that arose from the data revealed the following themes: 1. Challenges and dilemmas. 2. Attitudes 3. Collaboration with other professionals. 4. Collaboration with the children's parents. 5. Professional self-efficacy. 6. The availability of suitable resources.

4.1. Challenges and dilemmas

E. a kindergarten teacher that finished her studies four years ago:

"She demands all my attention, I feel there is her, and the rest of the children. It feels like she demands the same attention as the rest of the kindergarten. All day long I have to make sure that she is given positive feedback, I have to keep my eye on her all day long."

Y. "The kindergarten is a place where he feels comfortable and safe, but I am not sure if it advances him educationally. He likes to be in front of the computer, he is relaxed and quite there, which is good for us and for him. But it feels terrible, a waste".

"I am there to do the mediating, then the idea works, but it doesn't don't really work, they (the children) are playing near to each other but not with each other. He is feeling good that he is near them and the other children receive the praise from me."

4.2. Attitudes

Y." The fact that M. is in our kindergarten, I think that it is a present and I am for inclusion. I am also for the fact that the other children experience being with a child that is different". But I don't know how I would accept another child with physical defects. I would find that much more difficult".

E." I have a humanistic approach, that everyone is equal and everyone gets a chance. I come from that position totally".

E. "We emphasize in our kindergarten the values of consideration for others"

"I believe in integration, and want to bring my kindergarten the idea of integration, how to teach children to accept others who are different, how to bring my staff to include the child with special needs

into the kindergarten, but it needs to be in small portions of time. It is not impossible in the full-time program but it demands certain conditions. I am totally for integration but it needs to be limited in time and with certain conditions. It cannot be at the expense of the other children."

4.2.1. Collaboration with other professionals. S. "I asked for help from the special education kindergarten, how to mediate with M."

"I asked the psychologist to observe him and he told M parents that the special assistant was not suitable because she did not let M. act freely enough."

E. "I am very happy with the working relationship that I have with the kindergarten teacher from the special education kindergarten. We work together and everything is well organized. The communication with the parents is combined and each one knows her place".

V. "I make sure that I navigate the psychologist's hours in a way that will allow me to answer all the needs in the kindergarten. It is very easy to get into a pattern where all the resources go towards the child with the special needs".

4.3. Collaboration with the parents

S. "His mother is very scary, very aggressive and I was lacking in confidence as a new kindergarten teacher with little experience. There was no trust at the beginning".

C. "I never thought of what the parents were going through, I do not have that ability. I am able to understand the parents of other children that arrive cranky in the morning, or are having problems, but I never took the time to think what M.'s parents are going through."

E. "We learnt during the year to trust each other".

"After the Chanuka party 'his mother came up to me and told me how disappointed she was. I remember that was a significant point for me, I had done everything that I could or knew how to do".

4.3.1. Professional self-efficacy. Y. "It is not easy to manage a kindergarten when there is a child with special needs, not even for more experienced kindergarten teachers. Even more so for a kindergarten teacher in her first year".

S. "I did not know how to do this".

S. "In my first year I arrived on the kibbutz, no one prepared me for this, I had no experience or knowledge no one explained to me what is a child with special needs, you have to do this or other things. Today I am more experienced, today M. is in his second year in the kindergarten, I have more knowledge, so does he, he knows what is expected of him."

Y." I go to sleep easily at night and feel that I am fulfilling my professional duties."

4.4. Resources

V. "You know we are limited in the number of children that we can ask for special resources. Each year it is becoming more and more difficult to receive the necessary resources. Last year I was able to receive help for children with emotional difficulties, this year impossible".

C. "Inclusion that does not come with resources, or with the necessary professional advise, if it means extra staff or part time programs or professional consultation does not enable us to fulfill the targets of inclusion in a professional way".

5. Conclusions and discussion

The philosophy of inclusion comes from a democratic humanistic view of equal rights and opportunities for diverse populations.

The law of special education and inclusion in Israel is based on this agenda. The promotion of human dignity and the aspiration for equal opportunity. (2002) This research investigated the practical side of the implementation of the law from the experiences of kindergarten teachers whom are required to implement this law in their kindergartens. None of the kindergarten teachers who participated in this research had professional training in special education.

To ensure that the inclusion programs are successful it is necessary to provide certain conditions. According to the literature professional training, class load, support and time, and other resources were shown to be influential in effecting the quality of the inclusion programs (Smith & Smith, 2000). In this present research it was shown that all these factors were thought to be inadequate to allow the kindergarten teachers to feel that they were able to successfully activate the inclusion program, " I don't know to do this".

In conclusion it can be seen that the inclusion of children with special needs within mainstream kindergartens brings with it a complex myriad of dilemmas and challenges for the kindergarten teacher.

There seems to be a gap between the philosophical, ideological side and the implementation in the field. The researcher recommends that all teacher training programs address this issue and provide professional training in this area to enable future kindergarten teachers to feel professionally capable in being able to implement a program based on knowledge and not just depend on their instincts or trial and error and by so ensure that children with special needs are truly included in the communities that they live and are educated in. This research was limited in the number of kindergarten teachers and the geographical area. It is recommended in future research to increase the population and to include kindergartens from other geographical areas.

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THE APPLICATION OF MOBILE DEVICES IN ACTIVE LEARNING AT THE UNIVERSITY: A REVIEW OF LITERATURE

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Abstract

The use of technology as an instrument to support learning is presented as a trend that is on the rise, because their versatility and adaptation to change have become an indispensable tool in the training practice of university students; from that a theoretical research was carried out on how the application of mobile devices in active learning in a university environment is approached in Ibero-America; the purpose is to give an account of what has been produced and researched regarding this topic and it is interference in the teaching and learning process. Heuristic and hermeneutics were used as methodologies for their construction. It includes the findings published between 2014 and 2018. It was determined to consider only the articles presented in indexed scientific journals, as well as extensive reports of international congresses held in Latin America and Spain. During the research, doctoral theses related to the topic to be treated were found, so they were also considered for analysis. A bibliographic matrix was designed in the Excel program where all the texts that made up the universe were cataloged, and then the documents were selected applying the filters with respect to the topics related to mobile devices and active learning in higher education. The analysis of the results was based on a qualitative methodology; they reflect that the researchers agreed that there is a wide potential for the pedagogical use of mobile devices, however, are still little used to support active learning in a university environment; likewise, it is highlighted that students prefer to use these devices for activities related to leisure and entertainment. It also appears that personal environments of mobile learning are shown as technological scenarios of recent introduction in university education, however, it is necessary to expand the research that allows measuring the impact that these methodologies have on the educational process.

Keywords: *Mobile devices, active learning, university.*

1. Introduction

The technology as a support in the learning has been a subject treated by diverse experts in the last years, reason why it has appeared like a tendency that goes in ascent, this due to its versatility and constant adaptation to the change, in such a way that in these times have become indispensable for the formative practice of university students.

On the other hand, mobile devices have become not only a tool, but a necessity for the population, since their use has exceeded, and currently they report more than seven million subscriptions to mobile cell phones (Union, 2015), situation which has also impacted the educational field in which applying mobile phones to support the teaching-learning process is known as mobile learning, which has been implemented in some universities, where it is being applied in various educational activities, directly related to the process education (Humanante-Ramos, García-Peñalvo, & Conde-González, 2016).

Thus, the creation of technological environments that allow for improved learning, brings with it an evolution in the way in which a class is guided, as well as in educational models that seek to adapt to the constant change that technological progress has had. In this way, mobile learning also aims to respond to the educational demand of this century, providing greater flexibility to learn at the time and place that is decided, achieve significant learning through the design of instructional environments, customize the learning experience and greater effectiveness of learning by promoting active attention by students (Vargas Medoza, Gómez Zermeño, & Gómez Zermeño, 2013).

In order to successfully carry out the application of mobile learning in active learning, it is very important to design teaching activities that are in charge of the teacher, in such a way that it is the teacher who plays a fundamental role so that the technology can be used in educational processes, based on interactive content and, above all, fostering new possibilities and forms of communication between the actors in the educational environment (Henríquez Ritchie, Organista Sandoval, & Lavigne, 2013).

In order to successfully carry out the application of mobile learning in active learning, it is very important to design teaching activities that are in charge of the teacher, in such a way that it is the teacher who plays a fundamental role so that the technology can be used in educational processes, based on interactive content and, above all, fostering new possibilities and forms of communication between the actors in the educational environment (Henríquez Ritchie, Organista Sandoval, & Lavigne, 2013)

In this sense, one of the most important challenges facing teachers today is to take advantage of the potential offered by mobile devices to motivate student learning (Basantes, Naranjo, Gallegos, & Benítez, 2017); the previous thing through didactic activities that allow to surpass the contradictions that the traditional school has had and that in this way impel the active learning.

However, few studies have been done to know the impact that the application of mobile devices has on active learning in the university, in such a way that from the previous premises it was to carry out a theoretical investigation regarding how it is approached in Iberoamerica this topic, this with the purpose of giving an account of what has been produced and researched regarding this topic and its interference in the teaching and learning process.

2. Methodology

The objective of this work was to conduct a review of the literature that included the background, a descriptive and analysis of the publications and reports that had been made in the Ibero-American countries in relation to the application of mobile devices in active learning, addition to achieve an understanding of the topic by identifying the methodologies used and the thematic lines addressed, for which heuristics and hermeneutics were used as methodologies for the construction of the same.

With regard to the heuristic phase, the investigation and compilation of diverse sources of information were carried out in relation to the subject that concerns us, this with the aim of collecting it and afterward contextualizing it. The search for information was made in Spanish and in the geographical area known as Ibero-America.

This was decided because when talking about student learning, the volume of information found on the internet is quite significant, and it was determined that a specific search should be done, applying descriptors such as mobile devices, active learning, and mobile learning, and the combination between both, mainly.

To achieve the above, it was determined to consider only articles presented in indexed scientific journals, as well as extensive reports of international congresses held in Latin America and Spain. During the search, doctoral theses related to the topic to be treated were found, so they were also considered for analysis.

The research was carried out through a qualitative and interpretative design, of documentary type, which determined the procedure of selection, access, and registration of the documentary sample.

For this methodological section and according to Gómez Vargas, Galeano Higueta, and Jaramillo Muñoz (2015) a bibliographic matrix was designed in the Excel program where all the texts that made up the universe were inventoried and subsequently the documents were selected by applying the filters to topics related to mobile devices and active learning in higher education

In the Excel bibliographic matrix, a total of 257 documents of different type of material were reviewed, as previously mentioned; later, the selection of the sample was made using the filters that Excel allows, leaving a total of 52 texts: 38 articles, 10 extensive reports, and 4-degree papers.

According to the total number of documents considered for this work, which were 52. It was thought that this sample represented the information that exists in the Network, and it was sought that it fulfilled the following criteria: findings published in the last five years, among 2014 and 2018; that they were within the thematic axes referred to the mobile learning and active learning, all focused in the university scope; in such a way that it was determined that the data collected were representative to build this approach and literature review.

Thus, for the hermeneutic phase, the analytical content matrix was designed in Excel (Gómez Vargas, Galeano Higueta, and Jaramillo Muñoz, 2015), where the texts of the sample, written in vertical, were related to the categories of analysis that were taken from the descriptors established for the search of information and that were written horizontally. After the paragraphs or phrases were extracted where a topic related to one of the categories was developed to place it in the square.

3. Results and discussion

By reviewing and analyzing the information, important aspects were determined, among them, it was confirmed that few studies have been carried out regarding the relationship between mobile devices and active learning, mainly because most of them expose cases of use of the technology but without directly relating the subject that concerns us; although some investigations are interesting since they present data that at the time were taken into account for the educational process, however, there are still few who perform a general analysis that the use of mobile devices has in active learning or the relationship that these can have

In the results found, the studies carried out to publicize the design and development of activities based on mobile learning, as well as experiences on educational innovation stand out (Artal Sevil, Casanova López, Serrano Pastor, & Romero Pascual, 2017); case studies of educational research, as well as analysis of life stories, there are even articles that explain a conceptual model as innovation that allow us to foresee the potential of mobile learning (Mejia Trejo, Sánchez Gutiérrez, & De Jesús-Vizcaino, 2015), (Vázquez Cano & Sevillano García, 2014). In the same way, publications were found showing the didactic functionality of mobile devices, describing the design and development of a mobile learning system as support for the teaching and learning process, as well as the influence of motivational factors when they are used. mobile technologies as an educational practice (Castro, et al., 2016), (Sánchez-Prieto, Olmos-Migueláñez, & García-Peñalvo, 2017), (Villalonga Gómez & Marta-Lazo, 2015).

Studies are also shown in which it is said that the use of mobile devices and apps is widespread among students, who make constant use of them (Briz Ponce, Juanes Méndez, & García Peñalvo, 2015). This investigation talks about that virtually everyone has mobile electronic devices, studies are presented in which they show important statistics on the subject of these devices (Union, ICT Facts Figures 2015, 2015) (Humanante-Ramos, García-Peñalvo, & Conde-González, 2016), (Mendoza Bernal, 2014), (Herrera Sánchez, Díaz Irizar, & Buenabad Arias, 2014).

In relation to the benefits obtained by using mobile learning, several articles were found, including lectures and doctoral theses, in which they state that these devices allow new ways of teaching and sharing, allow the construction of knowledge between groups and improve communication ; it is also said that mobile devices can enhance interaction inside and outside the classroom, stimulating motivation and communication, as well as critical thinking (Basantes, Naranjo, Gallegos, & Benítez, 2017). In particular, we talk about the potential that this type of learning can have, such as ubiquity and mobility as its main advantage, becoming tools and elements available for both teachers and students through which you can access information without import the place where they are or the type of subject or sector being studied (Briz Ponce, Juanes Méndez, & García Peñalvo, 2015).

Regarding how mobile devices are applied in active learning in the university, findings are presented in which they mention the impulse that these devices can offer to have a real approach to knowledge and the possibility of creating and sharing knowledge, in addition to can support the organization and especially the communication of what is learned (Sahagún Jiménez, Ramírez García, & Monroy Iñiguez, 2016), in this same sense, in several studies has referred to the benefits that can bring with using mobile systems as a means to personalize student learning and encourage collaborative work as an active learning strategy, in addition to allowing the construction of knowledge among groups and improving communication, this is to enhance interaction inside and outside the classroom, There is also talk of effectiveness through the implementation of tools that allow students to take participate actively, generating collaboration and cooperation (Castro, and others, 2016), (Basantes, Naranjo, Gallegos, & Benítez, 2017) and (Fuertes, and others, 2016).

Among the studies stand out those in which research is presented related to cases in which mobile devices have been applied in order to achieve learning, highlighting that when working in this sense, it can be noted that the commitment of students is greater and favors autonomy and supports the development of competencies related to collaboration among peers (Silva Quiroz & Maturana Castillo, 2017); In this way, mobile devices are presented as an ideal medium for socialized learning, which implies integrating active methodologies that avoid the rigidity of traditional classes (Ramón Verdú, 2015).

Regarding the disadvantages that can also occur when using mobile devices as a tool to support learning, it is shown that there is a lack of development of cognitive skills that are required to incorporate this new methodology and above all how to use technology in favor of learning (Arce, 2017); in relation to the importance that teachers have for this type of methodologies to be successful in the educational field, it is said that one of the most important challenges for higher education is the training of teachers in the use of mobile devices inside and outside of the classroom for pedagogical purposes (For & SJ, 2017) and (García-Peñalvo & Ramírez Montoya, 2017).

Other works found show that despite the fact that the majority of university students have smartphones, they do not use applications that allow them to support their learning or to carry out academic activities, since a large percentage uses it only to play, chat and other activity related to leisure, (Herrera Sánchez, Díaz Irizar, & Buenabad Arias, 2014), that is, these tools can become a distraction that affects the improvement of the teaching-learning process (Fuentes, et al., 2016).

4. Conclusions

The presented work reflects that the researches found agree that there is a wide potential of the pedagogical use of mobile devices, however, they are still little used to support active learning in a university environment; likewise, it is emphasized that students prefer to use these devices for activities related to leisure and entertainment, even though this may affect their academic performance.

It also shows that personal mobile learning environments can be used as technological scenarios of recent introduction in university education, however, it is necessary to expand the research that allows measuring the impact that these methodologies have on the educational process.

Similarly, it is concluded that the number of investigations carried out in Ibero-America is still incipient, this is because what is called mobile learning has not yet been completely clarified, since it is not necessary to determine when and in what situations it should be called mobile learning, this coupled with the impact it has on the teaching and learning process.

At the theoretical level, there is a scarcity of research and publications on the application of mobile devices as a strategy to motivate active learning. In the research, it is noted that mobile learning is a relatively new phenomenon, in such a way that the theoretical bases that sustain it are still in development and most of the approaches have been made from a technological point of view and not focused on a perspective pedagogical.

In this same sense, various results show that the use of mobile devices and apps are common among students, however, it is considered necessary to deepen the potential they can have for specific uses of various subjects in the university environment.

For its part, stands the pedagogical design serves one of the most important functions for the application of mobile devices have an impact on active learning, ie successful participation of teachers in design, development, implementation, and evaluation of learning is required through these innovative methodologies.

In this sense, García Aretio (2017) refers to the effectiveness of using mobile devices and technology as part of the educational process, noting that it can be performed almost similar to the actual classes manner, claiming that the trend is not exhausted, but which continues to include the break with new technologies, such as mobile and active learning.

Finally, it is important to continue with studies that deepen the pedagogical impact of technologies, as well as innovative methodologies and active learning, it is necessary to develop new research methods for this type of studies in which various aspects are studied. didactic of mobile learning.

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ADJUSTING SCHOOL ENVIRONMENT FOR CHILDREN WITH PROFOUND AND MULTIPLE DISABILITIES

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Abstract

An “one track approach” has been defining the Portuguese policies and practices towards an education for all. Nowadays, more than 98% of children with disabilities is attending regular schools, including those with profound and multiple disabilities. This study aims to identify environmental factors supporting the inclusion of children with profound and multiple disabilities in mainstream educational settings. The Individualized Educational Programs (IEPs) of twenty-three children were subjected to a content analysis that used the International Classification of Functioning Disability and Health (ICF) for categorizing environmental facilitators. The examined IEPs were collected from ten schools of Porto district and were designed for children with significant impairments both on mental and neuromusculoskeletal and/or sensory functioning. Children had a mean age of 11 years old and were attending elementary and middle schools. Two co-researchers reviewed the categorization of the units of meaning into the ICF codes. A mean of 10 environmental facilitators were identified on students’ IEPs. Study findings report that 41.74% of the environmental factors comprised products and technologies, specifically the use of: adapted methods of communication (e.g., augmentative and alternative communication - Makaton, PCS and other symbol systems); adapted methods for education (e.g., time management; providing diversified sensory inputs; varied and ludic activities; segmentation of instructions; use of tangible concepts; structuring and anticipating routines/activities). Support and relationships embodied 40% of the facilitators, namely: providing physical and/ or verbal guidance; collaborative relationships between school-family and family-health professionals; positive reinforcement to students’ involvement and behaviors; choice-making opportunities; and tutoring support (identification and use of an adult and/or a peer of reference). The availability of services - such as transportation; extra-curricular activities; social assistance; medical and rehabilitation counseling (e.g., including genetics or neurology appointments) and the composition of a pluri-disciplinary educational team (including occupational and speech therapy) - was also found within students’ IEPs; embodying 9.57% of the identified facilitators. Others’ attitudes were also addressed in students’ IEPs in terms of promoting general acceptance and closeness to peers. Recommendations are outlined from the confrontation between the identified facilitators and the reported needs of students and families.

Keywords: *Profound and multiple disabilities, school inclusion, environmental facilitators, ICF.*

1. Introduction

To provide every student the sense of belonging and a well succeed participation – including children and youth with disabilities - is the current challenge faced by European countries towards an inclusive education (e.g., EASNIE, 2018). Defined by the ability to respond to the diversity of pupil’ needs, inclusive practices depend on identifying and implementing environmental supports that enables the learning and participation of each and every one of the students (e.g., Rozenfelde, 2016; Silveira-Maia et al., 2017). The access to regular schools is an established reality in Portugal, being documented (CRPD, United Nations, 2016) that around 98% of the children and youth with disabilities are attending regular schools. A wide spectrum of functioning diversity is, then, found in Portuguese schools, including circumstances of profound and multiple disabilities. Beyond the access, the goal is now imposed on moving towards an increased participation, in terms of skills, relationships and membership (Blum, Gutierrez & Peck, 2015). This study intends to contribute in the path for environmental enablement, by describing the supports implemented in regular schools for children and youth which functioning profiles reports profound and multiple disabilities.

Pursuing an inclusive education, Portuguese legislation adopted a multilevel approach for implementing supports in regular schools. Three levels of measures are considered and mobilized according to students' educational needs and their response to intervention (DL No. 54/2018, articles 8th, 9th and 10th):

- (i) universal measures - mobilized for all students, including adjustments such as curriculum enrichment, promotion of pro-social behavior, differentiated instruction;
- (ii) selective measures - implemented when universal measures do not fill the needs for learning supports. Include, as example: non-significant curriculum adaptations, psycho-pedagogical support, tutorial support;
- (iii) additional measures - designed to respond to "intense and persistent communication, interaction, cognitive or learning difficulties that require specialized resources (...)" (art 10, point 1). Include: "the completion of the school year by subject"; "significant curricular adaptations", "individual transition plan" (designed to promote the transition to post-school life and, whenever possible, to a professional activity), "the development of structured teaching methodologies and strategies"; and "the development of personal and social autonomy competences" (art 10, point 4).

As found in a literature review conducted by Bellamy and colleagues (2010), within the diverse definitions of profound and multiple disabilities, consensual characteristics include "profound cognitive impairment, and social functioning, as well as more than one additional disability, usually including sensory or physical impairment, and may also include autism or mental illness or challenging behaviours or an associated medical factor" (p.225). Their complex needs commonly require educational interventions inscribed in additional measures of support which implementation is monitored by a multidisciplinary team, composed by: the school director (or an assisting teacher); a special education teacher; members of the pedagogical council; a psychologist; regular teachers; and other technicians (as an occupational and speech therapist) (DL No. 54/2018). Significant curriculum accommodations are commonly implemented, including objectives established in terms of knowledge and competences related with autonomy, personal development, and interpersonal relationships. At the end of the school pathway, according to the law, for those who followed a curriculum with significant adaptations, a certificate of completion? is provided describing the individual education program and the experiences promoted through the individual transition plan.

Although the legislation privileges the context of the classroom for implementing additional measures, along the years schools has been adopting a specialized unit model. Specialized units implement specific interdisciplinary intervention strategies aimed at building capabilities and strengthening skills that are necessary for enhancing those students' participation in classroom activities with their non-disabled peers (Sanches-Ferreira, Silveira-Maia, Lopes-dos-Santos & Santos, 2017). According to DGEEC, in the 2013-2014 school year, 3.19% of the students receiving special education services were being assisted in Support Specialized Units.

It is important to note that Specialized units have been subjected to substantial criticisms, being referenced as creating a new form of segregation within schools. As it is reported by Pinto and Pinto (2018), 57% of the students using the units spend less than 40% of the school time with their peers of the regular classroom. One of the responses to this criticism consisted on the intention – stated by the Portuguese ministry of education – of reconfiguring Specialized units into "Learning Support Centres", transforming that contexts in dynamic and plural spaces with human and material resources for promoting knowledge and experiences of all, and not only students' with profound and multiple disabilities (DL No. 54/2018).

Framed by this ideo-political context, this study aims to contribute on the path for the development of inclusive practices and cultures, by describing strategies, resources, as well as assistive devices that are used to support the learning and participation of children and youth with profound and multiple disabilities in regular schools.

2. Method

2.1. Participants

The Individualized Educational Programs (IEPs) of twenty-three children were examined. IEPs were provided by 10 schools of Porto District. Recruitment process entailed an incidental sampling, that started with a letter of invitation addressed to school principals of Porto district; followed by asking parents' authorization for consulting the IEPs. Inclusion criteria for the selection of IEPs considered the conditions of: (i) being designed for children with significant impairments both on mental and on neuromusculoskeletal and/or sensory functioning; and (ii) including significant accommodations in the curriculum.

The included IEPs were designed for students with a mean age of 11 years old, that were attending elementary and middle schools. Twelve (52.5%) were females and eleven (47.8%) males. A wide scope of diagnosis was found on their individual processes, including cerebral palsy, down syndrome, autism, fetal alcohol syndrome, intellectual disabilities, and global developmental delay.

IEPs were designed by interdisciplinary teams, predominantly composed by a special education teacher, regular teacher, parents, psychologist and therapists. The regular classroom and the specialized unit for multiple disabilities were the main contexts of students' participation and learning.

2.2. Data analysis

The IEPs were subjected to a content analysis that used the International Classification of Functioning Disability and Health (ICF, WHO, 2007) for deductively categorizing environmental facilitators. The ICF is a biopsychosocial framework that has been broadly used as a taxonomy supporting assessment and intervention planning in special education and inclusive field. The ICF incorporates a comprehensive list of environmental factors, organized into five chapters (table 1).

Table 1. Domains (WHO, 2007) considered for environmental categorization.

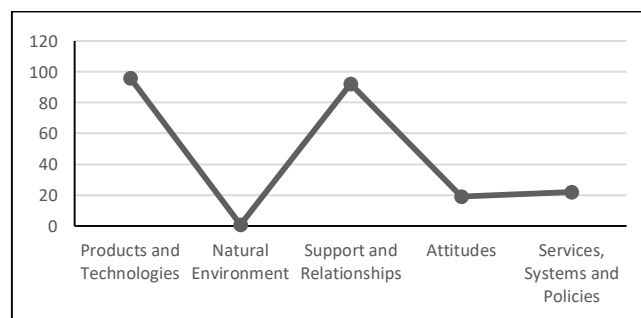
Environmental domain	Contents	Examples of corresponding meaning units and linkage to ICF codes
Products and technology	All references to "products or systems of products, equipment and technology in an individual's immediate environment"	"texture and diversity of food" (e1100-food) "adapted spoons with thickened cable" (e1151-assistive products for personal use in daily living)
Natural environment and human-made changes to environment	All references to "animate and inanimate elements of the natural or physical environment, and components of that environment that have been modified by people".	"Adjustment of light and sounds into different rooms" (e2400 - Light intensity; e2500- Sound intensity)
Support and relationships	All references to "people or animals that provide practical physical or emotional support, nurturing, protection, assistance and relationships to other persons, in their home, school or at play or in other aspects of their daily activities".	"Tactile kinesthetic cues" (e360-other professionals); "peer tutoring" (e325 - peers); "emphatic and secure climate" (e330-people in positions of authority)
Attitudes	All references to "attitudes that are the observable consequences of customs, practices, ideologies, values, norms, factual beliefs and religious beliefs".	"positive expectations"; "valuing progresses" (e430-individual attitudes of people in positions of authority)
Services, systems and policies	All references to provided "benefits, structured programmes and operations"; to "administrative control and organizational mechanisms"; or to "rules, regulations, conventions and standards established by governments"	"use of adapted services of transportation" (e540 - transportation services, systems and policies); "enactment of social assistance services" (e570-social security services, systems and policies)

Two co-researchers reviewed the categorization of the units of meaning into the ICF codes.

3. Results

A total of 230 meaning units were found on the 23 examined IEPs, representing a mean of 10 environmental facilitators specified in each students' IEPs. As shown in figure 1, most of support are described in terms of products and technologies (n=96; 41.74%) and support and relationships (n=92; 40%). An emergent reference to attitudes (n=19; 8.26%) and services, policies and systems (n= 22; 9.57%) was also verified.

Figure 1. Distribution of the meaning units according to environmental domains.



3.1. Products and technologies

In each IEP, a mean of 4 environmental facilitators was defined in terms of products and technologies. As we can read from table 2, a greatest diversity of factors was found on regard to products and technologies for communication and for education.

Table 2. Categories, subcategories and examples of meaning units found within products and technologies domain.

Categories of Products and Technologies	Subcategories	Examples of contents
Products or substances for personal consumption	Food Drugs	Diversity of food Pharmacotherapy
Products and technology for personal indoor and outdoor mobility and transportation	Assistive products and technology for indoor and outdoor mobility	Wheelchairs; lift for transfers
Products and technology for communication	Assistive products and technology for communication	Describing images/ situations, using gestures; using of the computer; using alternative and augmentative communication systems (SPC; Makaton; photos)
Products and technology for education	General products and technology for education Assistive products and technology for education	Interactive board; using the computer/ specific software's; didactic games; using audiovisuals; correspondences Tasks segmentation; furniture adjustments; tangible and concrete instructions; involvement gradation in terms of time; sequencing activities; using different textures; routines predictability;
Products and technology for culture, recreation and sport	General products and technology for culture, recreation and Sport	Dynamization of parties, school tours; sports
Design, construction and building products and technology of buildings for public use	Design, construction and building products and technology for gaining access to facilities inside buildings for public use	lifts or elevators, ramps
Non-specified	“Technologies/ assistive devices helps...”

3.2. Support and relationships

The environmental facilitators described in terms of practical physical or emotional supports registered also a mean of 4 references. Diversity of supports are defined on table 3.

Table 3. Categories, subcategories and examples of meaning units found within supports and relationships domain.

Categories of Products and Technologies	Subcategories	Examples of contents
Immediate family	Involvement on educational planning; generalization of the strategies in home; economic investment; familiar stability; articulation with school
Extended family	Involvement in students' educative life; emotional support; articulation with health professionals
Peers	Support in routines management; protection; behavior modeling; tutoring support.
People in positions of authority/ Other professionals	Positive reinforcement; monitoring; providing physical and/ or verbal guidance; encouragement; choice-making opportunities

It matters to highlight that several references to environmental factors did not specify, beyond the mention to the general environmental domain, which exact facilitators were mobilized for student's inclusion. Sentences as /“Technologies or assistive devices helps...”/ “The individualized support of the teacher is important for...” / “(...) with the support of the parents” / are often found in the IEPs, without further specification of the implemented supports.

General acceptance and closeness to peers represented the categories found within attitudes domain. Some of the references to services, policies and systems included transportation between school and rehabilitation centers, the availability of extra-curricular activities; economical support; social assistance support; technicians' interventions (occupational and speech therapy) and medical and rehabilitation counseling (e.g., including genetics or neurology appointments).

4. Discussion and conclusions

The present study provides systematized data on supports implementation reported on IEPs of students with profound and multiple disabilities. Study findings show that *products and technologies*, as well as, *supports and relationships* – in terms of physical and emotional support - embody the major environmental adjustments addressed on students' IEPs. An environmental habilitation centered on *products and technology* seems to reflect the greatest emphasis of the literature on interventions towards: (i) communication, as working based on pre-intentional or intentional signals or with augmentative communication systems (e.g., Chadwick, Buell & Goldbart, 2018); and (ii) structured learning environments, with predictable routines, anticipation, repetition, sensory engagement, choice-making opportunities or use of objects of reference (e.g., Arthur-Kelly et al., 2008). 'Attitudes' was an emergent environmental domain addressed on students' IEPs suggesting that school community isn't yet considered as a target of intervention. As widely known, attitudes embody one of the greatest barriers faced by people who have profound and multiple disabilities (e.g., Safak, Muzeyyen & Kot, 2014). Thus, the low importance assigned to that domain contrasts with the need for a consistent implementation of the strategies already projected in terms of communication or learning, which highly depends on educating the staff for understanding and using that cues; along with shaping positive expectations and investment on students' progresses. Also, the integration of attitudes as targets of intervention is a critical factor for the accomplishment of meaningful and quality relationships; connecting with peers and with the community (e.g., Nijs & Maes, 2014).

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IDENTIFICATION OF SCHOOL DEPENDED FACTORS, WHICH CAN AFFECT STUDENTS' PERFORMANCE ON ASSESSMENTS

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Abstract

The paper tries to define, name and assess different factors, which can affect evaluations results for students. In Norway, like in all EU countries, students need to collect 30 ECTS. To get ECTS students must pass an examination/evaluation at the end of each subject. The ideas of examining the students are to see to which degree the students have learned (assimilate) knowledge from the course. The examination is also a type of assessment to see if the students can choose and use effective study-strategies, and if they know how to prepare for and perform during an examination. It is an evaluation of learned skills and examination performance, not students' personal qualities.

Both research publication and authors experience show that in many situations, the students do not achieve an examination score proper to their skills. There are many reasons for this. In the paper, the authors will not focus on general reasons like economic condition or gender divergences but only on factors that can depend on university strategy, such as stress management, examinations technique, understanding of the tasks, etc.

The results of surveys conducted in all class show that the students have unsatisfactory knowledge about effective exams-strategies. They often know about theoretical problems but have insufficient experience with practical use of this knowledge. If the students are working with the curriculum (syllabus) on their own, they have hard time to perform under pressure. Often, their well-learned skills fail under a trial, because they are not prepared for the evaluation itself. Performing pressure, anxiety and stress are examples of variables that can affect student's execution or presentation of their well-learned skills. The students need to prepare themselves to an exam not only by reading the curriculum and solving past papers, but also by dealing with stress and pressure, by thinking ahead and mentally preparing themselves for the evaluation. Schools and universities should help students by teaching them different study- and examination strategies, so that students know how they can perform their best under exams.

The authors collected data through qualitative and quantitative methods (surveys, interview, and collecting anonymous data from exams results) to research study- and examination-strategies they use. The data was anonymized and analysed. The results were used to identify what factors affect students' performance most. The paper shows some suggestions how schools and universities can support students to be more prepared and self-conscious for this kind of situations.

Keywords: *Evaluation, study strategies, examination strategies, students, assessments.*

1. Introduction

To define education as merely formal education is a gross oversimplification (Michalos, 2017). In today's culture it is expected to learn many kinds of things through many ways and contexts, but the word "education" is merely associated with formal education from government schools and universities. Education today needs to "expand academic quality in all aspects, right from the curriculum to the learning-teaching process to examination and evaluation systems" (Aithal & Kumar, 2016). The oldest university in the Western world, University of Bologna, was founded in 1088 AD in Italy, and it is the first university in Europe for international mobility through Erasmus+ 2018 (University of Bologna). The times are changing, and higher education institutions need to create a model of education that keeps the curriculum in place with changing environment, technology adoption, changing industry requirement, changing aspiration of students and changing expectations of society (Aithal & Kumar, 2016).

Norway is a welfare state, where there are small, and mostly insignificant, differences between society classes, especially in the education system. In Norway an access to education is a human right, and everyone is accepted, yet many does not complete their degree. The authors experience stated that the students learn more during the semester then what they show on final assessments. Students that answers correctly in classes, and writes good assignments, does not reach their potential on final exam.

The purpose of this paper was to identify and analyse factors that can affect students' performance and assessment results. Factors that does not depend on society, economic or gender divergences, but factors that can depend on university strategy, teachers' preparations and the students themselves. That is factors that teachers and universities can influence to help prepare students for academic assessments.

In this paper the authors will present some theoretical background and previous research on this topic in section 2. Section 3 will present a methodology used to sample data in this project. In section 4 the results will be presented and commented. Last section, section 5, will discuss and conclude this research.

2. Theoretical background

2.1. ECTS credit system

The European Credit Transfer and Accumulation System (ECTS) was first introduced as a part of Erasmus programme in 1989, to support student exchange and mobility within Europe (ECTS Users' Guide, 2015). This system become a tool to unite, integrate and compare study programs and courses to same scale of quality. The results were positive and ten years later the European higher education institutions wrote down the Declaration Bologna, a part of Bologna Process, an international agreement and standardisation of ECTS (Havnes & Prøitz, 2016).

ECTS Users Guide states that the students are awarded with credits after they have showed that "the defined learning outcomes have been achieved at the required level" (ECTS Users' Guide, 2015). Furthermore, the Guide states that the relationship between learning outcomes, learning activities and assessment should be an essential requirement for educational programmes, but the Guide does not give any concrete specifications about how the higher education institutions are to conduct the assessments of learning outcomes, neither does is comment the individual needs of students in the learning process.

A. Souto-Iglesias and Baeza_Romero (2018) discussed that there is no way to validate if the courses with same nominal of credits and similar amount of lessons and study hours, have similar amounts of independent study. Furthermore, the study showed that workload in studies, varies from university to university, and can depend on poorly motivated or steered students, inadequately designed courses, part-time jobs, and other factors.

2.2. Academic performance

Academic performance is the final part of learning and studying, and a good academic performance consists of much more than good reading or listening features. A. E. Poropat (2009) claimed that different personality traits definitely influences students' performance on assessments.

In psychology the researches were for years trying to systematize personality traits, and current models consist of five recurrent personality factors. E.C. Tupes and R.E. Christal classified the five factors as "surgency", "agreeableness", "dependability" "emotional stability" and "culture" (Tupes & Christal, 1992). The current five-factor model of personality are can classify major personality traits into: openness (being creative, sensible, broad-minded, open for new things and ideas), conscientiousness (being persistent, dependable, prepared, structured and having the will to achieve), extraversion (being active, social, centre of attention), agreeableness (being reflected, cooperative, caring, friendly) and emotional stability/instability also called neuroticism (being often in stress, often upset, dramatical, unconfident, anxious and having adjustment issues) (Digman, 1990; Phillips, Abraham, & Bond, 2003; Poropat, 2009; Zhou, 2015).

Poropat (2009) found in his research that there is a strong relationship between academic performance and three of those personality traits: agreeableness, conscientiousness and openness, and he argues that it is the conscientiousness that has the strongest association with academic performance of all the five factor model dimensions. The effect of openness on academic performance is strongly discussed, but the role of conscientious are commonly acknowledged by the researches (Chamorro-Premuzic & Furnham, 2003; O'Connor & Paunonen, 2007; Phillips et al., 2003; Zhou, 2015). The research of Zhou (2015) describes that students with lover levels of self-determination are more influenced by the five factor model, than students highly motivated and self-determined. This means that students' motivation is not only a driving force of learning, but it influences student's performance as well. Chamorro-Premuzic and Furnham (2003) discovered that there is significant negative correlation between neuroticism/emotional stability and extraversion on students' performance. This means that students capable to be emotionally stable and introverted have 15% greater chance to better perform in academic examination performance (Chamorro-Premuzic & Furnham, 2003).

3. Methods

To answer the research question proposed in this study, the authors researched different student. Participants in this study were students on STEM courses (science, technology, engineering and mathematics) in different years in a Bachelor program. The data was collected through mixed methods. The quantitative survey and examination results from passed years were statistically analyse in paper (Fojcik, Fojcik, Stafsnes, & Pollen, 2019). The authors wanted to query and interview students at several stages of their engineering-study in order to see if there were differences in study techniques, and how they reflect towards their own ways of dealing with exams and the exam preparations. This article immerses previously founded factors with qualitative interviews to better understand student's perspective and behaviour.

The authors have done a query, with 66 students, and interviews with 4 first-year students, 3 second-year students and 2 third-year students. Students were first informed about this research project through an online learning platform, Canvas, and then the researches also visited all the classes in order to tell more about the project and to find volunteers.

All the data are voluntarily collected, in which the students said yes to be interviewed and signed a statement of consent to be a part of this project. Each interview was based on a semi-structured guide, that was approved by the Norwegian Centre for Research Data, NSD.

4. Results

The results obtained from the query show many factors that influences students learning and evaluation process. There are two most visible elements that influences students: stress and expectations. The greatest problem influencing students before assessments is anxiety and stress, which is mentioned by over 60 % of the students. The other problem is that the students that expect grades above average are more critical to themselves and show consciousness on their choices and responsibility. Meanwhile students that expect a passing grade or an average grade, expect the learning process to be given to them – through a passive attitude.

Both of those problems were immersed during interviews. Dialogue also have showed that students do not have specific preferences/experiences and they mention many different things. Yet, there are some differences between first-year students and more experienced students, there were three common factors: students experience on studying and learning, students' preparation and awareness of the assessments itself, and the model of final examination.

4.1. Differences in students' experience

After analysing the interviews of all the students, the authors tend to see that the more experience students get in being students, the more reflective they are about their own ways of studying. Those students explain how several aspects of studying affect themselves and what they do about it. First-year students, without any studying experience, tend to do what others do, without reflecting about how they adapt to the environment. Third-year students, and to some point also second-year students were more likely not to differentiate classes, courses and the level of effort in a subject on their own motivation or personal mood, but creating good study habits and structure learning process. While the first-year students were more likely to skip early-classes if they were not interested in the individual topic, or if they knew that they understood the topic.

Another difference between new students and experienced ones is the afford toward reaching desired grade. First-years students tend to fancy above average, top grades and expressing them achieving their goals. Third-year students tend to have goals related to the exam's difficulty and complexity. They tend to be more reflective about themselves both as students and towards how they adapt to the relation between themselves and the academic institution.

4.2. Anxiety and stress

The authors wanted to ask the students about the main factors from the query to get the students point of view, but surprisingly none of the students as talking about real nerves and anxiety towards the exam day. They seem to have confidence in their exam preparation, and in the fact that they have done the best to deal with the exam in the very best way they can. The only nerves or anxiety some of the students gets is about what kind of questions they will be on the assessment, or if they remembered everything from lessons. This kind of nerve disappear when they start solving the exam tasks. What is interesting is that all the students the authors talked to mention their classmates having anxieties that gives them a mental block during the exam. These results are not consistent with the result of the query, even more, these results are not normal distributed.

4.3. Form of the final assessment

Most participants in this project claim to have found a way preparing for an academic assessment that works for them. Some students claim to work best alone, others to work best in small groups with other classmates. Nearly all the students said that they work with practical problem-solving task related to the course and topic. Reading was not an effective way of preparing for the exams because the STEM courses are practical orientated, and the students follow this orientation and mainly practice arithmetic.

89% of the students argued that the 4-7 hours written exams are not an effective assessment method for STEM courses. Some said that a whole semester depended on one day, and if you got personal matters that put you out of mental balance, you are not able to give your best anyway. Others claims that a written exam does not represent the society or workplace one got today: today you got colleagues to discuss with, and no one expect you to know basically everything there is to know about every topic within the engineering work. They also say that one could get lucky with what he or she reads: one student could know only a small part of the subject, get lucky in the exam tasks and get a top grade. Another one could prepare and read everything except the given task and fail. It's often about how lucky you are with the topics and how your body and mind are on the day of the exam.

5. Discussion and conclusion

The authors goal with this project is to create a system that can help and support students in learning and preparing for an academic assessment. This study is limited for STEM courses in a Bachelor program, that makes it to specific database to generate the findings form this research. That is also the specifics of the education. Every student is different, every subject is different, every assessment and every exam, but this project shows some tendencies that teachers and institutions can take into account preparing next students for their final assessments.

Being a student means much more, that just performing well on academic assessments. It is the time to try new things, gather experience, exchange to different country or culture, and find more about himself, discover our strengths and weaknesses, and grow up. Education is not limited to a Bachelor's degree (Michalos, 2017). The personality traits like achievement striving, self-discipline and activity can influence students examination performance in 30% of known cases (Chamorro-Premuzic & Furnham, 2003). Furthermore, the knowledge of the factors that can influence students' performance can compensate for known weaknesses and nurture students strengths (O'Connor & Paunonen, 2007).

Our research indicates that there is a correlation between the student's study strategies and consciousness on their academic performance. The students' performance on objective academic assessments is influenced by their learning style, while application on that knowledge in real-life situations require additional skills (Lynch, Woelfl, Steele, & Hanssen, 1998). Student in this research complain that the most used form for examination in Norway is 4-7 hours written assessments, a form that does not reflect the current situation in working life. And that the expectations about the examination are high, but very few teachers actually use lessons to teach about different study techniques or different ways on how to prepare for the final assessments to perform on ones best.

An assessment or examination at the end of the semester is the final, and sometimes only, chance to proof ones knowledge in the subject. Usually there are not many occasions the students can show what they have learned and what they can do with that knowledge. Fojcik et al. (2019) discusses that the level of stress before an assessment should be distributed on a normal distribution model. This means that it is optimal for the students to be in a mediate stress during an evaluation, so that their body and mind can focus to perform their best. One may say that students that are not at all stressed, simply do not care enough to perform well. In the interviews the students did not mention any influence of stress or anxiety, nether the positive one or the negative one. A possible explanation is that the word stress, may associate with anxiety and choking under pressure, which those students did not experience. Another outcome may be that the students did not remember the stress after the exams, when they learned that they passed, those positive feelings could shadow the previous negative ones.

It is important to remember that the learning is a process, and students needs to be constantly reminded of the purpose of what they are learning and motivated to keep on working, as well as thinking conscious about the whole learning and performing process.

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REPRESENTATIONS OF THE DIGITAL SKILLS OF HIGH SCHOOL STUDENTS: A QUALITATIVE RESEARCH

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Abstract

With the rise of Information and Communication Technologies (ICT) today, digital competencies, for high school students, are necessary skills that must be systematically develop with the awareness of efficient use of ICT. Under this premise, qualitative research was carried out under the interpretative framework of the theory based on the social representations of the students, with the objective of knowing what it represents them to develop these skills in benefit of their formative process. In this sense, an in-depth interview validated by experts, was conduct to eighteen high school students. With this technique, we sought to identify how students recognize their skills in the use of technologies, how they apply them in their learning process, and what they represent for them. Researchers used ISTE Standards as dimensions for the categorization of data about creativity and innovation, communication and collaboration, research and information management, critical thinking, problem solving and decision-making, digital citizenship, and operations and ICT concepts. The results indicate that students recognize having skills for the management of technologies, however, these are not channeled in the sense of benefiting their training process since there is little participation in the creation of materials for the construction of knowledge. Likewise, they recognize the applicability of technologies for collaboration and communication, but they do not apply them as such, the use of ICT is direct to social and recreational issues than for the purposes of academic interaction and collaborative learning. They refer to the little formality which they carry out their investigations and manage the information, they do not apply processes of critical analysis, selection and evaluation of the information they consult. The development of critical thinking is limited, and they do not reach the solution of problems and decision-making based on accurate information. About digital citizenship, students are aware of the importance of using ICT in a responsible, ethical and safe way, however, they have fallen into plagiarism, cyberbullying and among other. Students recognize that technologies can support them according to their needs for knowledge acquisition and transfer, although they know that it is essential to use habits that lead them to the productive use of the tools and content provided by ICT. It is necessary to continue carrying out this type of research that provides empirical information about this subject.

Keywords: *Grounded theory, social representations, digital competences, high school students, qualitative research.*

1. Introduction

Information and communication technologies (ICT) have been present in all areas of educational levels, and high school students are no exception. Therefore, the incidence of technologies originates the evolution of skills developed by those who access them, either with the Internet from desktop or mobile devices, or through the consumption of information that people accesses excessively in computer systems. In this sense, students, who attend the high school are involved in a dynamic system, in which teachers, students and educational contents are implicated through the interactions between them (Islas, Zavala, & Carranza, 2018). Thus, the formative processes have been modified, forcing the main actors to focus on a different role-play from the one carried out in traditional teaching.

This is in addition to what is indicated in the NETS.S project (ISTE Standards, 2016) where the standards that students had to develop to become proficient in the use of ICT, and in the critical development of skills that would strengthen their personal productivity, as creativity, critical thinking and collaboration, both in classroom and in everyday life.

The ISTE Standards encompass six dimensions that guided the realization of this research project. They are listed below:

1. Creativity and innovation: students are evaluated if they demonstrate creative thinking, building new knowledge or generating innovative ideas that lead them to identify new trends and forms of expression either individual or group.
2. Communication and collaboration: students use media and technological environments for collaboration and communication in an efficient and productive way, at the same time, they generate their own knowledge and expose it in different scenarios and media.
3. Research and information management: It is valued if students have developed the ability to obtain, evaluate and use information in a planned and organized way through reliable sources and especially from scientific or academic areas.
4. Critical thinking, problem solving and decision-making: In this case, students should have sufficient skills to apply their critical thinking and give meaning to what they investigate from the information they consult, applying what they found in solving problems or decision making to increase their ability of acquiring and managing their knowledge.
5. Digital citizenship: Students know how to behave in an ethical, responsible and legal manner when they are using or disseminating information, and where they can show positive behaviors when they face with the use of TIC.
6. Concepts and functioning about ICT: Students demonstrate having the skills, knowledge and understanding of the appropriate use of information, devices and applications that the technologies imply, in such a way, they develop skills for their use efficient and effective of them.

Under these premises, this research project was developed and we only consider the digital competences of the students, following a qualitative approach under the interpretive framework of the grounded theory and the social representations of the students, in order to know what it means for them to develop these skills in benefit of their training process about digital competences.

Under this assumption, for approaching, the phenomenon of the development and applicability of digital competences by high school students was used the Grounded Theory. This epistemic foundation is a different approach to social reality according to Glaser and Strauss who are pioneers of this theory and the truth of scientific results arises from the observation and emerging consensus of a set of scientists who give some meaning to the phenomenon observed (Páramo, 2015). On the other hand, the empirical reality is conceived as a result of the meanings produced by some people who are inserted in common observation projects (Suddaby, 2006), and through of constant comparison produce data that allow the identification of theoretical categories emerging from the comparative analysis of various interviews or episodes of the observation. Researchers, of this project, found some coincidences in the analysis and comparison of the obtained data in the interviews of the students and what the standards mark. In this sense, the understanding of the observed in the interviews and the phenomenon studied were reached, taking also as an interpretive foundation the framework of social representations.

In this context, social representations work as an adequate reference for the study of educational phenomena since they allow giving intelligibility to the daily relationships between exchanges and imagination of the actors (Mora, 2002). Moscovici, the precursor of this conceptualized theory, who shows it as a cognitive expression where people construct with their own logic and language, and it implies their beliefs, values and ideas that allows individual reality and generate knowledge that affects their thinking and the organization of their everyday life. Therefore, social representations are a concrete way to communicate and understand about knowledge to analyze people behaviors and to predict them.

In the field of education, social representations have served to understand the behavior of teachers and students in certain situations, leading to the conclusion that beliefs, interactions or perceptions are incidents in the practice of those who are involved in the formative processes (Mora, 2002). Therefore, this interpretative framework allows moving from the elaboration of concepts to the construction of new theories, since they constitute a unit of focus that integrates the individual and collective, the symbolic and social, and thought and action (Chourio, 2012). In this sense, the usefulness of social representations is conceived before the possibility of synthesizing the explanations that people make about their reality, to what they think and live.

Thus, by adding both interpretative frameworks, social representations and digital competences, it was possible to rescue the figurative and subjective core that students give to their digital competences based on how they apply value and conceive them.

2. Design

This research project is qualitative then the size of the sample is not determined in probabilistic terms (Hernández, Fernández, & Baptista, 2013) because it is an in-depth research where 18 high school

students were interviewed. Researchers were interested in the arguments of what digital competences represent for the high school students and how they apply them in their daily live. To achieve this, it was necessary to clarify to the participants that the questions asked in the interview were only to collect data that would be treated scientifically and that their personal information would remain anonymous, so this allowed greater confidence and availability of the participants.

The interviewees were nine men and nine women, to maintain the representatives sample of them in the interview, we selected three students of the different high school grades, that it allowed to balance the gender and the experience of each one. The sample was a convenience of the researchers.

This research was conducted in public schools in a city in the state of Jalisco, Mexico, following the principles of qualitative research under the interpretative frameworks of grounded theory and social representations.

3. Objectives

To know what represents for the high school students the development of digital competences to benefit their own educational process.

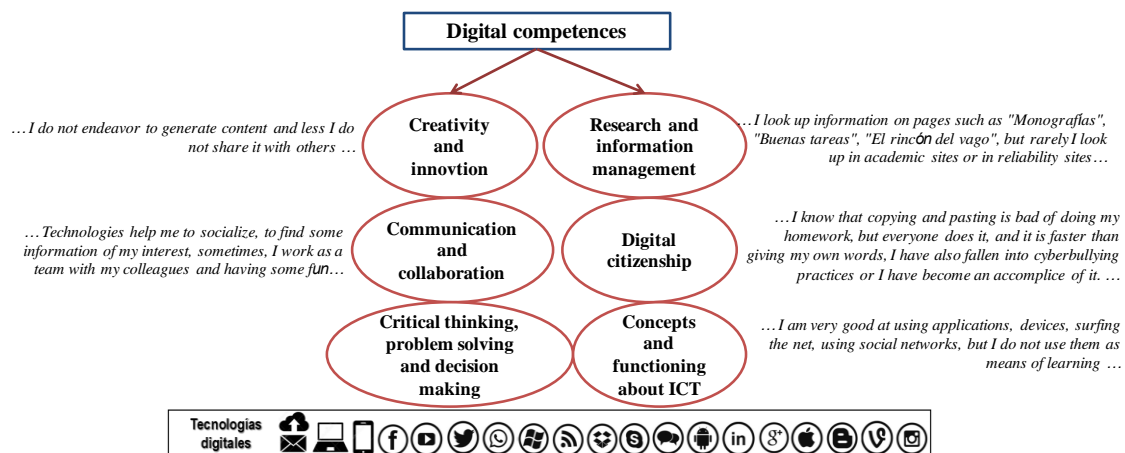
4. Methods

- In-deep interview.
- Applying the constant comparative method from the grounded theory.
- Applying social interpretive framework from social representations method.
- Unit of analysis: digital competences developed by the students and representation of them in the development of their learning.

5. Results

The results indicate that students recognize having skills for the management of technologies, however, these are not channeled in the sense of benefiting the students learning process since there is little participation in the creation of materials for the construction of knowledge. They also recognize the applicability of technologies for collaboration and communication, but they do not use them in an effective way, their use is more directed to social and recreational issues than for the academic purpose in the interaction and collaborative learning process. They refer to the little formality which they carry out their investigations and manage the information, they do not apply processes of critical analysis, selection and evaluation of the contents they consult. The development of critical thinking is limited, and they do not give the solution of problems and the decision-making is not based on accurate information. In terms of digital citizenship, students are aware of the importance of using ICT in a responsible, ethical and safe way, however, they have fallen into plagiarism, cyber-bulling and other bad practices about the use of information. Students recognize that technologies can support them according to their acquisition and transfer needs of knowledge, although they know that it is essential to have habits that lead them to the productive use of the tools and content provided by ICT.

Figure 1. Representation of the students. Source: Own creation.



6. Discussion and conclusions

The role of ICT, in educational context, has become an object of study from different positions, visions and interpretations; however, it is convenient that researches also focus on recognizing the articulation of technologies and the development of skills for their appropriate management. The applicability of ICT has favored the learning of students in different levels.

After this investigation, it was possible to identify that there are no learning benefits or high content structure in terms of complexity and depth, the copying and pasting practices and not respecting copyrights become common, the sites that students always visit are "Buenas Tareas", "Rincón del Vago", and, in very few cases, "academia.edu" or "Google academic". Good practices about working in collaborative way exist, although there are not in a greater proportion or quality, there is laziness or lack of willingness for being productive and going beyond the simple domain in the use of technologies and it is still notorious.

In terms of skills, they are considered skillful themselves and they make it notice, although, they do not trespass the barrier of social and fun to the benefit of their own knowledge, this finding coincides with the expressed by López (2014); Hicks (2011); Kinchin (2012); and Tompsett (2013) cited in Universidad Javeriana (2016).

It is noteworthy to indicate that the expectations regarding about digital competences, that students can develop, have generally been higher than what actually happens, and this can be attributed to adverse situations that not only depend on them, but also on the participation of teachers, educational authorities, and the education system. A clear consensus has not been reached yet, about what technologies are in the educational field.

There is no doubt that ICT are indispensable tools in today live, it is necessary to know their limits and scope of them, especially if it is based on the standards in ICT competences. Students are empowered to those skills that have to do with cognition and metacognition of who uses them, in addition to the values and skills that can be put into practice.

As is well known, ICT have the potential of working as psychological tools that mediate the processes of people interaction, therefore, their mediating role is recognized by the interactive triangle that is generated. The benefits of their potential are understood when there is clarity and awareness in those people who use them and they know how to act with or without them, so the scenarios that are configured mean an opportunity to play the dynamics role between the ICT and today society demands.

It is important to continue developing this kind of researches, where quality is given to the information found since the numbers and statistics of access and infrastructure are no longer enough, it must be passed on to the production of empirical knowledge that shows the advantage of including technologies in the training processes.

In the same way, it is necessary to emphasize that the educational system, at least in Mexico, must become aware of the need to disintegrate archaic structures in the teaching-learning processes. To give way to renewed techniques where students and teachers are aware of the importance of development of digital competences that enhance their intellectual and integral growth, to face the challenges that the changing world in which they are immersed demands them.

The formative processes must be structured in such a way that they prepare the students to face the challenges of daily life and advance beyond them to form them for life. The use of ICT gives them this possibility, since mental structures are no longer the same and unrestricted access to information requires skills superior to those developed a few decades ago. Therefore, it is important to promote creativity, critical thinking, the ability to solve problems, and the ability of making decisions, as well as they need to know about ethics about the use of digital media to respect the information that comes from them.

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THE USE OF INTERACTIVE WHITEBOARDS IN SOUTH AFRICAN SCHOOLS

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Abstract

The study was aimed at determining the impact of the use of interactive whiteboards (IWBs) in South African classrooms. Interactive whiteboards are one of the technologies which are most commonly used in education worldwide. Technology took over our lives and is becoming more necessary for upcoming generations to become technologically proficient. The Technology Acceptance Model (TAM) was used to determine the perceived ease of use, perceived usefulness and attitudes of educators towards technology. I collected data through short questionnaires from three secondary and five primary schools in Gauteng, where I obtained 122 responses and 18 secondary schools in Mpumalanga, where I received 103 responses. It was determined that more primary school teachers use the IWBs than secondary school teachers in Gauteng and they also use it more effectively. Most of the teachers find the IWBs easy to use and integrate the technology in their lessons. Teachers also indicated that the IWBs are very useful to save their work, to help them to make lessons more interactive, visual and interesting and that the use of the technology motivates learners to participate. The biggest concern is that many teachers still did not receive any training and this is an issue that governing bodies and principals need to address.

Keywords: *Interactive whiteboards, primary and secondary schools, South African classrooms, Technology Acceptance Model.*

1. Introduction

One part of the data in this study was obtained from primary and secondary schools in Gauteng, South Africa. These are urban schools. Although interactive whiteboard (IWB) technology is very common worldwide, it is still a resource well utilised in South Africa. I found one primary school and one secondary that were fully equipped with interactive whiteboards. A capital outlay like this reveals the level of commitment of the school governing body.

In rural schools in Mpumalanga, South Africa, a project manager started an IWB network in 2008, when a decision was made that the leading school (LS) would transmit lessons in Science, Mathematics and Maths Literacy to grade 11 and 12 learners in disadvantaged rural schools in the same town. Since then the network expanded to many schools in Mpumalanga. These schools seldom have Science and Maths teachers with a high standard of subject knowledge.

During the transmissions the teachers of the rural schools ensure that the transmissions take place, maintain discipline in their classes and communicate with technicians or the LS if something goes wrong. All the transmissions are done by the HODs and teachers of the LS.

2. Methods

This was a qualitative study. Nieuwenhuis in Maree (2007, p. 51) describe qualitative research as research that studies people or systems by interacting with and observing them in their natural environment with the intention of describing and understanding the phenomenon by "looking through the eyes" of the participants, so that the meaning can be described in terms of the meaning that they have for the participants. The emphasis is on the quality and depth of information.

3. Design

Case studies involve systematically gathering enough information about a person, social setting, event or group to permit the researcher to effectively understand how it functions (Berg, 2001). Case study research is descriptive research that involves describing events, conditions, circumstances or situations that are occurring in the present (Thomas, 2010). In this multiple case study, I described the use of the IWBs by the teachers involved.

4. Participants and data collection

Five primary schools and three secondary schools in Gauteng, utilising IWBs were chosen. The researcher asked permission from the principals to give questionnaires to the teachers utilising this technology. Thirty questionnaires were obtained from secondary schools and 92 from primary school teachers. In the rural schools, I sent questionnaires to teachers participating in the project in 18 different schools in 12 towns and received 103 responses. In both rural and urban schools, I wanted to determine the ease of use and usefulness of the IWB technology, as well as the attitudes of the teachers. The urban and rural schools filled in the same questionnaires, except that I also posed questions about the management of the network to the rural schools.

5. Data analysis

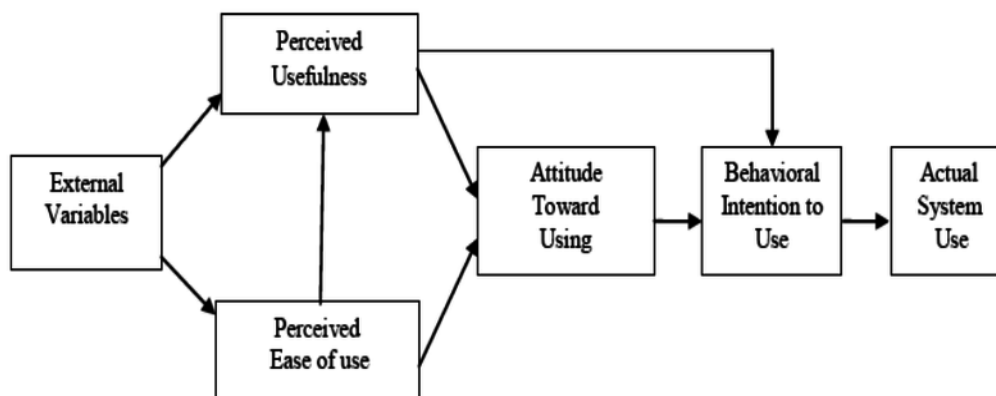
The data was described verbatim. I read the whole data set several times to obtain a whole picture of the teachers' use of and attitudes revealed by the data through the eyes of the participants. I omitted obvious redundancies and repetitions. Thereafter the data was divided in meaning units, parts of the data, communicating sufficient information even if it was read out of context (Elliott & Timulak, 2005).

6. Theoretical framework

The Technology Acceptance Model (TAM) is a model that tries to explain and predict factors of an individual's behaviour towards a new system of technology (Liu, Liao, & Pratt, 2009). The TAM model's main relevance is that of computer and IT technology (Gong, Xu, & Yu, 2004). The model is made up of two main beliefs for the use of technology namely; perceived usefulness and perceived ease of use (Liu, Liao, & Pratt, 2009). Perceived usefulness can be defined as; people may or may not use technology on their belief that it may or may not help improve their job performance (Davis, 1989). Perceived ease of use, according to Davis (1989), even if people believe that the new technology posed to them may be useful it may be too difficult to use and the effort levels outweigh performance benefits.

The Technology Acceptance Model (TAM) proposes a link between the users' perceived usefulness, perceived ease of use, attitude towards technology use, and behavioural intention and actual use of technology. The main idea is that perceived usefulness and perceived ease of use together affect the users' behaviour towards the technology.

Figure 1. Technology Acceptance Model (Davis, 1989).



This framework was suitable to this study because it focused on the ease of use of technology, how useful a teacher perceives the IWB technology to be and the attitude of the user. The researcher found that the perceived ease of use, perceived usefulness and attitude had a direct effect on the teaching and learning process.

Oriji and Amadi (2016) also showed in their research that it is necessary for a teacher's attitudes and beliefs concerning the use of technology in teaching, to change before implementation is possible. They observed that many teachers still fail to see the benefit of using technology and that they believe doing their job in the old way, is still the best way. Teo (2011) stated that teachers need to accept technology before they will implement it and before learners will benefit from it. Studies have found that the success of technology acceptance rely heavily on the attitudes of educators towards technology (Mahat, Jamsandekar and Nalavade, 2012). According to Mahat et al. (2012), "A teacher's attitude or beliefs are one of the several important human factors which have a significant impact on the computer adoption and the implementation of the technology in classroom."

7. Discussion

Many teachers find the IWB technology extremely useful and cannot imagine teaching without it. It seems to reduce the workload. A few has comments like "moderate" or just use it as a projector were made. Most find the technology easy to use. Some struggled in the beginning or are still struggling and are merely using the IWB as a whiteboard. Most use the IWB for PowerPoint presentations, videos, mind maps, project worksheets or interactive games.

The main challenges encountered are the calibration of the IWB, the light bulb not working, the Internet being offline, electricity interruptions, the pen that does not work, it is time consuming to set up, updating of the software, the sun shining on the screen and teachers personal lack of knowledge and lack of training.

Visual learning for visual learners is seen as an advantage, as well as the fact that technology is imperative for today's learners. Learners like learning interactively and being entertained. Learners' attention is captured and maintained. From a teacher's perspective, the lessons can be saved to be reused. It is clean and saves time and paper.

Learners' attitudes are generally very positive and they are excited and amazed about the technology. Some seem less involved. The teachers enjoy using it, are excited or just love it. They are eager to learn more.

Most teachers allow the learners to write on the board, do examples of exercises or calculations, play interactive games, use mind maps or do group presentations. Some do not allow learners to use the board at all, because of lack of time or because they are afraid that the learners will scratch the board or break something.

Many teachers think that they had adequate training, but others indicate that it was brief and basic without any follow up. Training is definitely a matter that needs more attention. Although many also indicate adequate support by management, this differs from school to school. Teachers also indicate that they learn most from their fellow educators.

8. Findings

Outside transmission time, the IWBs in the rural schools are used for normal classes. Most of the teachers in the rural schools need more training, especially in the use of Maths software, but also in more advanced features of the IWB.

In the urban schools it was found that the primary school teachers utilise the IWBs more than secondary school teachers. Very few secondary schools have IWBs, and if they do, it is usually only in two or three classes. It seems that the primary school learners are also more excited than the secondary school learners about the technology.

In the rural IWB network, only secondary schools are participating and both teachers and learners are very excited about the possibilities of the technology. In the past, learners in the rural schools only had old magazines and text books to use as resources. For them, a new world opened, especially with more career opportunities than ever imagined before.

In the IWB network, the principal and School Governing Body (SGB) of each school is in charge. Their main role is to draw up the budget for the project in each school. The project manager only exists in the LS. His main role at this stage is to obtain more sponsors. He is also responsible for a clear project plan to reach performance targets, determine resource budgets, manage project risks and to sustain a focused and committed team. All the administrative reports in the project are sent to the administrative officer (AO), and mainly the reports of the teachers and HODs. All the results from common tests are sent

to her before the meetings, so that she can analyse them and determine the improvement or not, and thus she is able to monitor the teachers' progress. She ensures that everybody knows the schedules and gets their calendars and she handles any administrative complaints. The HODs are in charge of their subjects and also ensure that the teachers in the network manage their classes and log in for transmissions and that all administrative issues are sent to the AO.

9. Conclusion

Although relatively few schools utilise IWBs in South Africa it is still very well accepted by teachers and learners alike, even though it is still a new practice in schools. It would be beneficial to South African schools to learn from their counterparts in developed countries where the phenomena peaked about 20 years ago. This would give opportunities to make wise investment decisions and to gain insight into possible obstacles before they occur.

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HOMO’POLY: UNDERSTANDING AND ACCEPTANCE OF DIVERSITY

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Abstract

Sustained gender-specific inequalities in education and upbringing continue to be exposed in numerous studies and surveys. In response to this persistent challenge, national and international organizations are looking to strengthen their co-educational infrastructure to better accommodate the specific needs of all pupils and students, regardless of their sexual orientation, with a view to fighting discrimination and promoting tolerance towards diversity.

The 2015 European Union Lesbian, Gay, Bisexual and Transgender survey illustrated the urgency of the issue. Considerable challenges present themselves at different levels: nationwide controversy about the incorporation of the topic of homosexuality into school curricula, controversial discussions about the implementation of gay marriage, homophobic attacks and bullying (particularly at a young age), the outing of and dealing with homosexual migrants, homophobic behaviour in sport, and homophobic legislation that restricts or even rolls back the rights and protections of the Lesbian, Gay and Bisexual (LGB) community.

This article introduces ‘Homo’poly’, a European project on homosexuality in schools that was launched in 2016 to address these issues. The aim of this strategic partnership (KA2 ERASMUS+) is to contribute towards a better understanding of homosexuality in secondary and tertiary education.

Keywords: Gender, homosexuality, migration, diversity, didactical material.

1. Introduction of the project

Homo’poly has adopted a cross-sectoral approach in cooperation with eight countries, with one university and one secondary school participating from each country. This strategic partnership is a KA2 ERASMUS+ project, funded by the European Union, which targets students and lectures in university colleges and universities, as well as students and teachers in secondary education. The countries in which Homo’poly is active are Belgium, Germany, Hungary, Poland, the Netherlands, Spain, Turkey and the United Kingdom. Homo’poly was officially launched in September 2016 and will end in August 2019.

2. Objectives

Homo’poly’s overall objective is to promote a better understanding and acceptance of diversity, specifically the LGB community in schools.

Because sustained gender-specific inequalities in education and upbringing persist, national and international organizations are looking to strengthen their co-educational infrastructure to better accommodate the specific needs of all pupils and students, regardless of their sexual orientation, with a view to fighting discrimination and promoting tolerance towards diversity.

The relevance and challenges of these issues remain evident on different levels: nationwide controversy about the incorporation of the topic of homosexuality into school curricula, the controversial discussion about the implementation of gay marriage, homophobic attacks and bullying (particularly at a young age), the outing of and dealing with homosexual migrants, homophobic behavior in sport, homophobic legislation of LGBTI-people in Russia and likewise many African countries, with images published and distributed by the mass media helping fuel it further.

Homo'poly set out to make a contribution towards better understanding and broader acceptance of homosexuality in schools, both in tertiary and secondary education. The project therefore targeted students and lecturers at teaching colleges and universities, teachers in secondary education and students at secondary schools. To achieve this, three objectives were set.

2.1. Objective 1: country-specific and comparative analysis

Homo'poly set out to deliver a comprehensive assessment and a comparative study on the mission, aims and content of gender-appropriate behaviours in educational institutions (for example: the topic of homosexuality in the training of teachers, in curricula and teaching resources for secondary schools) and of complementing non-school initiatives in other educational institutions.

2.2. Objective 2

Homo'poly committed to developing a toolkit for teacher trainees and teachers consisting of two curriculum modules. The first one, 'Gender & Homosexuality', covering general diversity of lifestyles, sexual identities, the question of coming-out and sexual well-being, was to be established across target groups and will form the basis of a school project over a period of several days. The second one, curriculum module 'Migration & Homosexuality', was to take into account the problematic situation of refugees in Europe. Implementation and evaluation of these modules was scheduled to take place in all participating secondary schools in the third year of the project. Each module counts as 3 ECTS.

2.3. Objective 3

Homo'poly set out to work with the teachers of its secondary schools to develop 12 didactical materials related to the modules and issues mentioned above. These materials would also be tested and implemented in these schools during the third year of the project. By working closely with teachers and their students throughout this process, the project envisioned effective and sustainable integration of these materials in the school curriculum.

It should further be noted that Homo'poly also developed a Knowledge Portal, available at www.homopoly.eu. The resources, modules and materials developed in the context of the project were published as they became available and will remain at the disposal of the general public in the future.

3. Results

3.1. Result 1

The country-specific and comparative study were published in the 2018 *Somewhere Over the Rainbow: Discussions on Homosexuality in Education Across Europe* publication. The research carried out by the project partners confirmed that the eight countries involved have strongly diverging track records where homosexuality is concerned. Where the Netherlands are widely considered a pioneer on gay rights, Hungary faces a rapidly shrinking civic space for gays and bisexuals. Religious convictions render homosexuality a difficult topic in Turkey, Poland and – to a lesser extent – Spain, whereas the UK is keen to portray itself as progressive but lags behind in practice. Belgium appears reasonably comfortable embracing homosexuality, but here too, equal rights, protections and opportunities still too often elude the LGB community.

The studies consider these trends in greater detail and shed some light as to how and why homosexuality is (or is no longer) such a divisive issue across Europe. To frame the context, the publication explores the attitudes towards homosexuality of teachers, pupils and parents in Homo'poly's eight participating countries. Reviewing a unique range of survey results – from over 6,000 pupils, teachers and parents – the comparative study sets out to capture how young people see homosexuality, and what role schools (can) play in shaping these views. The study outlines the data collection methodology and presents the results and key findings. As this is the first qualitative analysis on homosexuality in these eight countries, these results provide new insights that can help guide policy recommendations in this area.

3.2. Result 2

The two modules – on homosexuality and migration, respectively – were published in 2019. Each module offers text-based introductions as well as discussion questions, stories and additional resources.

Module 1, on gender and homosexuality, celebrates the project's commitment to equality and diversity. It consists of four sections: 1) sexual identities; 2) coming out; 3) sexual health and 4) different ways of living. The key aim for this module is to provide an understanding of different constructions of gender and homosexuality over the last 50 years. Teachers and teacher trainees are encouraged to

examine cultural, social and political perspectives, constructions and conceptions of gender and homosexuality and apply this understanding to the challenges facing young people in schools and in their family and societal contexts. The module also offers you a broad understanding of different ways of conceptualising gender and sexuality and issues affecting LGBT communities in different global contexts.

The second module tackles homosexuality and migration. Around the world more than 70 countries consider homosexuality illegal, in five of these the death penalty can apply. The persecution and discrimination many LGB people face, can be enacted by state officials, but is also often experienced within their own communities and families without any recourse to protection. This module also consists of four sections: 1) leaving and arriving, 2) LGB with a migration background, 3) roles and fears and 4) supporting and consultancy institutions. Together they explore how migration affects the experiences of LGB pupils, including, but not exclusively, those from immigrant backgrounds. The key aim for this module is to have teachers and teacher trainees consider the challenges faced in increasingly diverse classrooms and how teachers can learn to create safe spaces for all pupils in an inclusive, collaborative classroom setting analysing the benefit that resources, professional agencies and legal support can offer.

3.3. Result 3

Twelve didactical materials were developed by the secondary school partners of the Project, ranging from games to discussion and debate instructions to booklets, stories and more creative activities such as story-telling and sketching. Most materials were developed for classroom use only, but some also include the involvement of parents and others. All materials are available on the Homo'poly website. During the third year of the project, every school set out to test these materials. Three of them were tested by every school (the game of life, the debate and the colorful families); each school was then free to choose a additional one to three further materials to test.

Overall feedback was excellent: while some materials did require further tweaking, they were generally very well received and had a measurable and noted impact on the teachers and pupils involved. Germany's coordinators indicated that *"pupils had a lot of fun, but also felt very proud to participate in the project. The two days of testing were very intense, but they proved that the produced materials are very well-suited to approach different aspects of homosexuality in school, all in a way that, on the one hand, enriches the students' knowledge about the topic, and, on the other hand, invites them to change perspective, exchange opinions and arguments."*

Feedback from the United Kingdom was similarly positive, with the Deputy Head of the Eaton Trust Academy sharing the following note with the Homo'poly team: *"I visited all of the year 8 groups during lesson 1 this morning and wanted to give you some feedback. Every group was fully engaged and I saw absolutely no immature behaviour, embarrassment or silliness. Students offered sensible answers and listened carefully to each other. They were curious about some of the terminology and discussed their ideas carefully. Many students were very articulate and were able to extend their verbal responses with confidence. In one group a student said that they would not have thought about some of the issues had it not been for the lesson. There was a lot of genuine interest in the activities. The resources were clearly understood and the pace was maintained. The style and speed with which teachers were getting through the activities varied which evidenced the ability to differentiate the tasks according to the ability and understanding of the group. I have since spoken to a number of the teachers involved who really enjoyed delivering what could have been difficult material."*

Last but not least, feedback from Poland, arguably the most difficult country context, was highly encouraging: *"I tested these topics in 10 classes (150 people), lesson scenarios with students aged (13-14) and (15-16 years). My observations oscillate around issues related to substantive preparation for classes, and thus to the subject. Some of them turned out to be very well prepared in terms of content, which could be felt during the Oxford debate. Also during the division of students into three class teams, one could feel professionalism. The students were involved in the implementation of the project, which aimed to reduce the scale of hatred / dislike towards LGBT people. Only a few students could not find themselves during the lesson, they were embarrassed or reluctant to talk. The classes were accompanied by culture of speech and understanding. Students felt that they had a mission to fulfill, that their behavior in the game depends a lot. They were saying: it's great, we have never talked so sincerely about each other, for example, we did not know a lot about these issues. The students were very interested and open"*.

In recognition of the work done, the German "Schule der Vielfalt" network award will be offered to each secondary school during Homo'poly's end conference.

4. Lessons learned

As the project is coming to a close, project partners are carefully considering lessons learned and take-aways for future work in this area. Three provisional lessons are shared below, for reflection and to encourage further (academic) engagement on these issues.

4.1. Going against the grain: homophobia in Eastern Europe and Turkey

The comprehensive geographical reach of Homo'poly was considered a major strength of the project, but it was always clear that this would also come with certain challenges. Cultural differences in the 'West' are manifest in gender-specific education and upbringing, in gender-specific interactions and attitudes towards tolerance, diversity, and homosexuality. But unsurprisingly, it is in the participating countries from Central and Eastern Europe and Turkey that Homo'poly experienced some notable challenges.

In Poland, Under the persistent influence of the Catholic Church, educational institutions are now being directed to remove all references to sexual diversity or LGBT+ from the national curricula. On top of this, strong political pressure along the same lines means that it is nearly impossible for school administrations to protect their LGB students and staff. This made it difficult for our participating schools and teachers to develop and test the project materials – and it is to their great credit that such quality results were achieved in such a difficult context. Note the final piece of feedback from the testing phase in Poland: *“Information about my lessons has spread through the word of mouth. In another school where I teach (for 4 months), the pupils themselves suggested that I should teach them a lesson that they have already heard about from their peers from another school- SP11 - my mother’s institution. I was surprised that students from other schools communicate to each other what is happening in their classes. It was a very positive and pleasant experience.”*

In Hungary, results were similarly positive – due in large part to the concerted efforts of the partners, who had been involved in similar projects before and had strong personal commitments to these issues. While Homo'poly is proud of the results it has delivered, it remains regrettable that these are due the result of individual efforts, not of systematic or structural changes towards a more positive view or acceptance of LGB – this remains a long way off.

In Turkey, collaboration with the tertiary institution was equally smooth, but no secondary school was willing to participate. Throughout the course of project, the political context became more difficult. Project partners suspect that engagement on LGB issues in education is unlikely to develop positively in the near future.

4.2. Going beyond the school gates

In many ways, significant progress has been made in recent years, in no small part thanks to the tireless efforts of national organisations such as Stonewall (UK), Cavaria (Belgium), COC (The Netherlands) and others. European as well as national guidance, at least in Western Europe, now reflects a commitment to diversity and inclusion for all, and a significant range of tools and resources are available to schools and teachers who choose to make this a priority. All that being said, much work remains to be done to make schools across Europe more socially inclusive. Homo'poly believes that schools stand to gain much from working with pupils, not just for them, but for their wider communities in building a more safe, secure and welcoming learning environment for all. This kind of 'co-creation' - mostly with pupils, but also with parents and the wider school community - maximises the potential for schools to meet real needs, pushing the envelope on social inclusion but still staying faithful to their context and culture. This is a tried and tested approach for delivering meaningful and measurable change.

4.3. High-level political backing opens doors

Homo'poly's focus on 'social inclusion' aligns closely with the EU's political priorities. The European Parliament adopted a resolution on 14 February 2019 calling on the Commission to tackle the gender equality backlash targeting LGBTI people across Europe, prioritize LGBTI rights in its work in 2019-2024, and mainstream an intersectional perspective in its work, among others. Terry Reintke MEP, co-chair of the LGBTI Intergroup and shadow rapporteur for the resolution (Greens/EFA) commented that “We look forward to see the European Commission address the current backlash against gender equality – which impacts LGBTI people directly – in its current and future work. The resolution adopted with a strong majority is a clear mandate for the Commission to present a full-fledged strategy on LGBTI right with an intersectional perspective.”

With a topic as sensitive and contested as LGB, having high-level political backing and financial support opens door. Homo'poly would not have achieved its results without the EU stamp of approval – the fact that these issues are supported by European leaders and programs bring people,

projects and schools to the table. The rise of populism across the continent is a worrying trend for all of those working on the acceptance of LGB issues – both in schools and beyond. It is hoped that, by showing the significant impact of a relatively small project on the educational institutions, staff and pupils involved, further resources will continue to be dedicated to this important agenda in the future.

5. Conclusion

Homo'poly set out to improve awareness and acceptance of LGB in educational institutions, and – a few months before the close of the project – it has made measurable and meaningful contributions to those objectives. While there are significant results, it must be noted that much of this was due to the outstanding commitment of individual partner institutions, who worked in often difficult circumstances and who do not yet note a significant change in the overall country context – especially in Turkey and Eastern Europe. It is hoped that the learnings and materials produced by Homo'poly will be used beyond the project partners, and will prove helpful to those who champion the LGB community in Europe.

Acknowledgements

ERASMUS+ KA2 Strategic Partnership: Homo'poly. <https://homopoly.eu/>

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THE EFFECTS OF LEARNING STYLES OF PRE-SERVICE TEACHERS ON THEIR SKILLS TO PREPARE SKETCHNOTES

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Abstract

The study aims to explore the effects of learning styles of pre-service teachers on the level of their skills to create sketchnotes. In order to collect the data regarding the participants' dominating visual and verbal learning styles, the questionnaire "Dominating Visual or Verbal Learning Style of Learners" was applied to 44 prospective teachers at the faculty of education in a public university. The participants also created sketchnotes on a given topic. The findings indicate that the sketchnotes prepared by the participants with dominating visual learning style included more colours, highlights and other visual elements while the participants with dominating verbal learning style used more texts in their sketchnotes. The findings, thus, suggest that there can be a correlation between learning styles and note-taking skills of learners.

Keywords: *Learning style, sketchnote, pre-service teachers.*

1. Introduction

Individuals differ in the style they use for learning. Having the suitable learning style enables the individual to learn more easily and effectively, and thus, learning style is the key to learn. According to Dunn and Dunn (1993), learning style is the process that starts when the learner tries to concentrate on new and challenging information and that continues as the learner processes and internalizes it. The concept of learning style started to be used in the field of education in 1970s. Studies since then have frequently indicated that learning styles are among the important components of learning process (Günaydın, 2011). Learners use their five senses in order to reach information in a given learning situation and they become visually, audially, and kinesthetically active. Visual learners use their visual senses more effectively while auditory learners benefit more from their auditory senses. Kinesthetic learners, on the other hand, learn better by touching or being physically active. Learners usually use these three senses simultaneously, however, one of these three senses may have a dominating role in each learner's learning process (Felder & Silverman, 1988).

Learning materials assist learners to learn faster and in an easier way. The interaction between learners and learning materials occurs through the language of visual designs in the materials. Words and images are directed through this language. Words form texts and headings while visuals refer to pictures, designs and photos included to add simple or abstract meanings. Another type of learning material is the one composed of words and images. Whatever elements are used in these materials all compose the learning elements in harmony (Alpan, 2008).

Visual materials are crucial in visual learning. As teaching materials, pictures, graphs, tables, or drawings can facilitate learning as they enable learners to visualize abstract concepts and internalize them more easily. Visuals also help learners to understand relationships between concepts while increasing their attention and enriching the learning process. Visuals are convenient teaching tools as they are not only easy to use and integrate into any learning material and subject, but are available almost cost-free as well.

Visuals in teaching have been widely used since the use of pictures, graphs or diagrams enrich the materials visually. They enable concepts to be more easily understood and evaluated. They also help learners to pay attention and to make connections among concepts. Pictures are used to transfer abstract concepts through realistic visuals. Graphs on the other hand, are useful in transmitting knowledge with statistics or describing it socially while they help learners to move cognitively beyond conceptualizing. Diagrams are important in summaries. Especially they are effective when summaries of the topic. Pictures, graphs and diagrams are cost efficient and can be easily (Yanpar, 1999). These are teaching tools that could easily be used in teaching any subject or topic.

Sketchnotes are the notes that consist text and visuals such as drawings, pictures, objects, frames, letters, or numbers. They can be used to take notes of the learning materials, summarize, brainstorm, or to prepare a plan for any learning task. They help to visualize the learning material and thus, make learning easier and more retentive. By making lessons more enjoyable, sketchnotes can also increase learner participation and concentration as well as encouraging creative thinking.

As sketchnotes consist of visual and written elements they are thought to correlate with learning styles. Thus, determining how sketchnotes are affected by learners learning styles could enable better planning for lesson materials, assignment tasks, or other instructional activities. In this respect, the study aims to explore the effects of learning styles of pre-service teachers on the level of their skills to create sketchnotes.

2. Method

The study was designed following convergent parallel design. In order to gather in-depth data, qualitative and quantitative data were collected simultaneously. The findings are presented in combination of both qualitative and quantitative data.

2.1. Participants

The sample consisted 44 prospective teachers at a faculty of education department at a state university. They were all third graders with 37 of them female and 7 male students.

2.2. Data tools

The data was collected using a Likert-type questionnaire and sketchnotes. In order to collect the data regarding the participants’ dominating visual and verbal learning styles, the questionnaire “Dominating Visual or Verbal Learning Style of Learners” developed by Childers, Houston and Heckler (1985) was used. The scale included 16 items, eight of which were related to visual and 8 to verbal learning style.

The participants were also requested to prepare a sketchnote in any topic they wanted in Science. They were informed about preparing sketchnotes and possible materials they could use along with some sample sketchnotes. Then, they were allocated a week to prepare their sketchnotes.

2.3. Data analysis

The responses of the participants were analyzed statistically using SPSS 16.0 program. Since the data was not normally distributed, non-parametric analyses were conducted. The scores that students received from sketchnotes were analyzed descriptively using a rubric prepared by the researcher. The scores they received from visual and verbal learning styles were analyzed separately. Finally, the scores from the sketchnotes and the scores from the learning styles questionnaire were compared.

3. Results

The dominant learning styles of the participants based on gender variable are displayed in Table 1. The dominant style among the participants is visual with 5 (%14) for females and 2 (%29) for males. For 3 (%8) female students, both visual and verbal styles were at the same rate whereas none of the male students showed such a similar rate.

Table 1. Dominant learning style of the participants based on gender.

	Female		Male		Total
	n	%	n	%	n
Visual	29	78	5	71	34
Verbal	5	14	2	29	7
Visual-Verbal	3	8	-	-	3
Total	37	100	7	100	44

The results of the sketchnotes prepared by the participants are presented in Table 2. The participants’ use of sketchnotes based on their learning style was analyzed. It was found that all the participants paid attention to headings and shapes in their sketchnotes.

Table 2. The distribution of visual and verbal elements in sketchnotes.

	Visual		Verbal		Visual-Verbal						
	Visual	Verbal	Visual	Verbal	Visual	Verbal					
Shape	34	Information Box	3	Shape	7	Information Box	5	Shape	3	Information Box	2
Diagram	6	Written Explanation	33	Diagram	2	Written Explanation	7	Diagram	2	Written Explanation	3
Model	8	Heading	34	Model	-	Heading	7	Model	2	Heading	3
Table	3	Sub-heading	18	Table	-	Sub-heading	6	Table	1	Sub-heading	2
Graph	6	Ordering	4	Graph	-	Ordering	3	Graph	3	Ordering	2
Picture	1	Classification	30	Picture	-	Classification	6	Picture	-	Classification	2
Symbol	9			Symbol	2			Symbol	2		
Arrow	25			Arrow	1			Arrow	-		
Coloring	34			Coloring	4			Coloring	1		
Highlighting	34			Highlighting	6			Highlighting	3		

While visual learners tend to use more frequent graphs and tables in addition to coloring and highlighting, verbal learners are more likely to use information boxes and classifications for explaining concepts. Visual-verbal learners, on the other hand, balance between visual and written elements in their sketchnotes. The participants' use of visual and written elements were also analyzed based on gender variable (Table 3).

Table 3. The distribution of visual and written elements in sketchnotes based on gender.

	Female		Male				
	Visual	Verbal	Visual	Verbal			
Shape	37	Information Box	10	Shape	7	Information Box	-
Diagram	10	Written Explanation	36	Diagram	-	Written Explanation	7
Model	8	Heading	37	Model	2	Heading	7
Table	4	Sub-heading	21	Table	-	Sub-heading	5
Graph	8	Ordering	7	Graph	1	Ordering	2
Picture	1	Classification	33	Picture	-	Classification	5
Symbol	11			Symbol	2		
Arrow	21			Arrow	5		
Coloring	34			Coloring	5		
Highlighting	36			Highlighting	7		

The use of visual and written elements in the sketchnotes were analyzed based on gender. The results indicate that female participants tend to use visuals such as diagrams, tables, pictures and written elements like information boxes more frequently than the male participants. The males, on the other hand, used sub-headings in their texts and classifications in their explanations. The impacts of the participants' learning styles on their use of visuals are displayed in Table 4.

Table 4. The differences in the scores received from the visuals in the sketchnotes based on learning styles.

Learning Style	n	Mean Rank	df	χ^2	p
Visual	33	26,47	2	17,927	,00
Verbal	7	4,64			
Visual-Verbal	44	21,00			

The visual elements used in the participants sketchnotes were analysed based on their learning styles. According to the results from Kruskal Wallis H-Test independent samples test, there is a significant difference in the use of visual elements based on the participants learning styles ($\chi^2(2)=17,92$, $p<.05$). The reason for the difference was analysed using Mann Whitney U-Test for independent samples. The results show that there is a significant difference in terms of visual element use between the participants with visual learning style and the ones with verbal style ($U=3,5$, $p<.05$). The participants with visual-verbal learning style use visual elements more frequently than verbal style learners ($U=1,00$, $p<.05$). The effect of the participants' learning style on their use of written elements in their sketchnotes are presented in Table 5.

Table 5. The difference between sketchnote scores of the participants based on their learning styles.

Learning Style	n	Mean Rank	df	χ^2	p
Visual	33	17,56	2	21,080	,00
Verbal	7	38,50			
Visual-Verbal	44	35,25			

The verbal elements in the participants' sketchnotes were analysed using Kruskal Wallis H-Test independent samples test. There is a significant difference in the use of written elements based on learning styles ($\chi^2(2)=21,08$, $p<.05$). The reason for the difference between the groups were investigated using Mann Whitney U-Test for independent samples. Accordingly, a significant difference was found in terms of written element use between the participants with verbal learning style and the ones with visual style ($U=6,0$, $p<.05$). The participants with both verbal and visual learning styles were found to use written elements more frequently than the participants with visual learning style ($U=12,50$, $p<.05$).

4. Discussion

Learners use their learning styles actively while accessing, understanding and processing information. While some learners respond better to diagrams, graphs and pictures; others learn better with verbal or written explanations. Most of the learners are visual learners. However, the majority of the classroom instruction is carried out verbally. This shows that many learners cannot benefit from the lessons instructed verbally. Those who learn effectively are the ones that can process information both visually and verbally (Felder, 1993). In learning situations where knowledge is transferred both verbally and visually, all learners learn more effectively.

The findings indicate that the majority of the participants are visual learners. It is also revealed that the participants' learning styles influence their use of verbal and visual elements in their sketchnotes. The learners with visual learning styles used more visual elements in the sketchnotes they prepared while verbal learners used verbal elements more. The ones with both learning styles used verbal and visual elements together.

Fleming (2001) offers extensive suggestions for classroom approaches for matching teaching styles and learning styles. When teaching materials include both visual and verbal elements, they will be more meaningful for learners with visual and verbal learning styles while enabling retention. Furthermore, the visual and verbal elements in learners' notes will enhance processing knowledge and help them learn faster. Based on the findings of this study, it is suggested that teachers inform learners about and guide them to use sketchnotes with verbal and visual elements.

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MULTILINGUALISM, INTERCOMPREHENSION AND INCLUSION: THE LECTURIO + PROJECT AND THE DYSLEXIC STUDENT

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Abstract

In the Common European Framework of Reference for Languages: Learning, Teaching, Assessment (CEFR, Cambridge University Press, ISBN: HB 0521803136 - PB 0521005310 www.uk.cambridge.org/elt), it is emphasized that languages should not be considered as compartments to be faced and learned in isolation, and that by "plurilingualism" we mean the integration of different linguistic repertoires which do not necessarily imply complete mastering of all abilities.

Lecturio + is an Erasmus + project funded by the European Community for a partnership of public and private bodies. It develops along two lines of action: production and experimentation of learning paths of Romance languages on the model of linguistic inter-understanding and planning and implementation of an international summer school. Regarding the first action Lecturio + provides for the creation of a multilingual narrative tool intended for 8-year-old children of 3 European countries that guarantees attention also to dyslexic students. Moving from the scientific references on the difficulties in learning L2 for dyslexic students, the working group of the CNTHI of Unisalento, has been responsible for the inclusive design of the teaching tool, it is the book version and the Kamishibai version of a story titled "Thomas and the watermelon ", its adaptation to make it accessible and the methods of fruition and evaluation also through the digital version. This is a text structured according to the criteria of inclusive teaching that is proposed in schools in the partner countries of the project and translated into 14 languages. The purpose of the grant is to stimulate the learning of L2 through immersive experiences. The CNTHI working group has also organized two tools for the exploration of beliefs and attitudes towards the learning of a foreign language of teachers and students of the 4 primary school classes where the tools comes tried out. The aim is to recognize the preliminary components of a positive approach to the language.

Partners of The Lecturio + Project Are: Association Internationale Pour La Promotion de L'intercompréhension À Distance – France; Lycée Le Mas Blanc – France; Fédération Régionale des Maisons Familiales Rurales de Midi-Pyrénées – France; University of Salento – Italy; Universitat de Barcelona – Spain; Universite de Corse Pascal Paoli – France; Universitat des Saarlandes – Deutschland; University of the Studies Roma Tre – Italy.

Keywords: *Intercomprehension, dyslexic students, inclusive didactic tool.*

1. What is linguistic intercomprehension?

The term "intercomprehension" refers to the phenomenon that occurs when two people communicate successfully with each other by talking to each other in their own language. Inter-comprehension teaching is not an alternative to learning all the linguistic skills of a foreign language but represents an approach aimed at developing linguistic awareness, which aims at the enhancement of all languages, in perfect line with the Common European Framework of Reference for Languages (CEFR).

In fact, the CEFR emphasizes, on several occasions, that languages must not be considered as separate compartments to be faced and learned in isolation, and that "multilingualism" means the integration of different linguistic repertoires that do not necessarily imply complete mastery of all skills.

"The aim of language education is profoundly modified. It is no longer seen as simply to achieve 'mastery' of one or two languages, each taken in isolation, with the 'ideal native speaker' ... Instead, the aim is to develop a linguistic repertory, in which all linguistic abilities have a place."(QCER, 2001).

The intercomprehension allows the concrete realization of a plurilingual and multicultural European context, supporting diversity as an alternative to a single language of communication.

From the point of view of linguistic competences, the intercomprehension starts from the exploitation of the closeness and affinity of languages that belong to the same linguistic group, such as for

example the Romance languages, have numerous elements (lexical, phonological, morphological, syntactic) to which we add the discursive, textual or cultural clues related to a specific linguistic-cultural community

From the point of view of operational skills, the intercomprehension is based on the partial competences in which the competence of understanding is separated from that of production, the similarities between languages are exploited, the awareness of what each speaker already knows about the nature of the language, on the communication systems develops and on human interaction to accelerate mutual understanding processes and mobilize relational cognitive and emotional skills to build a common understanding plan. In the last decade of the last century, some European universities have begun to develop materials aimed at developing language learning according to the principles of intercomprehension. One of these teams led by Claire Blanche-Benveniste gave rise to EuRom4 (CEFR, cit).

2. Intercomprehension and inclusive teaching

In the educational field with the Salamanca Declaration (1994), attention was paid to every form of diversity, understood as a value in itself and to its recognition in a school for all, indicating the accessibility and participation of all children, regardless of disadvantaged situations, to common training paths. Inclusion is therefore the ability to provide a framework within which pupils - regardless of ability, gender, language, ethnic or cultural origin - can be equally valued, is a widespread and stable guarantee of participation and promotion of potential in terms of learning and development. "Inclusion moves from the recognition of differences between pupils" (Booth, Ainscow, 2008 p. 111). Inclusive educational contexts may be more appropriate even in situations of deficit and disability, as they are more designed and organized to reduce obstacles and to facilitate flexibility and personalization.

Learning the foreign language constitutes, in the educational training path, one of the most significant goals that contribute to completing the framework of key competences and that contribute to the formation of an intercultural and citizenship education. For this reason it is necessary to activate any form of intervention aimed at promoting the participation and inclusion of the students, removing educational or linguistic barriers that hinder training and designing accessible learning environments. These indications become even more important if we think of students with learning disabilities or dyslexia. "Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge." (Definition Adopted by the IDA Board of Directors, Nov. 12, 2002.). Even the person who has very much compensated for the problem of dyslexia with early rehabilitative interventions, that lead him to have performances similar to those of the normolector, with regard to word recognition continues to always have a phonological deficit that makes the reading less automatic and therefore slow and poorly flowing (Shaywitz., et alii 1999).

The dyslexic student presents many difficulties in the encounter with the foreign language both for the written part and for the spoken part. In the listening comprehension phase, it can be very tiring to segment the meaning units into the communicative flow, and will be able to perceive a higher speech speed than the companions. In the written comprehension he will encounter difficulties in deciphering the graphic units, in the association between signifiers and meanings and in the speed of reading. (Daloiso, 2009).

3. The Lecturio + project

In the perspective of favoring the learning of the foreign language in the dyslexic child, but above all in the perspective of building a positive and possibilist attitude in students with learning difficulties or disabilities, the Lecturio + project was designed and implemented. Lecturio + is an Erasmus + project funded by the European Community for a partnership of public and private bodies. It develops along two lines of action: production and experimentation of learning paths of Romance languages on the model of linguistic inter-understanding and planning and implementation of an international summer school. Regarding the first action Lecturio + provides for the creation of a multilingual narrative tool intended for 8-year-old children of 3 European countries that guarantees attention also to dyslexic students. The Lecturio + project was aimed at creating multilingual educational resources. In particular in this article we will talk about a narrative product called "Tommaso e l'anguria" a simple story for children, proposed in 14 different languages and with different modalities. As part of the Lecturio + project, the CNTHI of the University of Salento oversaw the adaptation of the text and images of the educational tool built for the project: the book Tommaso E L 'Anguria and its kamishibai version. The process of adaptation and revision made to the

identified cultural product (a story entitled "Thomas and the watermelon") has taken into account the pedagogical principles of the inclusive model in teaching design (Index 2012 and ICF 2001), and taking into account the characteristics functioning of the pupil with DSA and, in particular, of the dyslexic student especially as regards executive functions. The text of the story has been revised both for the lexical and graphic elements. The text-image consistency, the legibility of the text, the graphic choices of presentation of the textual part and images, the chromatic choices and everything else necessary to support the pupils in the comprehension by listening and reading the history was taken care of. The typical critical points of the dyslexic student concern the thresholds of attention, in particular the control of the interference and the management of working memory (Benso 2004), which are associated with the problems of visual interference and overcrowding (Rome High Health Institute 2010).

Figures 1, 2, 3 represent some of the steps in the adaptation of a Book table. The text consists of 14 tables. The adaptation work was carried out on each one. The principles of adaptation are illustrated in an educational video produced by the CNTHI. (<https://drive.google.com/drive/folders/17ueMUxTv2iOv0zAqD8r6MILSBfsZPh-B>).

Figure 1. Original version of the book's page.

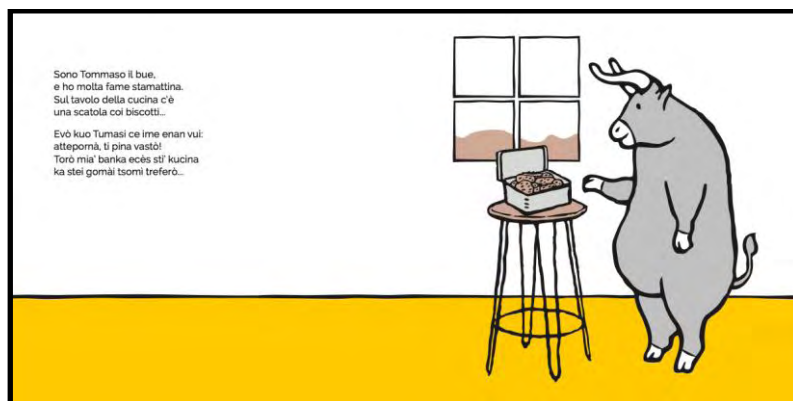


Figure 2. First Adaptation.



Figure 3. Final Adaptation.



The revision action was made to reduce the perceptual gap, the effect of visual crowding, the ambiguity of words and images. Use of the font, of the Uppercase, of the simplification, of the appropriate line spacing. In addition, all the graphic styles have been revised to increase the readability of the text and the understanding of the story. Both the adaptation of the story and the adaptation of the didactic activity carried out with history have been guided by the idea of producing a unique project for the whole class in response to the culture of inclusion that organizes and designs educational initiatives that do not exclude anyone. The story in book and kamishibai format was tested in March, on 4 third primary classes in a school in the province of Lecce. 78 children are involved, one with a dyslexia certification and seven with non-certified learning difficulties, but detected by the teachers. Tommaso's story in Italy will be tested in all foreign languages, while in the group of 78 children in French and Spanish. Both languages are not a subject of school study, in fact in all four classes children study English as L2. The story is read in the foreign language by the recorded voice of a native speaker, the reading takes place at a slow pace, articulating the most important keywords and is accompanied by the kamishibai tables, without text only images. The slow and punctual reading responds to the needs of a slow phonological processing typical of the dyslexic student. The reading is proposed twice. In the pretest phase it was realized that, unlike the classical reading of the kamishibai in which the streak anticipates the illustrated table, in this case the story read must correspond to an illustrated table that is shown to children, to reduce the difficulty of managing a double attention task and not to overload short-term memory. Later the children participate in a series of phonological didactic games to explore the similarities of new words, meanings and differences. The purpose of the educational activities is to make people reflect on the active listening techniques put in place and on how to manage the metacognitive strategies to better understand the content of the story.

Figure 4. The experimentation in the classroom.



Before the workshop activity with the kamishibai, the children completed a questionnaire of 10 questions to detect their attitude towards foreign language learning and the idea they have regarding the usefulness of knowledge of other languages. For children in reading difficulties, the questionnaire will be proposed in the form of an interview. The hypothesis is that there is a general resistance to language learning influenced by the scholastic approach to the subjects and that in children in difficulty this resistance is significantly higher than in the rest of the group. In response to this problem an inclusive and interactive approach to languages is proposed that can lead all students towards good results and not only those who have specific talents in language learning, because the aptitude for language learning, as a factor of individual difference or personal predisposition that facilitates learning itself is not a determinant in the absolute sense of success in learning but rather an element conditioning the speed of the process involved and the level of achievable results (Gardner and MacIntyre 1992).

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CHALLENGE BASED LEARNING: AN EDUCATIONAL PROPOSAL FOR SOCIAL TRANSFORMATION

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Abstract

The approach of problematic situations in the educational process requires the incorporation of new teaching and learning methodologies, among which the Challenge Based Learning (CBL) is presented as a pedagogical proposal to favor the development of transversal and disciplinary competences, collaborative work, leadership, research, critical and reflective thinking. The CBL allows the involvement of students in real teaching contexts, so that, through the design and implementation of projects, they generate proposals for solving the main social challenges; this teaching dynamic is based on the theory of experiential learning. The present work describes the antecedents, characteristics, the stages for the development of the CBL, and its main differences with the Problem Based Learning (PBL) and the Project Based Learning. Finally, the stages of the CBL are exemplified with a university experience of implementation of the project called *Social Reconstruction*, which allowed the participation of students and professors in a multidisciplinary and collaborative way in the social transformation of two Mexican communities affected by the earthquake of September 19, 2017.

Keywords: *Experiential learning, challenge based learning, social transformation.*

1. Introduction

New educational trends suggest the use of active methodologies in teaching and learning, centered in the student in order to favor the analysis and design of proposals for solving the main challenges of society. Among the methodologies, the Challenge Based Learning (CBL) is proposed, this method was originated in 2008 in a project by Apple company called *Apple Classrooms of Tomorrow-Today*.

CBL, as a pedagogical proposal, is based on experiential learning which incentives students to raise solutions to several problems, related with their environment, through their immersion in real training contexts and the design of multidisciplinary intervention projects. Under these contexts, learners recognize a problem of their own interest, and this issue becomes for them a challenge to be approached, analyzed, discussed and solved in a methodologically and collaboratively way. In addition to the above, the CBL awakens in the students a sensitivity about local problems that most affect society; favoring the development of various competences; for example: problem solving, communication skills, research, use of technology, collegial thinking, emotional competences, analytical thinking, reflective thinking and social commitment (Nichols et al., 2016).

Under the CBL, students have the opportunity to recognize the relevance of contents they have learned in the classroom through their active, intellectual, creative, social and emotional involvement in projects of global significance with local actions in order to solve those problems in a critical and proactive way. In fact, students are being directly involved in the context of the problem to be solved. However, it should be noted that the development of problem solving competence is not typical of the CBL, since this is similar to Problem Based Learning (PBL) and Project Learning (PL). The CBL, unlike the first one, uses real scenarios for the problematization of the contents while in the PBL the simulation of the problems is allowed (Sánchez, 2016), and with respect to its relation with the PL, the design of integrating projects is one of the characteristics that they share. However, in the CBL it is essential that the designed project be implemented, evaluated and disseminated.

2. CBL methodology

CBL begins with the approach of the general topic to be worked with, and that is called in this method like the *Great Idea*. During this phase, the teacher, as a facilitator of the process, together with the students, define the topic of global relevance and the possibilities of local action to work with. In this first stage, the essential question of the process is also established, and this is characterized by set a general question which allows linking the issue to be addressed with the problem to be solved (Apple, 2011).

Subsequently, students, once selected the challenge they wish to attend, they establish a series of important questions to work with in their research process. It is a key element, at the moment of defining the challenge, students closeness inside the problem environment because the above not only sensitize them about the neediness of social transformation, but also will allow them to dimension the needs to be solved, the actions to be established, and the possible scope of his intervention.

With the sustenance of the research, a systematized planning of the key activities is carried out. The necessary resources are also defined to address the challenge; through a dynamic group sessions of students with the guidance of their teacher. The purpose of this phase is that, through research, activities and collaborative work sessions, students will have sufficient knowledge to be able to generate innovative solution proposals for the selected challenge.

The next phase of this methodology consists of a construction of the solution proposal to the established challenge. That is how this proposal is described through the design of an intervention project. The project considers a multidisciplinary vision of the solution, as well as its concretion in several tangible deliverables which are developed during the implementation of the project. The foregoing makes this possible in order to demonstrate both, the acquired learning and the competences developed by the students. They, without a doubt, add this to their formative educational process, oriented towards social transformation.

Finally, the mechanisms to evaluate the learning and the impact of the project are established and also how the strategies for disseminating the results obtained are presented. The evaluation process requires the selection of the strategies and instruments necessary for the collection and recording of the information that is generated in the different phases planned. With regard to dissemination, students with the support of their teacher, agree on the best way to share the experience lived with both, the recipients of the project, and the academic community. This last stage makes it possible to identify the progress in the fulfillment of the expected objectives, achievements and the learning acquired by students and, it allows as well to appreciate the impact on transformation of reality in the community served.

The reflection and the informative evaluation are one important part of the process in each stage since they reinforce the learning and prepare the learners for similar situations in their professional future.

3. Social reconstruction project

In order to exemplify the CBL process, the experience of UPAEP is described below, whose educational model U-50 proposes an educational vision that mobilizes and transforms society from the person itself, through the generation of significant experiences through the use of active methodologies in teaching and learning processes; seeking, in this way, the formation of transformative leaders of social realities.

This university experience with CBL had as main purpose to involve both, students and professors, collaboratively and multidisciplinary, in a social intervention project, generated from the conjuncture of the earthquake of September 19th, 2017 in Mexico, which it brought housing destruction in rural communities.

The following describes the actions carried out by the project called *Social Reconstruction*, considering the stages of the CBL (Table 1).

Table 1. University experience of CBL employment.

Great Idea	Social Reconstruction
Main question	How could the university would help to rebuild the communities affected by the earthquake?
Definition of the challenge	Rebuild the communities of Tepapayeca, municipality of Tlapanalá and San Francisco Xochiteopan, municipality of Atzizihuacán, both in the State of Puebla.
UPAEP participants	Students and professors from the Faculties of Medicine, Nutrition, Architecture, Civil Engineering and Environmental Engineering High School students of the UPAEP. University Life Area Humanist Training Area and Entrepreneurs.
Strategic allies	Puebla Community Foundation, Estrella Roja, Mapfre Foundation and Beck Foundation.
Activities performed	Installation of a university gathering center Visit to the communities of Tepapayeca and Xochiteopan to size the problem and define the needs to be addressed. Brigades that supply provisions, help with demolition and debris removal. Diagnoses of health and nutritional status. Community integration activities with families, children and youth. Proposals for architectural designs. Establishment of strategies for educational, cultural, family and community strengthening. Advice in the process of economic reactivation.
Evaluation	Preparation of evidences of the intervention through photographs and videos. In the same way, interviews and feedback sessions were held with the students, professors and representatives of the communities through the methodology of focus groups.
Divulagation	Advances and results obtained during the project were shared with the university community and with the inhabitants of the affected communities, through internal means of communication and follow-up visits. There are portfolios of evidences prepared by the students.

4. Conclusions

The incorporation of innovative pedagogical strategies in the educational process, as a response to the need for an integral formation in university students, requires the establishment of systematized, collaborative and multidisciplinary educational actions which allows the linking of the disciplinary contents with the main social challenges.

The experience with the *Social Reconstruction Project*, under the CBL method, allowed university students and professors not only to become aware of the current problems of the communities affected by the earthquake, but also to participate directly in the various activities derived from the project. So, students will be favored with transversal, disciplinary and professional competences.

Teachers, students and the UPAEP community with the incorporation of the CBL, in their pedagogical model, have had the opportunity to concretize their educational proposal through the generation of integrative projects of community intervention and with actions linked to various agents of change, such as it is the instances of government, organisms and foundations of the civil society and companies. This is how, it has been possible to influence the transformation of our social reality.

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A GAME-BASED MODEL TO ENHANCE LEARNING AT UNIVERSITY

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Abstract

The present doctoral research, through the adoption of a game-based model, intends to promote the development of learning strategies of the students who encounter greater difficulties along their academic path. The game-based model consists in educational activities that have characteristics linked to the dimensions of video games, gamification and Alternate Reality Games. Particularly, the game-based model targets students of the Degree Courses in Educational Sciences and Primary Teacher Education of the University of Roma Tre that have encountered greater difficulties in their studies. The paper presents the results obtained at the end of the try-out phase, which was carried out within two workshops of the Degree Course of Primary Teacher Education at the University of Roma Tre with the aim of testing some components of the game-based model.

Keywords: *Learning strategies, university, gamification, learning.*

1. Introduction

Recent data and research (Burgalassi et al., 2016; Eurostat, 2017; Anvur, 2016) have highlighted the problem related to the high university dropout rate in Italy. Indeed, Italy is among the countries with the highest dropout rate in Europe and at the same time one of the latest countries for the number of people holding a tertiary education degree (26,5% against 40% of the other European countries). Moreover, the university courses are often attended by a very low number of students (on average less than half of the enrolled students), which consequently have few opportunities of establishing meaningful relationships with their fellow students and/or professors and to acquire the necessary skills to understand how to face the university context.

2. Theoretical background

Several authors (Huizinga, 1946; Caillois, 1981; Fink, 2008) have emphasized the importance of play, which is linked to cultural aspects, but also strongly connected to learning (Froebel, 1967; Vygotsky, 1972; Garvey 1979). In recent decades, the scientific literature has also highlighted the educational potential of video games that, thanks to their characteristics, allow the subject to learn in an interactive and highly immersive environment, promoting an experiential learning (Gee, 2003; Salen, 2008; Squire, 2011; De Castro, 2016). At the same time, also gamification, which refers to the use of game elements in non-game contexts (Deterding et al., 2011), has been used in education, for example, in the university context to promote students' motivation, interest and participation (Sanchez-Carmona et al., 2017; Bajko, et al. 2016; Leaning, 2015; O'Donovan et al., 2013). There are also experiences on the use of Alternate Reality Games (ARG) in education (Connolly et al., 2011; Bonsignore et al., 2013; Gilliam et al., 2016). ARG are interactive experiences that focus on the narration of a story that develops both within real life contexts and digital ones (Szulborski, 2005; Palmer & Petroski, 2016).

3. Objectives and methods

The present research, which is still ongoing, represents a pilot study that uses quali-quantitative tools and that involves some students enrolled in the second year of the Degree Courses in Education Sciences and in Primary Teacher Education at the Department of Education at University of Roma Tre. The assumption at the base of the study concerns the fact that the introduction in educational contexts of elements derived from the dimensions of video games, gamification and Alternate Reality Games seems to have a positive impact on learning (Griffiths, 2002; Hamari et al., 2015; Steinkuehler & Squire, 2015; Ebrahimzadeh & Alavi, 2017; Liu, 2017; Kaufmann, 2018; Chapman & Rich, 2018; Hitchens, & Rowan, 2018).

Therefore, the goal of the present research is to verify the effectiveness that elements derived from games and video games can bring within the support strategies (for example in the tutoring services) to university students who have encountered difficulties in their academic path. The research question is the following: to what extent can the introduction of elements derived from the dimensions of video games, gamification and Alternate Reality Games within a set of activities related to the six areas of competence of the *Questionnaire for Learning Strategies* (Pellerey & Orio, 1996) encourage the promotion of learning strategies in university students who are critical in their studies? It is assumed that, through the adoption of the game-based model, students who present issues in their study can obtain benefits on the implementation of their self-regulating skills both on the qualitative level (orientation, motivation to learn, interest, attitude, social relationships) and on the quantitative one (frequency of lessons, improvements of the grades). The presence of any changes in the profile of the students will be detected through qualitative procedures (self reports, interviews, focus groups) and by referring to academic performance (grades and number of exams taken).

In order to select the sample involved in the pilot study, three questionnaires were used to identify the critical elements encountered in the study experience by the students of the Degree Courses in Education Sciences and Primary Teacher Education: the *Questionnaire for Learning Strategies* (QSA-Pellerey & Orio, 1996), the *Zimbardo Time Perspective Inventory* (ZTPI-Zimbardo & Boyd, 1999; Tr. It Riccucci, 2009) and the *Questionnaire on the University Study Experience* (QuESU)¹. In order to select the students, we referred to the critical issues that emerged in their profiles of the QSA and the ZTPI, also on the basis of the characteristics that presents the profile of the *disoriented student* (La Rocca, Margottini & Capobianco, 2014), who shows difficulty in controlling his/her emotional states, high levels of disorientation, difficulty concentrating on the studies, lack of perseverance, attribution of his/hers successes or failures to uncontrollable causes.

Although there are several models related to the use of gamification in education (Uhr et al., 2015; Rutkauskienė et al., 2016; Zaric et al., 2017), the game-based model presented in this contribution is based on the six areas of competence related to the *Questionnaire for Learning Strategies*. The six areas of competence are: *managing processes and strategies for understanding and remembering; orientating and organizing in the study tasks; relating and collaborating with others; controlling and managing anxiety and emotions; perceiving competence and locus of control; controlling and protecting emotions*. Specifically, the *Questionnaire for Learning Strategies*, a tool validated and used both in schools and in universities (Pellerey, 1996; Pellerey et al., 2013; Margottini & Rossi, 2017; La Rocca, Margottini & Capobianco, 2014), consists in 100 items, that refer to fourteen evaluation scales (seven of them are linked to the cognitive sphere and seven to the affective-motivational sphere). Each of the fourteen evaluation scales pertains to a specific area of competence. Through the proposal of a game-based model of didactic support we intend to reformulate the activities that allow to enhance each area of competence – some of these activities are taken from Ottone's volume (2014) – through the introduction of features derived from the dimensions of video games, gamification and Alternate Reality Game. Therefore, for each area of competence we foresee activities aimed at strengthening learning strategies that fall within that specific area, such as: the creation of concept maps on the topics of the course, group work to deepen the topics of the course and activities that aim to promote the reflection on the link between emotions and learning.

4. The try-out phase

Within the present research, a try-out phase has been carried out along two workshops with the students of the Degree Course in Primary Teacher Education of the University of Roma Tre.

The first try-out was carried out within the Workshop of *Educational Technologies* (coordinator of the workshop is Professor Daniela Olmetti Peja) in the months of March and April 2018. The objective of the workshop, developed over five meetings, was to provide fourth-year students with the ability to understand the characteristics of serious game, video games specifically designed for learning (Abt, 1970), and also making them reflect on the possible use of these games in their professional future. In this sense, students, working in small groups, had to create the storyboard of a serious game to be used in school contexts. After a brief theoretical lesson about the characteristics of mainstream video games and on the ways by which they engage the players, students were given the opportunity to play with a serious game on their smartphones: *Father and Son*, a game produced by the National Archaeological Museum of Naples. The game offers the opportunity to explore some areas of the museum and also to travel back in time, for example, in ancient Egypt. After their gaming experience, students were able to reflect on the differences observed between mainstream video games and serious games. In light of the feedback received, a brief theoretical introduction on the characteristics of serious games has been proposed and on how these tools

¹ The QuESU questionnaire has been created specifically for the present research.

are used to fostering learning in the didactic field. Then, students worked on the creation of the game, deciding: the topic and the subject connected to it; the target; the goal, namely what it was possible to learn by playing with it; the plot; the characters; the mechanics of the game. The storyboard technique allowed students to realize a graphic representation of the main sequences of the game; students also included short captions in order to describe the different scenes. The feedback from the participants was positive and the serious games realized focused on topics such as geography, civics, English, etc.

The second try-out was instead carried out in May 2018 within the Workshop of *Special Pedagogy and Didactics 2*, (coordinator of the workshop is Professor Fabio Bocci, who is also the supervisor of this PhD research), involving students enrolled in the third year. The goal of this workshop – which was developed over four days – was to making students reflect on the issues encountered more regularly during their academic path and stimulating them by solving these issues with proposal connected to the use of game mechanics. First of all, students were invited to carry out individual and group self-analysis work on the difficulties and problems encountered more regularly in their university experience. The participants also had to make short interviews with friends or fellow students to understand the difficulties encountered by them. During the second day, the participants met the students working within the Department's tutoring services in order to obtain further information on the most widespread difficulties and to understand the ways in which these services respond. Then, divide in small groups, they realized a map of the difficulties encountered by them at university. The most common problems identified by the students concerned the lack of spaces for studying, the difficulty in communicating with academic staff, the difficulty of working students in balancing university life with work, the difficulty in finding the needed information for carrying out certain educational activities. During the third meeting, students were then given a short presentation on the use of video games, gamification and Alternate Reality Games in the educational field and, subsequently, the groups were invited to make proposals for the resolution of the difficulties encountered: the proposals had to have ludic characteristics. Students, in carrying out the group work, elaborated proposals based in particular on the use of technologies. Indeed, students' proposals were based on the creation of Apps or digital platforms, characterized by the presence elements derived from videogames and in which they could interact in a simple, fast and effective way both with their fellow students, with the tutors of the services and with the academic staff (teachers and administration). The students' preference for the use of Apps and digital platforms to communicate is probably due to the fact that they have grown up within an environment strongly characterized by the presence of technologies, which inevitably have influenced their way of interacting with others.

5. Discussion

The two workshops activities presented are part of the try-out phase of the present pilot study. Through the first try-out, it was possible to understand the level of knowledge of students towards serious games and this workshop has represented for many of them a first approach with topics concerning the use of video games in the educational field. In particular, serious games can be useful educational tools for their future role as teachers. Through the second workshop, it was possible to reflect on the introduction in the university field of some typical mechanics of video games, gamification and Alternate Reality Game in order to improve the orientation and the communication between students and academic staff.

This phase represented a preliminary and introductory stage of the pilot study, which will involve the use of some components of these approaches within the activities that will be part of the game-based model.

6. Conclusion

The present research, which represents a pilot study, starting from the identification of the critical issues encountered in the study by the university students along their academic path, intends to promote the development of their learning strategies through a series of educational activities characterized by the presence of elements derived from games and video games.

The opportunity to learn in an environment that also has characteristics derived from games and video games, can represent a modality through which promoting an academic study experience that can be perceived positively by the students – which belong to the Millennials generation and are also defined as *digital natives* (Prensky, 2001).

The activities of the game-based model refer to a validated tool, namely the *Questionnaire for Learning Strategies* (QSA-Pellerey & Orio, 1996) – indeed all the activities of the model are based on the six areas of competence of the QSA. This makes us believe that it is possible to enhance the learning strategies of the students, also making use of the presence, within the activities, of elements taken from games and video games.

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**THE USE OF THE RENZULLI-HARTMANN RATING SCALES (2010)
WITH ITALIAN TEACHERS
PRELIMINARY DATA FROM A CORRELATION ANALYSIS**

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Abstract

The assessment of Gifted students represents a new emergent area of study in Italy. Education and training programs start from a good evaluation of children' potential and their learning characteristics (Tomlinson, 2012). The lack of appropriate identification procedures often does not allow teachers to understand the student's needs of exploration and knowledge. Consequently, it usually happens that Gifted students underachieve (Neihart & Betts, 2010) and/or do not receive appropriate instructional and educational supports. In continuity with this need of useful instrument of observations for teachers, this study presents the results of part of a macro-study for the adaptation of the Renzulli-Hartmann Rating Scale (2010) in the Evaluation of Giftedness in Italian middle schools in south-eastern, north and centre Italy. Considering the different educational panorama in terms of inclusive practices of Italy and America the study will primarily present the inclusive historical pathway in the American and Italian school system. Successively, the contribute will present the analysis of the correlation between the learning subscale chosen from the Renzulli-Hartmann Rating Scale (2010) and the final marks of 140 students of second and third year of a middle school. These preliminary data will be helpful to understand if the instrument presents a strong concurrent validity and it is relevant to the Italian context.

Keywords: *Giftedness, assessment, school, teachers, Renzulli.*

1. Introduction

In the educational and psychological literature there are different conceptions of intellectual giftedness. It is described as a general cognitive ability, often identifying it with a high IQ, or a domain-specific characteristic. Some systemic models offer a more systematic vision and describe giftedness as the union of several cognitive and non-cognitive variables. These models have influenced not only the ideas of teachers and educators on giftedness, but also their educational practices. The systemic models have overcome this classical conception going to detect other psychological variables in the definition of the construct. According to the systemic models, giftedness is given from the confluence of psychological processes that work together, processes that are not only cognitive but also emotional and relational (Kaufmann & Sternberg, 2008, p.76). Parents, teachers and even peers can contribute significantly to the balance of this elements and to the expression of a specific talent (Monks & Boxtel, 1985). As regard school provisions and support for gifted students we can assist to more and less inclusive practices. In the USA gifted students assist regular classroom and schools usually offer them special programs. According to the US Department of Education around 6% of US students benefit of those programs (2003). In some states special services for gifted students are regulated by the states special education law (U.S. Department of Education, 2008). The No Child Left Behind Act of 2001 (NCLB), a comprehensive law "designed to improve the educational performance of all students in the U. S. [...] schools must be held accountable for educational outcomes for all students, including those with any type of disabilities" (p.23), stirred controversy among gifted education (Gallagher, 2004) above all because gifted students "have been increasingly passed over at their own expense" (Beisser, 2014, p.11).

In 2005, 11 years after the European Recommendation, a research entitled «Gifted Education in 21 European Countries: Inventory and Perspective », conducted by Professor Franz J. Monks and Robin Pflüger of the Radboud University of Nijmegen (Netherlands) on behalf of the German Ministry of Education and Research, review the educational modalities specifically related to gifted students implemented by 21 countries of European Union. According to this document, in Italy, giftedness was ignored within the national school system.

Although in Italy there is no specific legislation that intervenes in matter of Giftedness with the exception of a regional provision of 2012¹ the regulations regarding school autonomy² and the protection of special educational needs³ (Ministerial Directive 2012) allow the school to decide in educational and organizational terms how to respond to these new requests (Pinnelli, 2017).

In Italy gifted students attend regular classrooms and could receive specific enrichment programs in specific school subjects; they could benefit of curriculum compacting, mentoring, extra-curricular programs and web courses. They could also skip the classroom only once in their school career students can access in advance both primary and secondary schools (Roncoroni, 2017).

Going back to the Monks European Report, beyond the lack of an official Legislative Recognition and Regulations, all the documents report, above all, the lack of specific identification criteria and giftedness recognition relies often on parents, teachers and self-nominations.

In order to offer more specific tools for teachers, an Italian validation of the Renzulli-Hartman Scales for Rating the Behavioural Characteristics of Superior Students (Renzulli, et al., 2010) is carried out. In this study only the correlation analysis of one subscale is presented.

2. Design

2.1. Instrument

In this study teachers judgment measures were used to explore the students' potential. These instruments are in line with the Renzulli's definition of giftedness. Between the three more worldwide used and empirical supported scales: Scales for Rating the Behavioural Characteristics of Superior Students, Scales for Identifying Gifted Students (Ryser & McConnell, 2004) and Gifted Rating Scales (Pfeiffer & Jarosewich, 2003) the first are used.

The Italian translation of the Renzulli-Hartman Scales for Rating the Behavioural Characteristics of Superior Students (Renzulli, et al., 2010) was used for this procedure. These rating scales "are not used to eliminate students with lower ratings [but] to provide a composite profile of the nominated students" (Renzulli, Reis, 1997, p. 60). The original SRBCSS-III (revised edition) comprehends a total of 14 scales aimed to evaluate the following areas:

*Table 1. Subscales for Rating the Behavioural Characteristics of Superior Students (Renzulli et al., 2010)
On the purpose of this study only the learning subscale will be considered.*

Learning Characteristics
Creativity Characteristics
Motivation Characteristics
Leadership Characteristics
Artistic Characteristics
Musical Characteristics
Dramatics Characteristics
Communication Characteristics (Precision)
Communication Characteristics (Expressiveness)
Planning Characteristics
Mathematics Characteristics
Reading Characteristics
Technology Characteristics
Science Characteristics

Every single scale of the instrument assesses different aspects of the person, from basic skills to transversal ones. In the learning subscale the teacher assesses the student answering to 11 questions about the learning style of the student (inductive or deductive), their reasoning and memory ability. According to the "Protocol for completing Renzulli Behavioural Rating Scales" the following steps were observed during the administration:

¹ Deliberazione della Giunta Regionale del Veneto n. 1192 del 25/06/2012, Approvazione avviso pubblico per la realizzazione di interventi a supporto dei bambini con buon potenziale cognitivo – Potenziare il potenziale nel sistema scolastico.

² Regolamento dell'autonomia scolastica di cui al D.P.R. 275/1999.

³ Legge 170 del 2010, Nuove norme in materia di disturbi specifici di apprendimento in ambito scolastico.

1. Students must be observed from the teacher for a minimum of nine weeks before rating scales can be completed.
2. Identification of two teachers from different academic content areas to complete both the creativity and motivation rating scales.
3. Training of selected teachers on the Renzulli Rating Scale.
4. Teachers complete the Scale for each student after training.
5. Rating scales must be completed independently, never collaboratively.

The students' final marks of the same school year were used to establish the correlation. The final marks consist of an average of the single school subjects' final marks (Italian, math, technology, music, art, history, geography, physical education, science, English, and third language) and the mark on the behaviour.

2.2. Sample

The researchers who conducted the study obtained parents approval to conduct the surveys and collect other student information used in this study. Data were gathered from a convenience sample of 9 teachers (three of them had a specialization also in Special educational needs and one was actually working as a SEN teacher). The 9 teachers made 212 evaluations to 140 students (some students were evaluated by two different teachers) attending a village middle school in Eastern South Italy during the 2016–2017 school year. 77 students (55%) were boys and 63 (45%) were girls. Students were in grades 6 and 7, corresponding to the Italian first and second year of middle school.

3. Results

Before conducting the analysis to compare the results of the two groups, both variables were tested for Normality using Shapiro Wilk normality test (See tables 2 and 3). Because those values are below .05 we assume that the data are not normally distributed and for this reason.

Table 2. Tests of Normality.

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Marks	,116	210	,000	,953	210	,000

a Lilliefors Significance Correction

Table 3. Tests of Normality.

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
LEARNING subscale	,055	210	,200(*)	,982	210	,010

* This is a lower bound of the true significance.

a Lilliefors Significance Correction

According to the results as the assumptions of Pearson's bivariate Correlation are not met, only Spearman's rho Correlation Analysis can be used in this case. As shown in Table 4, the Renzulli learning subscale was significantly correlated with the students final marks ($r = .809$, $p < .01$).

Table 4. Correlation between the Renzulli learning Subscale and students' final marks.

			Marks	LEARNING
Spearman's rho	Final Marks	Correlation Coefficient	1,000	,809(**)
		Sig. (2-tailed)	.	,000
		N	210	210
	LEARNING	Correlation Coefficient	,809(**)	1,000
		Sig. (2-tailed)	,000	.
		N	210	210

** Correlation is significant at the 0.01 level (2-tailed).

4. Conclusions

Giftedness is a multidimensional construct that takes in consideration cognitive and not cognitive factors. For this reason gifted identification is not a linear and univocally defined process. “School information, familiar information and child observations in classroom should be considered together, and each information has the same “dignity” to be considered in a democratic evaluations of the students because they capture aspects of the child in different contexts and situations and, above all else, its inner potential” (Sorrentino, 2019, p.561). As regard school information, specific instruments for teachers are needed in order to find gifted students and to not lose their potential.

In this research we wanted to present part of a broader validation study of the Italian version of the Renzulli Subscale. Although this data is only preliminary and the sample need to be extended with more evaluations, these first results demonstrate a strong concurrent validity of the Renzulli learning subscale with school final marks. Further studies need to be carried out to examine the validity of the whole instrument and its efficacy for Italian teachers.

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LEVERAGING EDUCATIONAL SOFTWARE WITH EXPLORATION GUIDES IN HIGHER ARTS EDUCATION: THE VIDEOLAB SIMULATION CASE STUDY

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Abstract

Availability of ‘creative computing’ toolkits has lowered barriers to the development by educators of complex applications, enabling the development of educational software according to their own assessments of needs. VideoLab presents such a case, an educational software designed to assist the teaching of video technology concepts in accordance to an assessment of the needs at a Film Studies program in a Portuguese higher education institution. This software combines simulations and tutorials and was designed according to principles laid out by the Multimedia Learning Theory (Mayer, 2003) and the Cognitive Load Theory (van Merriënboer & Ayres, 2005), and its use in the classroom is complemented by an exploration guide for students (cf. Paiva & Costa, 2010). Empirical assessment of VideoLab’s instructional efficacy was carried out with a total of 40 students over two school years. During specific lessons of the Editing unit, students were given the software and asked to follow the exploration guide while completing some included questions as to measure learning. Other methods were employed simultaneously, including observation by the researcher, screen recording, and a questionnaire based on the Learning Object Evaluation Scale for Students (Kay & Knaack, 2008), as to determine students’ perceptions of learning value, design quality, and engagement. VideoLab was found to be an effective learning object and its design quality was found to be very acceptable. Findings from previous research on exploration guides were also replicated, in that students’ close adherence to the instructions was a key to learning effectiveness. Educational software development thus shouldn’t stop at the software itself, even in the face of a ‘self-sufficient’ design. Consequent implications for the reusability of educational software and simulations should be considered and can indeed be a focus of future research.

Keywords: *Higher education, Arts education, educational software, exploration guide, case study.*

1. Introduction

Despite the continued proven efficacy of educational software and computer-assisted instruction in general (cf. Tamim et al., 2011), little specific research and development can be found within the domain of Higher Arts Education. While there is also some evidence of instructional gains from the use of digital technologies in arts education, at least within K-12 levels (Munteanu, Gorghiu, & Gorghiu, 2014), their classroom potential in higher education continues mostly unexplored (Wilks, Cutcher, & Wilks, 2012). This paper presents a case study in the local development and use of an educational software, which the authors feel meets the call for a critical embrace of digital media’s possibilities while resisting technological determinism (Selwyn, 2010; Snyder & Bulfin, 2007).

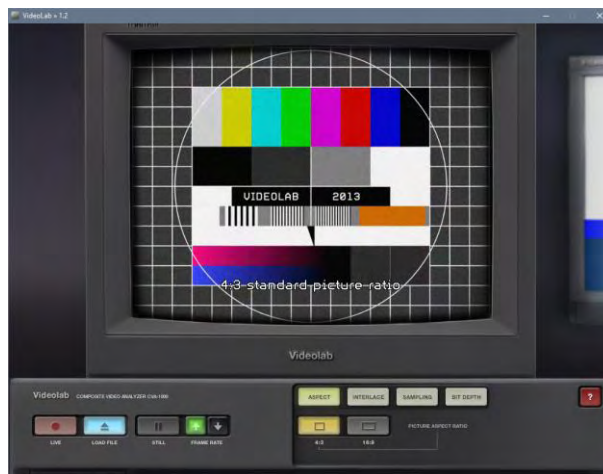
VideoLab met a specific need found in teaching the Editing unit at the Film Studies undergraduate programme of a Portuguese higher education institution. Being a compulsory unit, Editing is challenging to instructors because not all students are interested in the technical side of filmmaking. Despite video editing software having made large strides towards user-friendliness, proper understanding of digital video as its raw material still clarifies many tasks and enables students to solve common problems. To that end, concepts of digital video such as aspect ratio, interlacing, or sampling would typically be explained with the aid of videos, images and diagrams. Those lectures were often met with lack of interest and students would perform poorly at technical tasks in videography. The development and use of simulations allowing manipulation of representations of video concepts was therefore considered adequate, conforming to the notion of material practice that is central to arts education (Hausman, 2000) while drawing from literature that corroborates the effectiveness of simulation and tutorial software (cf. Escueta, Quan, Nickow, & Oreopoulos, 2017).

2. Design and development

VideoLab’s design followed recommendations acquired from the Multimedia Learning Theory (Mayer, 2003) and the Cognitive Load Theory (van Merriënboer & Ayres, 2005). The reduction of the complexity of the information presented on screen at any one time, as to reduce any extraneous cognitive load, was a key idea in VideoLab’s design. Realizing this ‘modality effect’ led to the implementation of a modal interface, in which each mode addressed a different set of technical concepts. VideoLab therefore includes four different simulation modes – a) Aspect Ratio, b) Interlacing, c) Luminance, Chrominance and Sampling, d) Bit Depth. Each of VideoLab’s modes also contains a help function which presents multiple slides with a textual explanation of their topic accompanied by diagrams and images, which in articulation with the simulation to follow leverages a ‘multimedia effect’ that positively affects learning (Mayer, 2003). This help function is automatically activated the first time a user loads a specific mode and can be re-invoked at any time. Overall instructions for VideoLab are also automatically presented upon loading the software. In no situation is all the information presented all at once, a progressive approach aligned with the implications of the Cognitive Load Theory.

As seen in Figure 1, the visual interface mimics the look of professional video hardware, under the presumption that the affordances thus provided are beneficial and improve the affective quality and perceived usability of the software (Hassenzahl & Tractinsky, 2006; Norman, 1988).

Figure 1. VideoLab’s user interface (Aspect Ratio mode).



Only the control buttons on the lower right area of the VideoLab application are changed according to the simulation mode, thus preserving an overall feeling of contiguity in the user interface (Figure 2).

Figure 2. VideoLab’s four simulations modes – Aspect Ratio (top left), Interlacing (top right), Luminance, Chrominance and Sampling (bottom left), Bit Depth (bottom right).



2.1. Software development

VideoLab was built iteratively starting from very simple routines implementing each simulation. Such development methodology leveraged Processing, a programming framework intended to ease the development of complex software by artists and designers (Reas & Fry, 2006). Having the added benefit of producing cross-platform executables, VideoLab was compiled for both Windows and Mac systems, allowing its installation in a larger number of workstations and greater student reach. The executables and the source code are available in an open repository at <https://github.com/edmorais/VideoLab>.

2.2. Exploration guide

Concerning how to best integrate the educational software with classroom practice, van Merriënboer and Ayres suggest “that a good instructional strategy for teaching problem solving starts with the presentation of worked examples and smoothly proceeds to independent problem solving if learners acquire more expertise” (van Merriënboer & Ayres, 2005). Exploration guides offer such an instructional strategy, providing “signposts that help guide students' learning, avoiding dead ends and dissipation” (Paiva & Costa, 2010). An exploration guide was thus written, describing the steps students should follow in interacting with each of VideoLab's modes, resorting to sample video files which were also included with the software. The end of the guide included a few multiple-choice or short open-ended questions about each mode's topic as to measure learning outcomes.

3. Method

This paper presents the aggregate results of two studies conducted in the academic years 2014 and 2015 with students enrolled in Editing, a first year unit of a Film Studies undergraduate programme. Permission for the study was granted by the institution's academic administration under condition it didn't exceed the duration of one single four-hour lecture with each class. It was also stipulated that the two classes in each year would have to be taught equally, ruling out the use of a control group that would enable assessment of VideoLab's instructional effectiveness. Given these constraints, these studies were thus primarily intended to assess VideoLab's instructional efficacy and, in addition, students' engagement with the software and their opinion about its design quality. The studies' design employed a mixture of qualitative and quantitative research instruments to such an end.

3.1. Participants

Forty students participated in the studies, divided in two homogenous classes of 20 participants. In aggregate, 22 participants were male and 18 were female. Participants were aged 18 to 27, with a median age of 19 and an average age of 20.2. Asked whether they were familiar of educational software, 22 participants reported little experience and 12 reported a higher level of experienced. In addition, when asked about their familiarity with the subjects covered by VideoLab, 8 claimed full knowledge, 25 reported a little familiarity, and only 7 claimed no prior knowledge.

3.2. Procedure and research instruments

At the start of the lecture on VideoLab's topics, the study procedure was described to the students and they were invited to participate. The software and the sample video files were made available and students were given the choice of running the application in either the classroom's or in their own laptop computers. Students were also provided with the exploration guide. Under their written consent, participants also allowed screen recording as to time their interactions with the software. After beginning, interactions with the software were under observation as participants followed the exploration guide and completed the included questions. Afterwards, participants were asked to complete a survey based on the LOES-S – Learning Object Evaluation Scale for Students (Kay & Knaack, 2008) – as to collect descriptive statistics about their assessment of the software's learning value (how the software's characteristics helps users learn), design quality (how well organized, helpful, and easy to use is the software), and engagement (how motivating and enjoyable are the software and its theme).

4. Findings

On average, students spent 45.4 minutes interacting with VideoLab. Their mean time spent on each mode was as follows: a) Aspect Ratio, 10.8'; b) Interlacing, 7.9'; c) Luminance, Chrominance and Sampling, 11.9'; d) Bit Depth, 6.7'. Participants also spent a mean 7.6 minutes reading modules' help. It was noticeable that participants grew impatient as they spent more time in the first mode (Aspect Ratio) than the last (Colour Depth), even though their contents and simulations may be considered of comparable complexity. A fifth of participants spent less than 5% of their time reading each mode explanations and help; a third of participants, on the contrary, spent more than 25% of their time reading rather than interacting with the simulations.

4.1. Exploration guide outcomes

On average, participants were able to answer correctly 61.1% of the questions presented at the end of the exploration guide. Mean correct answer percentages in each mode were as follows: a) Aspect Ratio, 67.5%; b) Interlacing, 86.3%; c) Luminance, Chrominance and Sampling, 45.0%; d) Bit Depth,

53.8%. Students experienced difficulties with the topic of Luminance, Chrominance and Sampling, while manifesting a good understanding of Interlacing, a topic which some of the students reported having had previous contact with during the group interviews.

Despite the reduced number of participants in the study, the data was tentatively subjected to bivariate analysis. Using the SPSS software, a compelling Spearman 2-tailed correlation ($\rho = .591$, $p < .001$) was detected between the time spent by participants reading each mode's help and exploration guide outcomes. A persuasive correlation was also found ($\rho = -.432$, $p = .005$) between worse outcomes and participants switching mode more often, suggestive of a departure from the exploration guide. Usage time, however, was found to have no correlation with participants' outcomes. It should also be noted that no significant correlations were found between participants' reported knowledge of VideoLab's content or prior experience with educational software and their exploration guide outcomes.

4.2. Student evaluation

As mentioned, participants filled out the LOES-S questionnaire (Kay & Knaack, 2008), reporting their agreement, through a five-point Likert scale, to twelve statements about VideoLab's learning value, design quality, and engagement. Testing confirmed each construct's adequate reliability (Cronbach's $\alpha > .7$), as defined by Nunnally (Nunnally, 1978), and factor analysis corroborated their internal consistency. On a scale from -2 to +2, participants reported a mean learning value of 1.05 ($\sigma = .40$), a mean design quality of 1.23 ($\sigma = .51$), and a mean engagement with VideoLab of 0.68 ($\sigma = .66$). Therefore, learning value and design quality were perceived as clearly positive, while perceptions of engagement, even though still positive, were much more ambiguous.

Tentative Spearman 2-tailed analysis also found clear correlations between participants' opinion of VideoLab's learning value and of its design quality ($\rho = .602$, $p < .001$), between their opinion of its learning value and its engagement ($\rho = .436$, $p = .006$), as well as between their opinion of VideoLab's design quality and its engagement ($\rho = .389$, $p = .014$). A conclusive correlation was also found between students' regard of VideoLab's design quality and their exploration guide outcomes ($\rho = .538$, $p < .001$). However, no correlations were found between students reporting a better regard of VideoLab's learning value or engagement and their outcomes in completing the exploration guide.

The questionnaire included two additional questions on what participants did and did not like about VideoLab. Overall, participants praised VideoLab's learning efficacy and ability to communicate visual concepts. Aware of what would be reflected on their outcomes, participants considered that the topics of each of the software's modes presented uneven learning challenges, highlighting that the topic of Luminance, Chrominance and Sampling was too challenging and hard to understand. Participants did, however, overestimate their understanding of the Colour Depth topic, while underestimating their comprehension of Interlacing. Participants also left contradicting comments on whether it would be better for the content of VideoLab to be discussed by the instructor before or after the use of the software. Participants also wrote and talked about a number of enhancements they would like to see, such as more detailed help on the topic of Luminance, Chrominance and Sampling, the ability to overlay multiple simulation effects, use of 'tooltips' in the user interface, a feature allowing them to save video clips. Some students also praised the visual interface of the software, while others criticized it.

5. Discussion and conclusion

We showed that a stricter adherence to the exploration guide's instructions (Paiva & Costa, 2010) had a positive effect on participants' outcomes in correctly answering questions about the topics covered by VideoLab, hinting that the software is incomplete as to its educational efficacy without the simultaneous application and adherence to the exploration guide. In addition, participants with better outcomes were more likely to express more positive opinions about VideoLab's design quality, which raises the questions of whether the exploration guide is a key contributor to such perception, while permitting speculation on whether improvements to VideoLab's ease of use could improve outcomes. Learning outcomes differed across topics, and the overall difficulties in answering questions about the topic of Luminance, Chrominance and Sampling, confirmed by the students in their comments, should make the improvement of that mode a priority for future iterations of VideoLab.

Still, as VideoLab's learning efficacy has been determined, we feel that it exemplifies how creative computing can enable the local development of digital educational resources and software, and empower educators to use computers as expressive media (Meeken, 2012) rather than as mere playback tools for presentations and non-interactive content. Despite being borne out of a specific assessment of needs, the software and the companion exploration guide can be used by students and educators in other Higher Education programs, as well as in professional and vocational studies.

There is much to be gained from further studies. Beyond determining instructional efficacy, our findings warrant further study with larger populations and controls as to determine the degree of effectiveness of VideoLab use in the classroom in comparison to other lecture formats. Technology acceptance research methodologies (cf. Venkatesh, Morris, Davis, & Davis, 2003) may also be relevant to assess students' perceptions of VideoLab use, as well as educators' attitudes toward educational software development using creative coding tools. Future research is also needed to address the gap in literature regarding how educational software interacts with the instructor, the curriculum, and other course materials (Escueta et al., 2017). Closer work with interested educators is thus highly desirable. As mentioned, VideoLab is open source and new contributors to the project may therefore play a role in the future developments described, as well as in the distribution, reuse, and further study of the use of VideoLab in the classroom.

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WHAT DO EDUCATIONAL PROFESSIONALS THINK ABOUT GIFTEDNESS? AN ANALYSIS OF ATTITUDES AND REPRESENTATIONS

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Abstract

In recent years, studies on teachers' attitudes towards giftedness have become increasingly numerous, though a strong heterogeneity both in the approaches and results. In this direction, focusing on the social dimension of knowledge and on the processes of interpretation and co-construction connected to it, the paper will describe the attitudes toward Giftedness of a sample of 130 Italian education professionals (educators, teachers, pedagogists, psychologists) from North, Centre and South Italy. A specific questionnaire was built to investigate the representations of giftedness. The contribution will explore the main categories of representations connected to Gifted students through an interpretive analysis of qualitative data. We want to verify also if the professional and social role could affect the interpretation of giftedness among the sample of study. Although a great variability is present in the attitudes of the subjects, main dimensions arise in the ideas and imagination of giftedness. The characteristics of the dimensions and how they influence the identification, intervention and education of gifted students is discussed. The contribute reflects on the social representations expressed by the people interviewed about the concept of giftedness and the mental image associated with it. The main differences refer to the meaning of creative thinking and IQ and the image of giftedness as a process of development, growth and plant germination.

Keywords: Giftedness, attitudes, teachers, inclusion, social representation.

1. Social representation of gifted children: the gaze of teachers and educational professionals

Teachers can contribute significantly to the education of gifted students, enhancing or preventing their potential development (Geake & Gross, 2008). Molapo and Salyers (2014) show how the success of Gifted education “depends on teachers’ attitudes” (p. 191). For this reason, according to Davis and Rimm (2004), the teachers, before taking part in a training or start an educational intervention related to giftedness, should ask themselves the following question: “What is our attitude toward gifted children? (p.55). In recent years, studies on teachers’ attitudes towards giftedness have become increasingly numerous, but they have a strong heterogeneity both in the approaches and in the results. In this sense, is important to underline that the attitudes towards an object of knowledge/evaluation, in this case the giftedness, are an individual variation of a collective belief (Salès-Wuillemin, 2006), they are the result of the representations that people create and share during social interaction (Ramel, 2014; Moscovici, 1961; 1984). Although with a very broad analysis object, the theory of social representations (Moscovici, 1961, 1984) offers a remarkable contribution to the study of perceptions on giftedness because it allows reflection on the social dimension of knowledge and on the processes of interpretation and social construction. The representations, in fact, serve to interpret, to “familiarize” (Moscovici, 1984) and socially shareable what we perceive as little known. Like any object of knowledge, even the giftedness can be represented through two processes: 1) anchorage, which allows us to understand what is not familiar, putting it in relation with the interpretative categories already possessed (mathematician, genius, artist, etc.); 2) objectification, which translates into concepts that are difficult to use. The complex and abstract ideas are then objectified through the personification, use of icon-people to represent an idea (Albert Einstein, Leonardo Da Vinci, etc.); figuration, use of concrete images (genius, exclusion, sociopathic) and ontologization, the use of physical or character properties to represent an abstract idea (unkempt hair, goggles, unkempt appearance, introverted character).

In relation to the mentioned processes, there is a international literature review on the representations of giftedness, that shows the most recurrent ideas of the teachers and educational professionals.

Unfortunately, the most recurring idea is that the gifted pupil can be identified with a very high IQ, in line with the formulation of psychometric models (Möttus et al., 2008; Heyder, Bergold & Steinmayr, 2018) or that giftedness is a gift, a predestination (Foley-Nicpon, 2015). Only a small part of the teachers think to giftedness as an opportunity, a possibility, a predisposition to achieve success. It is not a guarantee of success, but rather represents the way to go to "reach it". International literature offers different perspectives on the idea that teachers and educational professionals have giftedness at school: they think of the gifted student as a fragile autodidact (Baudson & Preckel, 2013), a helpless and immature student, a resource that serves the development of a country (Perković Krijan, Jurčec & Borić, 2015), a student with special educational needs and which requires specific but not elitist supports (Martin, Burns, & Schönlaue, 2010). In this perspective, the research that follows will try to bring out the representations in a group of Italian teachers and educational professionals.

2. Methods

The contribution will explore the main categories of representations connected to Gifted students through an interpretive analysis of qualitative data. The socio-demographic variables will be considered in order to understand if the professional role could affect the interpretation of giftedness among the sample of study.

2.1. Instrument and procedure

For the survey an ad hoc questionnaire was formulated. After a series of questions aimed at evaluating the demographic characteristics of the sample, two open questions sought to explore the idea of giftedness and the image associated with it:

- Q1. What idea do you have of intellectual giftedness? Try to describe it and motivate it.
- Q2. Thinking of intellectual giftedness, what image comes to mind?

2.2. Data analysis

On the quantitative data a descriptive analysis of the percentage frequencies was carried out, reported in the sample below, while a qualitative analysis was conducted. Through specific reading grids, the hermeneutic-qualitative analysis allowed us to examine and fathom in depth the representations, identifying the key topics. The logical-interpretative assumed plan allowed to analyze the empirical materials acquired according to a sequence of classification operations, initially simple and then composite, aimed at the construction of categories of meaning. The analysis developed on different categorical levels, according to an order of generality/specificity of information. The main objective of the analysis is thematic (Strauss and Corbin, 1998; Krippendorff, 2004), i.e. the identification of similar concepts, exploring the relationships of meaning. Two cultural repertoires emerged from the analyzed textual corpora, a cognitive and non-cognitive area. The presentation of the results will be developed following the analysis of the different narrative categories that emerged. To make the analysis even clearer, some of the most significant textual extracts are reported.

2.3. Sample

The sample taken into consideration in this research consists of 130 participants from different parts of Italy. Specifically, 112 people come from the University of Lecce, 6 from the University of Rome and finally 12 participants from the University of Bologna. The subjects involved are care professionals and possess skills in the psycho-educational and scholastic field. 71% are teachers, 20% are educators, 1% are school principals, 4% are psychologists, 1.6% are pedagogists and 4% are parents. The participants are 92% females and 8% males. 29% of the participants have an age between 20 and 40, 56,4% had an age between 41 and 60, and 3% of the participants were over 60 years old. Regarding the sample of teachers, about 37% teach in second level secondary school, 36% in primary, 25% in first grade secondary school and 1.1% in kindergarten. The majority of teachers (35%) teaches more than 19-20 years, 19% teaches from 16- 19 years, 17% work in the field from 11 to 15 years, 15% from 6 to 10 years, and finally the 14% are teachers from 0 to 5 years.

3. Results

The picture of education professionals' representations is heterogeneous. To the question "*What idea do you have of intellectual giftedness?*", according to some sample subjects, giftedness is the interaction of several dimensions that are expressed in different ways. It embodies creativity, motivation and exceptional abilities. A gifted person has intuition, problem-solving skills, empathy and divergent

thinking. In this case we are dealing with answers that explain the giftedness according to a perspective, which could be defined “not cognitive”.

Instead according to other subjects, the giftedness concerns above-average cognitive abilities. It also speaks of a high cognitive potential present in the child that manifests itself with a high score in Q.I. The idea of giftedness is that of students having an extra gear on a cognitive level or of subjects with a general skill level far above the average. These expressions are read from a perspective that could be called “cognitive”.

Specifically, 39 sample subjects answered according to the cognitive perspective while 54 according to the non-cognitive perspective. In order to more detailed analysis of the conceptions of the sample subjects, it was decided to divide the answers into two main areas:

- cognitive area: whose answers tend to concern the potential and functioning of the psychological abilities of gifted people.

“Students who have a higher gear on a cognitive level, subjects with a level of general ability far above the average, little geniuses”.

“Giftedness is the cognitive ability exceptionally superior to the norm that is manifested with a greater mastery of some abilities”.

“In my opinion, giftedness is proper to those boys that present a superior IQ due in part to the socio-cultural environment in which they live but above all and innate characteristics of the individual”.

- non-cognitive area: whose answers refer to creativity and socio-environmental and scholastic aspects.

“Gifted is one who has unique and rare qualities and characteristics that can be referred to various aspects of his way of being. Talent, in fact, can refer to a single field of action (theater, dance), but also to several fields of different types”.

“Giftedness is divergent thinking, ability to grasp links and relationships in an immediate way, elaboration of other strategies”.

“Students able to solve more complex problems than those offered to children of his age, very curious. They do not necessarily excel in all fields and are very creative. Their brain always runs: they invent questions, they make deductions...”.

Analyzing the answers of the single subgroups (pedagogists and teachers) this subdivision in the answers remains constant (educators’ responses related to cognitive area: (47%) and non-cognitive area (53%), teachers responses related to cognitive area (41%) and non-cognitive area (59%). Only in the subgroup of psychologist there is a more tendency toward not cognitive answers, however the limited number of psychologist in the sample cannot give the possibility to generalize this result.

In addition to the subdivision of the answers given by the teachers in the cognitive area and in the non-cognitive area, the teachers themselves were divided according to their specialization on the Special Education or in The Curricular area. In general, 39 teachers have the SEN specialization and 34 are curricular teachers. As regards teachers with SEN specialization 51% of the answers are related to the non-cognitive area, 49% to the cognitive area. On the other hand, 68% of curricular teachers without specialization in SEN responded according to a non-cognitive perspective, the remaining 32% according to a cognitive perspective.

Thinking to the image of giftedness (the second question of the survey), in general, for all the subjects of the sample, giftedness is imagined as a combination of skill and intelligence above average.

Starting with the subgroup of educators and educators, it focuses on the educational aspect and considers the social and scholastic context in promoting giftedness. Likewise, without the contribution of the environment, giftedness can turn into a failure for the person. Failed education and care

Some answers given by educators are reported below:

“The image I think of is that of the so-called “geniuses” who are so excellent, as they are sometimes hindered precisely because they do not know how to manage and make the most of their skills and abilities”.

“I imagine geniuses that have marked abilities above the average and present excellences in one or more areas. When they are identified, they should be encouraged and improved in their academic career”

“Thinking of the giftedness, I remember “Lisa Simpson”, a girl far ahead of her age forced to adapt to the “normality” of her class”.

The sub-group of teachers, like that of educators, attaches importance to school education, but at the same time considers giftedness as a “problem” to be addressed. The teachers report that they are unprepared to deal with this “particularity” but they would be in favor of further exploring the theme to identify the specific needs of gifted children. Below some of the answers of the teachers are reported:

Teacher A: “*Giftedness makes me think of something exciting but at the same time complex and challenging*”.

Teacher B: “*These gifted children are very often mistaken for behavioral disorders so that for them to a specialized plan and learning paths designed for them would be necessary*”.

Teacher C: “*Teachers must also be trained on giftedness: the inadequacy of teachers and educators comes to my mind*”.

Teacher D: “*A rough diamond that shines brightly and preciously.*”

Teacher E: “*A swollen river*”.

4. Conclusions

The study reveals a partial idea of the giftedness that is often divided between cognitive and non-cognitive aspects. Giftedness is instead a multidimensional concept, which embraces numerous characteristics such as creativity, intelligence, motivation, leadership (Renzulli, 1978) and which can relate to both aspects, often leading to situations of asynchronous development (Kreger Silverman, 1997).

In the description of the images the attention therefore shifts to the management of the problems created by the gifted pupil, seen as a flooding river, often mistaken for pupils with behavioral problems. It is interesting to note that the image of teachers is self-centered to their role and that consequently the gifted child or boy is seen as a problem that the school must face “so that a diamond can then become a jewel”. Hence the need for educational didactic tools for teachers, a school planning attentive to the peculiarities of these students (Renzulli, 1977, 2012), who find teachers who are not prepared to deal with these requests. The first step is to recognize who is a gifted student, starting from a deep knowledge of the phenomena and its characteristics in order to build the capacity of teachers to create meaningful opportunities for these children. This aspect must be translated into knowledge of giftedness and into operation towards giftedness, i.e. education professionals have the task of getting around and responding to educational needs even born from school excellence. The first step is certainly to recognize a talent, but beyond any possible label it is necessary to satisfy the educational needs of the gifted student who enters into relationship with his family, with his experiences and life contexts, avoiding any possible stigmatization or myth of his diversity. In this direction, the history of Italian scholastic integration is a teacher, it teaches everyone that the needs of a student, albeit a talented one, reflect those of a student's life, a life of dreams and fears, achievements and defeats, friendships and enmities, support and autonomy. The article, therefore, pushes us to reflect three emerging themes: creating a positive, constructive and supportive learning environment; offering a cognitively challenging curriculum; and engaging the learners in partnership to understand and manage their learning support.

Gifted students should have great importance and they should be given great attention in terms of social, emotional, cognitive adequateness, interests and abilities. For that reason, the education they took is one of the priorities for their developmental needs so as to provide them the opportunities they need in educational environments. Moreover, the education should be seen as a critical process consisting of identification, assessment, but above all in a competent and loving guidance.

How do educational professionals develop an instructional and education plan that will be challenging, enlightening, and intriguing to students of different abilities, and still maintain a sense of community within the classroom or social aggregate? This is the central question for educators as they begin to work in this educational field.

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TEACHING CLIL IN HIGH SCHOOL: A COMPARATIVE CASE STUDY IN TRENTO ALTO-ADIGE

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Abstract

The present paper represents the research design of an ongoing project conducted in two high schools in the Province of Trento, Italy, during the current school year, 2018/2019, that later on will become a PhD thesis. The aim of this research is to closely observe the implementation of a teaching method called content and language integrated learning (CLIL). The research is a qualitative one using a constructivist grounded theory (Charmaz, 2006) theoretical framework which means trying to establish an adequate theory starting from data. The interest of the project was spurred by the great results the students of the two high school have managed to achieve in such a short period of time since the Trentino Trilingue has been implemented, in November 2014.

The main research questions are: “What are the factors that influence teaching CLIL in high school? How do these factors intertwine and affect each other? What is the best combination of factors that ensure achieving the best results in teaching CLIL?”

In order to be able to answer these rather challenging research questions, data collection was initiated in October 2018 and will continue till the end of the current school year through observation, fieldnotes and interviews of the willing participants. Several CLIL modules of different subjects all taught in English, namely History, Web design, History of Art, Project Design, Geography and Science will be observed in two high schools in the Province of Trento. The lessons are being both observed and audio recorded, tasks and activities are being photographed, whenever possible, and the willing participants, i.e. the teachers and several students participating in the project, are being interviewed, on a voluntary basis. All these data obtained in the field, will be triangulated by adding the results of the tests the students normally take during a school year and the results of national tests that are compulsory in the fourth and fifth year in high school. Triangulating all these pieces of information will provide additional reliability to the findings. Further on, all collected data will be analyzed and compare using numeric and statistical methodologies and qualitative data analysis software packages.

Motto: “The more languages you speak the more human you are” (*Bulgarian proverb*).

Keywords: *CLIL, linguistic ethnography, English, constructivist grounded theory, high school.*

1. Preamble

“Any programme can be effective in promoting language learning. The key issues are how it has been made to work, and which factors and events have shaped success”. (Kiely in Coyle, Hood & Marsh, 2010, p. 135). There are several, successful language teaching methodologies out there, some ancient, such as the translation-memorization method, some newer, that have adjusted to the requirements of the new millennium and the globalization of our world like full immersion, bi- and multilingual teaching and content and language integrated learning (CLIL). The central aims of the present paper is the latter, that is the content and language integrated learning with a focus on the implementation of the CLIL philosophy in two high schools in Trentino, Italy.

2. Research design

2.1. Introduction and literature review

The project begins with a presentation of the topic followed by a review of the literature, followed by the theoretical framework of the paper and a definition of the concept of bilingualism using the Content and Language Integrated Learning (CLIL) term created in 1994 by David Marsh and Anne Maljers. The term CLIL is, in fact, used to define a teaching methodology that refers to teaching pupils and students

subjects such as Maths, Science, Art, PE, Cross Curricular, Biology, Geography, etc. through a foreign language (L2). However, it is more than a teaching method, it is a philosophy. Why a philosophy? Because it talks about how a language is learned, the mental processes involved in learning a foreign language, the fact that it is more than a method and it includes lifelong, positive changes in people's brains allowing them to learn better and faster (Diamond in Gallagher, 2013). CLIL is also often referred to as an umbrella term covering both learning a content topic through a foreign language and learning that language while studying content (Gallagher, 2013).

2.2. Content

The content part of the project contains the ethnographic data gathered in the field where the researcher will be observing lessons for the duration of entire school year, 2018-19. Collecting data for what it may seem like such a long period of time could be unclear, however, it is necessary because collecting relevant ethnographic information takes time and cannot be rushed (Campbell and Lassiter, 2015). The process has to be allowed to take its natural course in order for the thick ethnographic descriptions to be revealed (Geertz, 1973). In fact, experts in the field of ethnography state that PhD students who choose to do ethnography have to spend at least a year "in the field", that time leads "to depth", and that ethnographers need "an extended period of on-site time in order to produce their characteristically rich and thick cultural descriptions" (Campbell and Lassiter, 2015, p. 32). By rich and thick, Campbell and Lassiter mean the same thing that ethnographers Robert Emerson, Rachel Fretz, and Linda Shaw intend when they say that

"fieldnotes inscribe the sometimes inchoate understandings and insights the fieldworker acquires by intimately immersing herself [or himself] in another world [...] by directly running up against the contingencies and constraints of the everyday life of another people. Indeed, it is exactly this deep immersion [the] 'thick description'." (in Campbell and Lassiter, 2015, p. 66).

Interviews have to be transcribed as soon as possible after being recorded and so do the final draft of the fieldnotes, in order to avoid forgetting additional elements that a participant observer has still fresh in his or her memory but that fade over time (Campbell and Lassiter, 2015). Thus, this is what it will be done after every session of observations, interviews or conversations with the participants in the project. The pictures taken during lessons will be organized and dated thoroughly. The teachers, usually, provide materials for the next lesson and encourage the researcher to ask questions about them. They also welcome feedback either positive or negative.

Data will be gathered from seven CLIL modules observed in the already mentioned high schools in Trentino. The short modules observed are ten hour modules of Graphic design, Web design, and Science. The longer ones last for approximately thirty hours and they are two History of Art modules, one of Geography and one of History of Great Britain. One of the Art History modules finished kind of abruptly on the 15th of February when the English teacher withdrew her consent to participate in the project. However, she accepted to be interviewed and she extended an invitation to another CLIL module she is conducting with another class. When the ten hour modules have finished, all seven teachers that have taught it were interviewed together with twelve students from one class and eight from another one.

Given that the data collection is an ongoing process that will end at the end of the current school year, the analysis that can be done at this time is only a preliminary one. Every day new information is being gathered, more observations and fieldnotes are being written, more willing students are being interviewed. The students that are participating in the project are aged between 14 and 19 years, that is, from the first to the fifth class, so their opinions on the CLIL modules they have been attending vary considerably, which will be reflected in the analysis.

2.2.1. CLIL contexts. Based on the on the degree of exposure, we can say that the Italian model of CLIL encountered in these two institutions is monolingual, which mean that the students are in their home country learning a subject through CLIL. There are some students that are not non-native speakers of the Italian language, but who have an optimal command of the language and their number does not exceed 20% of the entire class (Glossary of terms and concepts used in TKT: CLIL, 2009).

2.2.2. Factors. The success of the implementation of the CLIL philosophy depends on several human and organizational factors. Among the most relevant human factors we can mention the students' starting level. According to the literature and the researcher's experience as a teacher of English, the higher the level the better. However, when teaching using CLIL, a lower English level is not an impediment as long as the materials are adjusted for that level and the topic is of interest to the students. Another factor is represented by different levels inside the same class. To tackle this potential impediment, CLIL favours group work and reciprocal help. Thus, when choosing group members, teachers normally put together one or two students

with a higher level of English and the rest with a lower level and encourage communication on the content that has been taught in English. This way, students help each other to acquire both the language and the content.

The interviews, however, have revealed a breach in this armour, because most of the students from the fifth class that were interviewed revealed that in groups the students tend to speak their mother tongue. This tendency was also noticed during class observations.

Due to the fact that the Provincial Council has implemented the Trentino trilingue law only in November 2014, some subject teachers do not have the necessary level of language required to teach in autonomy – i.e. a C1 level – so they are, in most cases, assisted and aided by a language teacher. From this factor derives the next ones which are related to their experience in teaching CLIL and to the balance of power between them (Blommaert, 2005).

As for the organizational factors, we can briefly mention non pedagogical and didactic factors such as the classrooms and all the other facilities that contribute to effective learning in the 21st century, and the schedule.

2.3. Data analysis

The third phase of the project is data analysis which includes sorting and coding the data and ultimately answering the research questions. There is no one way to code the information obtained in an interview or during observation sessions in the classroom, therefore, the researcher has to create his or her own categories that are relevant for the topic and adapt them while going through the material. Campbell and Lassiter (2015) state that, in fact, the more you reread your fieldnotes and your conversation transcripts, the deeper your understanding of the categories you need to create is. The transcriptions are done using software packages, wherever possible.

The trust of the participants is being gained by offering to help them with creating and/or translating CLIL materials, giving feedback on the materials they have already created, helping students and teachers whenever necessary. When the students address the researcher with “prof” and ask for help and advice or when the teachers tell the researcher that she is “ormai di casa”, the trust is gained. The teachers have started to open up to the researcher, confide in her, ask for her opinion at the end of each class and even trust her enough to share personal issues with her.

The context and the ambiance of the classrooms are being completed with impressions, feelings, opinions, detailed descriptions of the learning environment in both high school. Thus, the researcher can compare the two realities as accurately and as thoroughly as possible. Ethnographic work means just that, getting an “as rich a picture as possible of the environment in which the fieldwork was completed (Blommaert and Jie, 2010, p 63). As mentioned above, pictures of the students’ work, of the blackboards, books and all materials used, of the classrooms and corridors of the high schools are also taken by the researcher. All these elements will allow her “to make a careful reconstruction of the place, time and occasion on which” fieldnotes were written (idem).

2.3.1. The theoretical framework. The theory originates from Kathy Charmaz’s constructivist grounded theory which is a bottom up approach, i.e., starting from data a theory is being built (Charmaz, 2006). The base for her rather bold theory were Barney Glaser and Anselm Strauss theories, who, in the late 1960s, founded and developed a new methodological proposal called Grounded Theory. This theory aims at demonstrating that qualitative investigation procedures give results that are as significant as those obtained with quantitative research methods. Thus, the Grounded Theory can be defined as a “general method of comparative analysis (...) capable of generating a theory based on data” (Glaser & Strauss, 1967).

The methods of data collection in Grounded Theory are qualitative, such as in-depth interviews, focus groups, participant observation. However, the researcher has decided to take it to the next level by adopting a linguistic ethnography method. This way, the researcher gets to know the participants and they, in turn, learn to trust her. Thus, everybody benefits from the research. The answers to the interview questions are much honest and heartfelt and the researcher and the participants basically build a relationship from scratch that will, hopefully, go beyond the completion of the thesis. It is definitely more challenging and time consuming but a lot more rewarding.

The analysis of the data is carried out, as mentioned, together with the data collection, through three stages of coding that are becoming gradually more abstract. Through this process, data is conceptualized and categories of analysis of the phenomenon are being determined, specifically the so-called “core category” – or the main element – that allows deciphering the psycho-social process at the base of the phenomenon object of the research. Through Grounded Theory, therefore, it is possible to highlight the critical elements at the base of the investigated phenomenon, so that to obtain meaningful and useful data upon which the researcher can intervene and obtain a research-action perspective.

The constructivist theory, too, is relevant to the project, given that Charmaz (2006) combined the Grounded Theory with the constructivist one in order to create her unique approach, that is, the Constructivist Grounded Theory, a successful mixture of the two that is more appropriate for the nowadays teaching reality. Constructivism is a very broad conceptual framework in philosophy and science and its most well-known application is the theory of learning postulated by the Russian philosopher Lev Vygotsky in the 1930s and elaborated by the American psychologist Jerome Bruner and the Swiss philosopher Jean Piaget thirty years later. It basically means that learners construct new ideas or concepts based on their current or past knowledge.

When applied to research, this theory means that the researcher has data that he or she attempts to extract a theory from. Constructivism is a qualitative research theory and is somewhat similar to the Grounded Theory where the researcher examines the data and then tries to extract a theory. The difference is that when using the constructivist approach, the researcher brings to the table his or her knowledge and not just the data he or she has obtained from the research. What Kathy Charmaz basically does is she adds to Glaser and Strauss' Grounded Theory and Vygotsky's Constructivist Theory the position of the researcher in relation to the participant. The researcher makes the actors count, he/she gives them voice and renders their experience important and meaningful.

3. Conclusions

In sum, we can definitely affirm that there are no bulletproof language learning methods out there. No matter how elaborated and comprehensive a teaching method is, what makes it effective is the way school systems by its representatives, i.e., the teachers, put it into practice while taking into account the factors mentioned above. Although the relationship between these factors make the difference when it comes to its success, we can confidently affirm that the role of the educator is crucial.

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TEACHING SITUATED DESIGN METHODS: A CASE STUDY

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Abstract

Preparing students in higher vocational education for a career in the domain of design requires the transfer of a deep understanding of the design methods applied within that domain. Within design practices, however, a shift can be observed from methods based on sequences of planned steps towards the design of a certain object, to more situated design methods that favor progression on the basis of actions in the design context towards more open ended outcomes. Moreover, literature on situated design methods suggests that adopting such methods is to *perform situated actions* on the basis of previous experience, rather than to *execute preplanned steps* explained by educators. This poses a challenge to design educators, as students do typically not have much previous design experiences to rely on; they have yet to build up a reservoir of resources and know-how to be able to perform within a design context. To explore this apparent dilemma, we formulated the following research question: *How can education best facilitate situated actions in the design processes of students?* To gain insight into this question, a case study was conducted in which 25 students were observed and interviewed at various stages of their design processes in the context of a minor course on the design of mixed reality projects. Their processes were observed on the basis of natural observation, and data was recorded on the basis of written event sampling. At the end of each workshop, semi-structured interviews were conducted with participants about their design process. The case study revealed that (i) the discussion of story concepts in the classroom environment was dominant in the design actions taken by the students; (ii) planned and situated design actions generally alternated within their design processes; and (iii) limitations in time, facilities and pre-existing experience seemed important factors with respect to their choices in design actions. On the basis of these findings, we conclude that, design education should ultimately facilitate situated actions in the design processes of students by opening up the learning environment for situated learning experiences rather than merely use it for reflection on the outcomes of design steps. This conclusion raises fundamental questions about the organization of higher vocational education in design and calls for a better awareness of the relationship between situated design methods and the learning environments in which they are taught.

Keywords: *Design education, situated action, design methods.*

1. Introduction

Preparing students in higher vocational education for a career in the domain of design requires the transfer of a deep understanding of the practices within that domain (Cross, 2006; Goodman, Stolterman, & Wakkary, 2011; Van Dartel, 2016). In literature on design practices that is used in support of this transfer, design processes are generally described as sequences of planned steps towards creating a certain design object (Simonsen et al., 2014). In contrast, an approach to design referred to as situated design methods favors progression on the basis of ‘situated actions’ in the design context (Simonsen et al., 2014). The concept of situated design originated in the work of Lucy Suchman, who conducted research on human-computer interaction that led her to a distinction between ‘plans’, i.e. processes that are dependent on predefined actions, and those that are based on ‘situated actions’, i.e., that “depend in essential ways upon the action’s circumstances” (Suchman, 1987, p. 38). In contrast to planned steps, which are generally determined on the basis of preconceived ends, situated actions are informed by the specific circumstances of a design context (Simonsen et al., 2014). Consequently, in adopting situated design methods, designers generally rely on their experiences with particular material and social circumstances, rather than on explicit knowledge of design. Moreover, literature on situated design methods suggests that adopting such methods is to *perform situated actions* on the basis of previous experience, rather than to *execute preplanned steps* explained by educators (Simonsen et al., 2014). This poses a challenge to design educators, as students do typically not have much previous design experiences

to rely on; they have yet to build up a ‘grab bag of technical tricks’, as Rouse and Barba (2017) call it. To explore this apparent dilemma, we formulated the following research question: *How can education best facilitate situated actions in the design processes of students?*

Besides its practical relevance for educators that aim to prepare students for a career in design, addressing this research question may also shed new light on two more fundamental challenges in design education. Firstly, the challenge that the increase in attention for *practice-led* education causes the borders between practice, research and education to be more and more permeable (Dunin-Woyset & Nilsson, 2007). Secondly, a better understanding of how education should facilitate situated actions in the design processes of students may help to support educational institutions in resisting the push towards (over-)specifying the learning outcomes (Davies, 2012).

To address our research question, in the below, we introduce a case study in which we closely observe the design processes of students in higher vocational education and interview them about their design processes. Subsequently, we will discuss the results that our case study yielded and conclude on our research question.

2. Case study: Minor research in immersive storytelling

Recently, Rouse and Barba (2017), looked at processes in the design of mixed reality applications and concluded that agile approaches like prototyping seem to fall somewhere on a spectrum between opportunistic and deterministic. The design approaches on the opportunistic side of this spectrum typically leave room for serendipity and improvisation and are often taken by designers with an arts and humanities background. In line with what Suchman’s calls ‘situated action’, Rouse and Barba conclude that designers with such backgrounds are more “willing to adapt to emergent phenomena” (2017, p. 250). Former experiences provide them with a “grab bag of technical tricks” (*ibid.*). On the other end of the spectrum, deterministic approaches are those in which designers tend to plan ahead, or what Suchman calls ‘plans’. These approaches are significantly more often adopted by designers with interaction and media design backgrounds (Rouse & Barba, 2017).

Moreover, Rouse and Barba’s work on design approaches suggests that the domain of mixed reality is a fruitful domain for an exploration on how education can best facilitate situated actions in the design processes of students. Therefore, in our case study, students developed designs for mixed reality applications over the course of three workshops. These workshops were part of a minor program, titled *Research in Immersive Storytelling*, which taught students how to develop an immersive story and engage an audience in a story through some kind of mixed reality interaction. Each workshop ran for a period of two to three weeks and focused on a different theme: *Prototype It* (workshop 1) focused on the use of prototypes in interaction design; *Hoax Design* (workshop 2) focused on the design of transmedia projects; and *VR & Performativity* (workshop 3) focused on the design of Virtual Reality experiences. While students worked on individual projects in workshop 1, they collaborated on projects in groups of three or four students during workshops 2 and 3. Each workshop was set up according to the five stages of design thinking: (1) empathize, (2) define, (3) ideate, (4) prototype, and (5) test (Dam & Siang, 2018). For the purpose of our case study, we observed students throughout all five stages of their design processes and subsequently conducted interviews with them about their design processes.

2.1. Participants

The students that participated in the case study majored in a variety of domains related to design and immersive storytelling, such as photography/film (PHOFI, 1 student), illustration/animation (ILAN, 9 students), fine art (FA, 2 students) and multimedia design (MD, 10 students). All 25 students (participants) had recently entered their third year of a four-year Bachelor’s degree program of the Academy for Art and Design or of the Academy for Communication and User Experience of AVANS University of Applied Sciences (Breda, NL), with the exception of three participants that studied similar degree programs at Fontys Media Design (Tilburg, NL), Luca School of Arts (Brussels, BE) and Ljubljana Academy of Art & Design (Ljubljana, SLO). All 25 students participated in each of the three workshops of the minor program.

2.2. Observations and interview

During each workshop, participants worked in various classrooms that were designated to the minor program at predetermined hours, except for workshop 3, in which one classroom was dedicated to the workshop during school opening hours. During these hours, the design processes of participants were observed on the basis of natural observation. These observations were recorded on the basis of written event sampling; whenever design steps were evaluated amongst participants, e.g., when methodology was explicitly discussed or a certain type of planning took place, their discussions would be captured in writing (Lewis-Beck, Bryman, & Futing Liao, 2004).

At the end of each workshop, a sample of five participants were selected for semi-structured ten-minute interviews about their design processes. Participant samples always included participants from at least two different academies and included both male and female students. In each interview, participants were first asked to describe the steps they took in their design processes to achieve their results. Secondly, participants were invited to elaborate on their choices for these particular steps. Thirdly, interviewees were asked to explain their design approach and whether this approach was based on either pre-determined plans (i.e. deterministic approach) or situated actions (i.e. opportunistic approach). Students were introduced to these two design approaches during the introduction to the minor program, but were not explicitly asked to apply them within the workshops. Audio recordings of each interview were made, which were subsequently transcribed.

3. Results

Our case study yielded event samples related to each of the five stages of design thinking that the workshops were structured around, as well as fifteen interviews (five per workshop) that reflected on the design processes of participants.

3.1. Observations

The written event samples that our case study yielded show that, within the *empathize*, *define* and *ideate* phases of the design processes observed, design actions were dominated by brainstorming and discussions of story concepts: Participants typically gathered around tables to discuss a concept with their teacher(s) and other students that were present. In some occasions, sketches were used to illustrate the concept, but in the majority of observations the exchanges were purely verbal. The only exception to this occurred during workshop 3, which involved experimentation with a 360° camera in small groups outside of the classroom environment followed by the design of experiences using this technology within the classroom.

Each workshop ended with a presentation of outcomes, which were considered to embody the *testing phase* of design thinking, since these presentations were a way for students to test their concepts and reflect on them in the presence of teachers and fellow students. With the exception of workshop 3, the realization of prototypes, part of the *prototype phase*, did typically *not* take place within the classroom environment during workshop hours, but was considered homework and therefore typically conducted outside of it.

In the light of our research question, the seemingly most notable observation that our case study brought forward is that, design actions within the classroom environment seem to concentrate on brainstorming and discussing the story concept.

3.2. Interviews

Overall, the interviews conducted with participants that our case study yielded revealed that students are able to distinguish multiple steps in their design processes. Participants often diverge into the aims of their projects and explaining their concepts, but a small reminder would be enough to regain focus on the design steps taken, after which they would distinguish between steps such as brainstorming, visualizing, prototyping and testing.

In explaining why certain steps were taken in their design processes, students typically mentioned reasons that related to either time constraints or to limits imposed by the workshop facilities. Students for instance mentioned that “My initial idea was really big in my head, but because of time constraints I had to make it much smaller and concrete.” (workshop 1, Brussels); “It would probably have helped a lot if I had seen the space first and would have started working from there. That is just how I work, but this was not possible in this case.” (workshop 1, Ljubljana); “I had a hard time to not be able to explore as much as I wanted. This made me insecure about my decisions.” (workshop 2, FA); “Within a day we came up with our concept and we almost immediately started creating a space using materials that we could easily get our hands on.” (workshop 3, MD); and “Then I ran into what I usually run into: ‘*yeah nice plan, but I’ll never be able to realize it in the short time that is available*’.” (workshop 3, ILAN).

Asked to indicate whether their design steps were based on pre-determined plans (i.e. deterministic approach) or situated actions (i.e. opportunistic approach), participants would typically answer that their design approach were based on determinism *as well as* opportunism, and that they had been alternating between these approaches at different stages of their design processes. Participants would for instance respond with phrases such as: “I was a bit done with thinking about the concept, so I just starting making.” (workshop 1, FA); “I might have a plan, but that plan does not work out half of the time, which is when I turn to just responding on the fly to whatever happens while making. But before that, when I’m thinking about what kind of support I need from people, [...] I base my actions on plans.” (workshop 1, MD); “When I sit down to focus on my idea, it doesn’t work. I just have to continue with my life and then ideas start flowing automatically. When I am riding my bike for instance.” (workshop 1,

MD); and “In the beginning we had a plan, but then when we started to make we relied more on improvisation.” (workshop 3, MD). In some cases, participants also reflected on their reliance on pre-existing knowledge. They would for instance add comments like “I know what my technical limitations are, so I knew I could do this myself.” (workshop 1, MD); “We planned it all in detail beforehand, but only knew whether or not it was going to work when we executed it.” (workshop 2, ILAN); and “We were being modest in formulating initial ideas, because we thought they would otherwise be impossible to realize, but when we tried our ideas out using VR it was all much easier than we thought.” (workshop 3, MD).

In the light of our research question, the most notable insights that the interviews with students about their design processes provided us with were that students alternated planned and improvised actions within their design process and that time, facilities and previous experience (e.g., what participants assumed to be feasible) are important factors with respect to the choices that students make in their design processes.

4. Discussion

While the observations of the design processes of participants (3.1) gave rise to the noteworthy insight that (i) within the classroom environment, design actions seem to concentrate on brainstorming and discussing the story concept, from the interviews conducted with participants in the case study (3.2) it can be gathered that (ii) planned and improvised actions alternated within the design process, as well as that (iii) time, facilities and previous experience are important factors with respect to the choices that students make in their design processes. In the below, we will discuss these three findings in more depth.

4.1. The classroom environment

Our findings suggest that design methods based on plans dominate in the classroom environment. Although this could imply a causal relationship between the design actions conducted and the classroom environment, a mere practical explanation is also possible: During the first half of the minor program students met in different classrooms, while they were provided with a dedicated classroom to work in only during the second half of the minor. This may have had an influence on the nature of the actions undertaken in the classroom in the earlier stages of design, since initially classrooms were set up to meet and discuss, instead of for instance work on prototyping designs. In contrast, in the second half, during workshop 3 participants expressed that they had started making within the context of the school environment relatively soon after the initial brainstorm, since that was also part of an assignment. It seems that the classroom or school environment limited the possibilities for developing concepts by way of situated actions, in the case of workshop 1, or helped to facilitate it, in case of workshop 3, depending on how the class or school environment was used. In short, when the classroom environment did not provide the facilities required to perform design actions beyond the creation and discussion of plans, participants took such actions outside of this environment (see, e.g., the quote “I was a bit done with thinking about the concept, so I just starting making.” reported in Subsection 3.2). This finding simultaneously marks the limits of natural observation in the classroom environment as a means to analyze design processes: situated actions were typically conducted outside of the classroom. Most of these actions undertaken by participants in our case study therefore only became apparent in the interviews conducted.

4.2. Plans and situated actions

Our results suggest that, for most participants, the concept phase of a design process is characterized by a planned design approach. However, as one participant explained, such ideation often leads to follow up outside of classroom environment, which might be more improvisational in nature. This makes it difficult to strictly discern planning from improvising in the design process. If anything, our results suggest that design students moreover alternate between the two types of approaches. This finding seems to bring nuance to the argument brought forward by Rouse and Barba (2017) that designers can be positioned somewhere on the spectrum between opportunistic or deterministic. In line with Suchman (1987), our findings confirm that, at least for the participants in our case study, plans become a resource in situated design, rather than predetermining the course of action in any strong sense, as Simonsen et al. (2014) claim. Therefore, it is important to note that students alternate between these approaches, disregarding whether this alternation is for instance caused by the format of a workshop or the facilities available.

4.3. Issues of time, facilities and previous experience

Based on the insight that time, facilities and previous experience are important factors with respect to the choices that students make in their design processes, it could be argued that the context in which the design should function or be experienced is ultimately the best place to design it. The results

yielded during workshop 2 illustrate this, as participants reported that they could only find out whether or not their hoax-concepts would ‘work’ if they executed it. Clearly, in this case, the classroom environment provided limitations that the design context did not.

Finally, our findings also suggest that participants often relied on ways of working that they had previous experience with, as many quotes from the interviews start with phrases such as “I’m the type of designer that ...” or “I’m someone that ...”. Moreover, our findings reveal that when certain expertise was required to realize a concept but was lacking in a participant’s ‘grab bag of technical tricks’, students often resort to improvisation to work around this lack in experience. As reported above, one student for instance mentioned that “I might have a plan, but that plan does not work out half of the time, which is when I turn to just responding on the fly to whatever happens while making.” On the basis of such improvisation students may gain experiences that they add to their ‘grab bag of technical tricks’, instead of limiting themselves to what they already know.

5. Conclusions and future research

Our case study gave rise to three important insights in the light of our research question *How can education best facilitate situated actions in the design processes of students?* Firstly, design actions seem to revolve around brainstorming and discussing within the classroom environment. Secondly, planned and improvised actions alternated within the design processes of students. And thirdly, time, facilities and previous experience are important factors with respect to choices in the design actions taken by students.

On the basis of these insights, we conclude that design education should ultimately facilitate situated actions in the design processes of students by opening up the learning environment for situated learning experiences rather than merely use it for reflection on the outcomes of design steps. By doing so, educators can guide students in the improvisation required to gain experiences and expand their ‘grab bag of technical tricks’, which may be alternated with preplanned steps. Future research should look into how the education environment can best be opened up for situated learning experiences. As workshop 3 in our case study seemed to facilitate situated action best, it might particularly be worth looking in detail at lab-like environments for the facilitation of situated actions in the design processes of students.

Besides its practical relevance for educators that aim to prepare students for a career in design, our conclusion also sheds new light on two more fundamental challenges in design education: Firstly, better facilitation of situated action may be important in the move towards more *practice-led* education, which causes the borders between practice, research and education to be more and more permeable (Dunin-Woyset & Nilsson, 2007). Secondly, a better understanding of the role and relevance of situated actions in the design processes of students may help to resist the (over-)specifying of learning outcomes (Davies, 2012) by offering alternative ways of looking at the outcomes of design processes.

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COMBINING DIFFERENT SUBJECTS FROM AN INDUSTRIAL CHEMICAL ENGINEERING BACHELOR'S DEGREE FOR ADVANCED KNOWLEDGE ACQUISITION

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Abstract

This study intended to achieve advanced knowledge acquisition by creating effective linkages between specialised engineering subjects. Herein it is describing a pilot experience based on a problem-based methodology (PBM) involving third-year students taking the Industrial Chemical Engineering Bachelor's Degree at the Faculty of Engineering Vitoria-Gasteiz (University of the Basque Country (UPV/EHU)). In this case, students had to design lab reports regarding how to determine different target substances in real matrices, such as deodorant bottles, brass alloys or lab residues.

Despite the difficulties encountered by students as regards attaining the established objective (elaborate a lab script), the proposed activity was found to be an adequate tool for linking *Analytical Chemistry* and *Chemical Engineering Laboratory II* subjects, as well as an efficient method for internalizing theoretical knowledge. Performance of the activity was evaluated by means of a student survey and SWOT analysis. This experience could be transferred to other subjects related to Engineering or Applied Sciences.

Keywords: *Active learning pedagogy, chemical education, chemical engineering degree, laboratory experiments, problem-based learning.*

1. Introduction

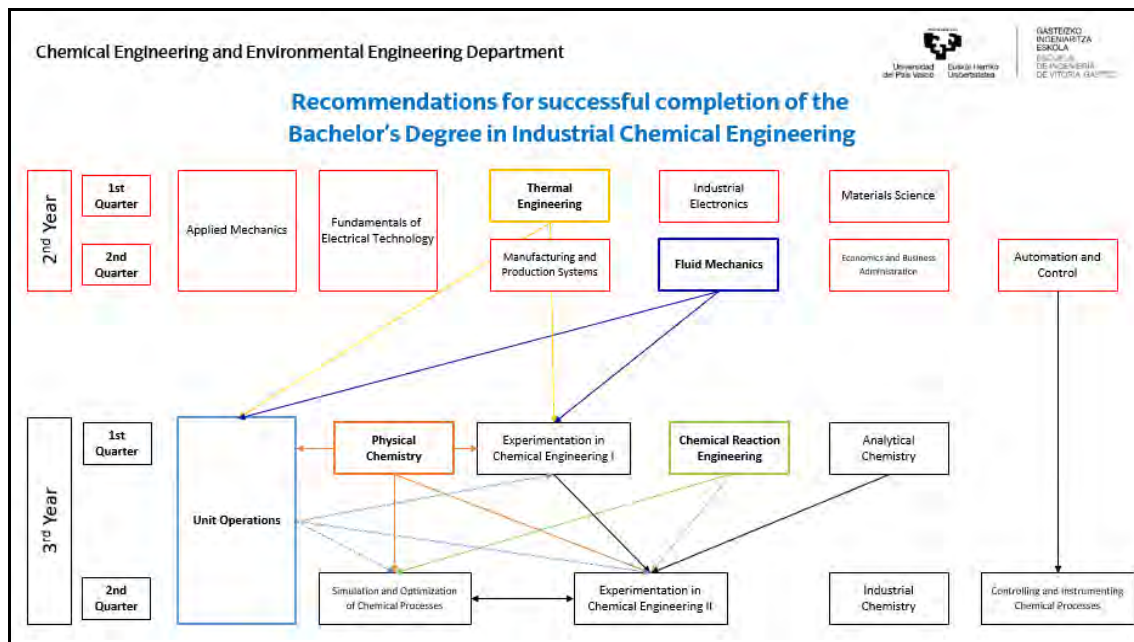
Implementation of the European Higher Education Area following the Bologna Declaration resulted in a transformation of Industrial Engineering studies in Spain. The teaching plan for Industrial Engineering specialties (240 ECTS) (e.g., Mechanical Engineering, Industrial Electronic Engineering, and Industrial Chemical Engineering) is currently designed to ensure that students take the same courses for the first two years, with more specialised subjects being introduced throughout the third academic year, thus reducing the specific workload to 60 ECTS (Feijoo et al., 2018). This all adds up to a vast amount of theoretical knowledge that must be acquired over a short space of time.

In the case of Industrial Chemical Engineering, a second problem resulting from the reorganization of Bachelor studies promoted by the Spanish Ministry of Science and Innovation includes a reduction in laboratory hours. Indeed, several subjects, such as *Analytical Chemistry*, *Physical Chemistry* or *Industrial Chemistry*, have not planned to dedicate any time to laboratory practicals. As such, laboratory and practical work related to chemical engineering is exclusively taught in two sequential subjects (*Experimentation in Chemical Engineering I* and *II*) worth 6 ECTS credits each. This leads to the paradox that students carry out practical work in chemical engineering laboratories without having the prior knowledge needed to understand the tasks at hand. This is primarily the case because students have not yet undertaken the theoretical subjects directly related to this specialization. Figure 1 shows the educational pathway diagram proposed by the Chemical Engineering and Environmental Engineering Department of the Faculty of Engineering Vitoria-Gasteiz for correct adherence to the academic program for the Bachelor's Degree in Industrial Chemical Engineering.

Despite having access to this information, experience has shown that very few students follow the directions given above, performing laboratory practicals without having consolidated the theoretical content taught in subjects such as *Unit Operations*, *Chemical Reaction Engineering* or *Analytical Chemistry*.

In any case, even those students who following the suggestions in this figure to the letter have trouble understanding the practicals carried out in chemical engineering laboratories due to the limited time available to assimilate content given that theoretical subjects and practicals overlap throughout the academic year.

Figure 1. Recommendations for correct adherence to the academic program.



With a view to solving the aforementioned problems, this work aimed to achieve greater knowledge acquisition by creating effective linkages between specialised subjects. To that end, a joint project between *Analytical Chemistry* and *Chemical Engineering Laboratory II* was proposed.

2. Framework

This research project was applied during the 2018-2019 academic year with students studying for the Industrial Chemical Engineering Bachelor's Degree at the Faculty of Engineering Vitoria-Gasteiz (University of the Basque Country (UPV/EHU)). The interdisciplinary theoretical-practical framework comprised of two specialised subjects taught during the third academic year: *Analytical Chemistry* (1st quarter) and *Experimentation in Chemical Engineering II* (2nd quarter).

Analytical Chemistry (6 ECTS) is devoted to providing an understanding of both quantitative chemical analysis and instrumental analysis, while *Experimentation in Chemical Engineering II* (6 ECTS) is considered a fundamental subject for acquiring the practical skills that graduates with a Bachelor's Degree in Industrial Chemical Engineering should demonstrate on a daily basis in their profession.

3. Objective

The aim of this approach was to improve the process by which students internalize theoretical knowledge that is subsequently applied in solving real problems, in other words implementation of a problem-based methodology (PBM) according to the following steps: create a team, analyse the problem, research, visualise all the possible solutions, debate, test and, finally, provide a solution.

4. Methodology and development

Thus, in the first subject, students were divided into groups of about 5 and asked to propose an experimental design by means of different experimental methods for real problems suggested by teaching staff (the first four tasks detailed in the previous section). In the practical session, during the course of the second subject, students completed the research following the self-designed lab-script and verified the feasibility of their proposal (the latter two activities).

The following real cases were proposed:

- **Case 1 – Quantitative determination of aluminium in deodorant brands:** the primary substances contained in deodorant bottles that help to keep the body dry (i.e., aluminium zirconium trichlorohydrate GLY24 or aluminium chlorohydrate) are aluminium-based (Sedwick, Leal, Turner, & Kanu, 2018), since this element is able to clog sweat ducts in the areas to which it is applied. However, this is not an element that resides naturally in the

human body and, therefore, analytical methods should be developed to determine its content in over-the-counter products, such as deodorants.

- **Case 2 – Determination of the chemical composition of a brass sample:** according to DIN 1718, brass includes all copper-zinc alloys with more than 50 % copper (wt %). Additionally, it can contain up to 4% lead (Cintas Metálicas S.A. [CIMSA], (n.d.)). Due to its bright yellow colour, brass strongly resembles gold, therefore it is widely used in costume jewellery and decorative elements (Coca Rebolledo & Rosique Jiménez, 2000). Depending on the amount of zinc in the alloy, other applications range from weaponry to boilermaking and welding. As such, analytical methods should be developed to determine the zinc content in brass alloys.

Going back to the problem previously posed in the introduction section (i.e., subject enrolment in the wrong order), a real-life case (**Case 3**) was designed for students undertaking *Experimentation in Chemical Engineering II* but not *Analytical Chemistry*. These students used a silver nitrate waste solution generated during laboratory practicals in *Chemical Principles of Engineering* (compulsory first-year subject) and were asked to plan and test a treatment to recycle this waste back into a new reagent, thereby reducing costs for the University and burdens on the environment.

The first two cases were presented at the beginning of the *Analytical Chemistry* course, and each student group was required to complete the following work assignments throughout the sessions:

1. **Analyse the problem:** a comprehensive understanding of the properties of the product and its applications should be achieved, including the theoretical amount of the target compound that is usually found within the matrix, as well as the influence of the latter.
2. **Research:** collect all the possible quantitative analysis techniques for determination of the target substances.
3. **Visualise all the possible solutions:** it should be kept in mind that proposed solutions have to comply with current legislation, taking into account the maximum permitted concentrations for these substances, etc.
4. **Debate amongst themselves and with the supervisor:** the best proposal should also take into consideration a number of factors, such as material resources, budget for the purchase of chemical reagents and time available, etc. Thus, the best available technique for practical implementation of the analysis and determination of the test sample will be selected from all the project proposals submitted.

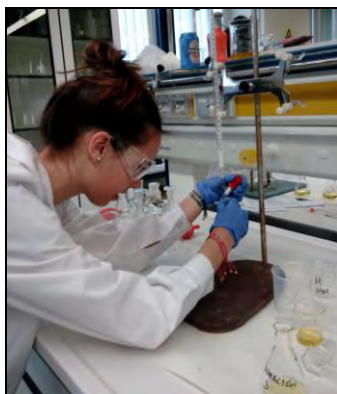
Each of these issues led to a technical report that students presented in order to assess their work. This document had to include a laboratory manual comprising the following sections:

- Background and context
- Objective
- Theoretical foundation
- Experimental procedure (Materials and methods)
- Expected results
- References

For the second project phase (*practical sessions*), participants were required to:

5. **Test and Confirm:** the protocol proposed in the technical report was carried out in the chemical engineering laboratory (Figure 2).
6. **Provide a solution:** the necessary modifications were implemented, taking into account the results obtained in the previous section, to provide a satisfactory answer to the problem.

Figure 2. Example of student working on their self-designed lab-script and verifying the feasibility of their proposal.



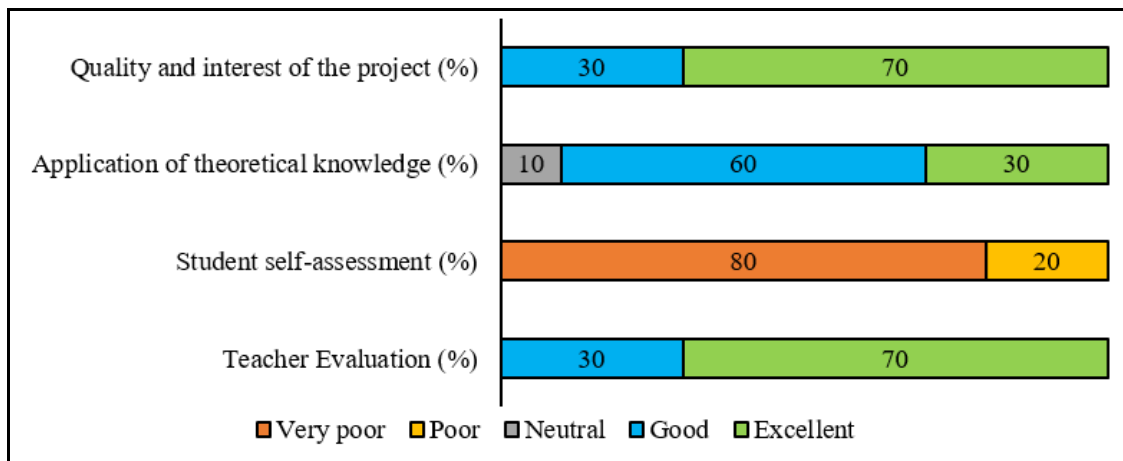
5. Evaluation and informal feedback

Project evaluation in terms of effective resolution of the three challenges posed was unsatisfactory given that students were unable to propose realistic experimental solutions to these problems or to draw up a draft protocol similar to an international standard. In our case, the origin of this

problem is probably mostly related to the fact that our students had no previous experience with this kind of methodologies that enhance their social skills.

As students' survey results illustrated (Figure 3), this does not, however, mean that the pilot experience had not been very helpful: students were able to maintain a theoretical discussion of the possible experimental solutions, contrasting their own wrong approaches with the valid alternatives proposed by teaching staff. Indeed, it became obvious at the end of the study that students acquired a significant amount of basic theoretical knowledge related to analytical chemistry.

Figure 3. Comparison of survey results concerning quality and interest of the project, application of theoretical knowledge, student self-assessment and teacher evaluation.



In addition, the survey showed that 70 % of students considered this kind of activity to be an attractive way of learning. Given the value added to the learning program, they believed that similar projects should be carried out by establishing additional linkages between specialised subjects such as *Chemical Reaction Engineering* or *Experimentation in Chemical Engineering II* and *Simulation and Optimization of Chemical Processes*.

As regards student self-assessment, 80 % of participants acknowledged a very poor misallocation of time, which finally resulted in poor-quality work at the end of the theoretical sessions. As far as teacher evaluation was concerned, 100 % of participants considered that the approach adopted for the project, its monitoring, as well as coordination by teaching staff, was good or excellent.

5.1. SWOT analysis

After initial implementation of the PBM interdisciplinary study during the 2018-2019 academic year, both students and teachers carried out a careful reflection with a view to identifying areas of improvement. Table 1 shows a two-by-two grid that organizes the top strengths, weaknesses, opportunities, and threats by means of the SWOT analysis tool.

Table 1. SWOT analysis of the PBM example linking specialised subjects in the Industrial Chemical Engineering Bachelor's Degree.

STRENGTHS	WEAKNESSES
Students realize the applicability of theoretical knowledge in real cases	<i>Experimentation in Chemical Engineering II</i> and <i>Analytical Chemistry</i> students are not the same
Close monitoring of learning achievements: teachers receive detailed feedback regarding the theoretical concepts understood by students	Non-compliance with the timescales
Enhancement of critical analysis	Lack of coordination within the group, which results in inequitable distributions of the workload
Encourages communication ability and acquisition of debating skills within the group and with supervisors	Weak self-demanding attitude
OPPORTUNITIES	THREATS
Possibility of extending the experience to other subjects	Lack of time to complete the work if similar projects are simultaneously developed
Ascertainment that engineering challenges have many solutions	The requirement to expose new challenges every academic course to avoid any plagiarism

6. Further improvements

Based on this evidence, a series of improvement actions were proposed to minimize the weaknesses detected previously:

- The performance of assigned tasks in theoretical sessions should be followed-up in a more personalized, closer and speedier way in order to avoid leaving the toughest issues to the end.
- The role of group-coordinator should be established during the team-creation step, and periodic meetings should be held with this person in order to ensure the involvement of all group members in the project.
- The performance of the project in a staggered manner should be guaranteed by coordination with teaching staff and the setting of common rules.

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E-ENGINEERING: TEACHING ELECTRICAL ENGINEERING AT DISTANCE

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Abstract

The e-learning concept was born in the 19th century when the development of the mail services in England enabled the delivering of correspondence courses by mail. Initially restricted to printed material, the content was enriched with audio and video records in the third quarter of the 20th century. Still, it was the development of the Internet that revolutionized e-learning in the dawn of the 21st century. Apart from facilitating the delivery of a broad set of different materials, the Internet enables a degree of interaction between students and instructor and among students never achieved before, considerably improving the learning process. It also enables the development of remote laboratories, sets of equipment that may be manipulated remotely in real-time to perform experimental work. Initially restricted to the implementation of small experiments, the development of virtual instrumentation enabled the accomplishment of increasingly complex tasks.

In engineering disciplines, laboratory work is widely recognized as essential for students to acquire the required skills. The concept of e-Engineering results from the concatenation of those two previous ideas - e-learning and remote laboratories.

Compared with traditional face-to-face courses, e-Engineering courses require a distinct pedagogical and organizational framework. The experience won with an e-Engineering course developed under a first European project resulted in a new European project currently underway whose aim is to document a set of good practices in e-Engineering. By documenting our experience, our aim is to help other universities to develop and manage their own sustainable e-Engineering courses.

Keywords: *E-engineering, e-learning, remote laboratories.*

1. Introduction

The concept of distance learning education emerged in the XIX century when the development of the mail services in England gave to Sir Isaac Pitman, the English inventor of shorthand, the idea of delivering correspondence courses by mail (Matthews, 1999).

The first distance learning undergraduate courses in the world were offered by the University of London through its External System established in 1858 (UoL, 2019). However, the number of courses on offer was very restricted, mainly due to the low degree of interactivity between instructor and student limited to write paper material exchanged via the slow post services. Only a century later, in the third quarter of the 20th century, things started to change with course materials being enriched with audio and video records when the development of the technology enabled students to have access to affordable audio and video players. The United Kingdom's Open University (OU), established in 1969, despite mainly keeping the same way to communicate with students, offered much more diversified materials, ranging from texts and photo materials and audio and video records, to conventional broadcast radio and television programs, complemented by live individual or group sessions over the phone.

However, the major breakthrough was the introduction of the concept of e-learning during the 90s of the XX century, supported by two of the greatest advances in the telecommunications area: the Internet network, and the World Wide Web. The Internet provides a fast, reliable and interactive channel of communication, enabling a degree of interaction comparable to face-to-face classes. The World Wide Web with its hypertext links, enable the delivery of much more diversified and engaging multimedia

materials, readily available and highly interactive. This revolution was accompanied by the massification of personal computers, which made them affordable and accessible.

Despite all these advances, the undergraduate courses on offer were nevertheless mainly restricted to non-technical areas. The main reason is that engineering courses require students to perform experimental work, be it in chemistry, physics, mechanics, electrical machines, electronics or optics, which entail the access to specific labs and the interaction with equipment and instrumentation.

Until recently the only solution envisaged enabling students in technical areas to perform hands-on lab work has been the use of blended learning solutions, with the entire program conducted online, except for lab classes, which required students to travel to the University campus to perform the indispensable lab work (Zhu, 2010).

With the help of technology, this reality has been changing. Not only virtual tutors will enable speech interaction anytime and with a level of realism close to human interaction (Pells, 2019), but also technical areas are benefiting from the proliferation of remotely accessible laboratories that enable students to perform hands-on lab work remotely, with a level of interactivity and realism never achieved before.

2. The EOLES course

Since the beginning of the XXI century that a lot of work has been done in the area of remote laboratories. In the specialized literature there are many examples of different laboratories for different areas of physics and electrical engineering (Albu et al., 2004) (Cardoso & Gil, 2013) (Garcia-Zubia et al., 2010) (Hercog et al., 2007) (Priem et al., 2011) (Restivo et al., 2009) (Said et al., 2012) (Sousa et al., 2010), each one allowing different degrees of freedom in the configuration of the experiment by the remote user. However, their use has been restricted, operating separately and usually as a complement of on-campus lab classes. Never these labs appeared integrated as part of a fully online undergraduate program in engineering, despite the proven effectiveness of the use of virtual and remote laboratories in the development of essential engineer students' skills, as demonstrated by an extensive study published by Brinson (2015).

The EOLES (Electronics and Optics e-Learning for Embedded Systems) project was a three-year TEMPUS project, financed by the European Commission (EOLES, 2016), whose goal was to bring together all this knowledge with the objective of creating a fully online undergraduate program on Electrical and Computer Engineering. In this first step, only the 3rd year of a Bachelor program was developed, but in the long term, the goal is to remotely offer the complete Bachelor program. The EOLES project comprised 15 Institutions, four European ones from France, Portugal, Belgium and Romania, and 11 from three Maghreb countries, Algeria, Morocco and Tunisia, part of them with previous experience on the delivering of e-learning courses and/or the development of remote laboratories. The educational goal was the development of higher education in cutting-edge engineering subjects, a national priority defined by the governments of the Maghreb countries participating in the project struggling with a lack of professionals in this fundamental area for its economic development.

The L3-EOLES (Electronics and Optics e-Learning for Embedded Systems) (L3-EOLES, 2019) was designed as a specialization 3rd-year of a Bachelor's degree and oriented towards a vital telecommunications field, that of the electronics and optics for embedded systems, essential to support the high-speed data transfers required by modern telecommunications networks.

Apart from the theoretical knowledge students must get, they also need to perform experimental lab work, to acquire essential technical experimental skills, whose mastering is indispensable for their future professional success. The execution of laboratory assignments over the Internet required the development of remotely accessible experimental laboratories enabling students to interact in real-time with real experimental setups. Some of the EOLES project partners had extensive experience in the development of remote laboratories used to implement various types of experiments on diverse technological fields, including optics, electronics, and embedded systems (Priem et al., 2011) (Said et al., 2012) (Sousa et al., 2010).

The target population of the course is students already holding 120 European Credit Transfer Units (ECTU) obtained in areas like Physics, Electrical, Electronics, Automation, Optics, Telecommunications, or similar and willing to pursue a career in the specific field of electronics and optics for embedded systems.

The program is divided into fifteen technical units (TUs) that cover a broad list of topics, plus three optional units. These optional units are preparatory TUs provided at the beginning of the 1st semester to level students' knowledge in critical topics for the course – electronics and optics, since students from diverse knowledge backgrounds may apply to be enrolled in this program.

The course runs for 31 weeks, plus 4 weeks reserved for examinations that take place at each one of semester's end, plus two for make-up exams by year's end.

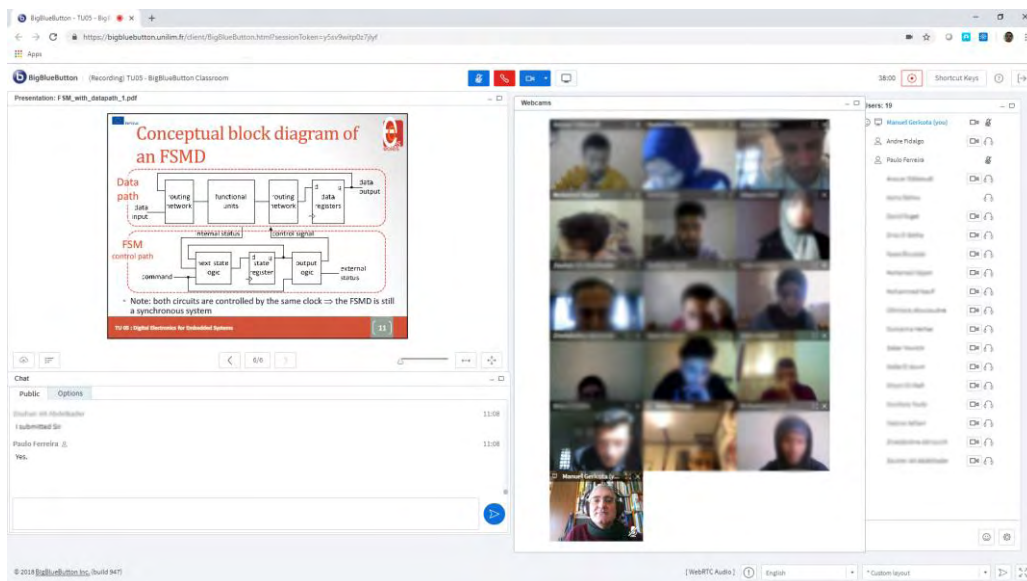
The aim of the first mandatory TU - Virtual Learning Environment – is to introduce the student to the learning platform and to the interactive tools that support the course dynamics. The remaining 14 TUs are divided into three groups: fundamental sciences – including mathematics and physics; applied sciences – digital and analog electronics, electromagnetic waves, digital signal processing, instrumentation, and optics; and complementary soft skill units, like communication techniques in English and business management, or alternatively, an enterprise internship.

Each TU is organized on a weekly basis and may take three to six weeks. New study materials are released every Mondays. Pre-recorded asynchronous lectures, where a tutor explains the theoretical basis of a given subject, are supported by different types of written and visual resources interspersed with self-evaluation questions – multiple-choice, fill-in-the-blanks, matching exercises –, whose aim is to keep students' interest and attention, breaking long expositive videos. Apart from it, these self-evaluation questions also provide immediate feedback about the students' degree of understanding of the subjects being taught. Students may progress at their own pace, reviewing the material anytime, any number of times, without restrictions. Nevertheless, the student may only continue to the next lecture after the successful completion of the self-evaluation questions associated with the previous one. A range of other materials, including free companion books, web links to other sites containing specialized information and other complementary data, is available to support students' study.

To force students to respect the course schedule compulsory assignments must be delivered each week. These assignments, composed by sets of problems comprising individual or group assessment works, must be uploaded into the platform by the week's end.

Each week, students have the possibility of attending synchronous classes run by the TU tutor where they may clarify any doubts and ask questions related to the content of the TU (figure 1). These classes are based on BigBlueButton, an open source web conferencing tool for online learning (BigBlueButton, 2019). Sessions are recorded and made available to students.

Figure 1. Example of a BigBlueButton -based synchronous online session.



Forums and live chat resources are also available, plus an always open, freely accessible BigBlueButton classroom, a virtual cafe where students may meet anytime they want.

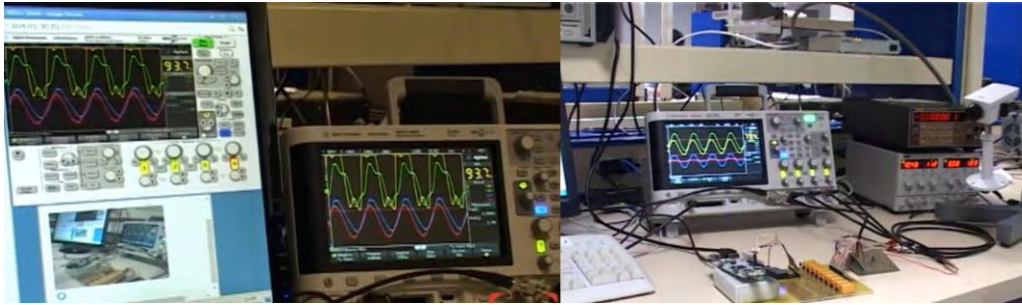
But the main originality of the L3-EOLES course is the remote laboratory used by students to perform online the practical works. Two kinds of laboratory works are included in the remote laboratory:

- Virtual experimentation using professional software running in an application server or open-access software available from different companies and universities;
- Real remote laboratory experiments intended for students to perform real-time monitoring and control of instrumentation and equipment at distance.

The latter is the most innovative part of the remote laboratory. Each hardware instrument (function generator or oscilloscope, for instance) is connected to the Internet and may be monitored and controlled remotely from the students' own computers.

For each TU a set of laboratory works is prepared by the tutor. Students may access the lab through a dedicated page right from inside TU's page. Through the virtual instrument interfaces that are deployed remotely, which mimic the real instrument's panel available interface, students can change the hardware configuration in real-time. Immediate feedback of their actions is provided through the same or another interface and/or by a high-definition camera, depending on the instrument and nature of the experimental work (figure 2). The camera enables students to see what is happening in the real laboratory and how the real instruments react to their remote commands. This feedback is important for students to be sure the interface they see in their own computers it is not the visible face of a virtual world, but the virtual interface of a real instrument.

Figure 2. Example of an oscilloscope interface deployed remotely and of a laboratory set up with a high-definition camera.



The course accreditation was, from the beginning, one of the main objectives of the project, because only its official recognition would ensure its financial sustainability after the end of the project. The course is currently accredited by the educational authorities of France, Morocco, and Tunisia, which means that all students who successfully complete the course receive not only a Diploma that is recognized inside the European Higher Education Area, but also, in the case of students from Morocco and Tunisia, a diploma issued by one of the accredited universities of their home countries.

The course is also now being offered as a lifelong learning course by some of the EOLES partners' institutions, further ensuring its long-term sustainability.

As far as authors know, the L3-EOLES course is the first where a remote laboratory is used as part of a fully online accredited degree in these areas of engineering to enable students to perform all the required practical work. From the association between e-learning and remote laboratories emerged the concept of e-Engineering.

3. The e-LIVES project

The EOLES project ended at the beginning of 2016, but the L3-EOLES course created during the project continues with its 5th edition underway.

However, despite its success, the adoption of the e-Engineering concept and therefore the development and offer of e-Engineering courses in different engineering fields by higher education institutions is far from happening. Many different aspects related to the development and management of an e-Engineering course need to be addressed by the institutions, aspects that involve a series of other essential elements not strictly related with its pedagogical part, namely: the set up of the necessary infrastructure to support course delivery; the choice of the Learning Management System (LMS) platform; the building of a curriculum; the definition of the learning modules content and schedule; the attainment of the course national accreditation; the training of teachers and technicians; the creation of the contents; the quality assessment; the management of the course; the development of the virtual and remote laboratories.

The aim of the new e LIVES – e-Learning InnoVative Engineering Solutions project (E-LIVES, 2019), a three-year ERASMUS+ European project that started on October 2017, is to create a detailed description of the different parts necessary to set up and run a successful e-Engineering course supported on the consortium partners own successful experience. The documentation produced by the consortium and freely downloadable from the project's website will list and detail each one of the steps necessary to design and develop an e-Engineering course. A first e-Engineering Best Practices Guide, which condenses the partners' research and experience on the creation and delivery of e-Learning and e-Engineering courses, is already available. Other guides covering the different aspects involving the design and development of e-Engineering courses will follow, empowering other institutions to build their own innovative e-Engineering courses in a sustainable way.

4. Conclusions

After the success of the L3-EOLES course, several other institutions showed interest in the results achieved, namely the effective response e-Engineering courses may provide in the formation of a fast-growing number of engineering students. The aim of the new e-LIVES project is to systematize the acquired knowledge, engaging more institutions on the design and development of e-Engineering courses, showing their advantages and benefits to the advancement of higher education on developing countries, as well as the opportunity they represent to create lifelong learning courses able to engage a different public willing to refresh or update their know-how in innovative engineering fields.

The goal of the e-LIVES consortium is to achieve wide dissemination of the Best Practices Guides so institutions may gain enough insights on the advantages e-Engineering courses may bring to them, namely as a viable alternative to crowded classes and as a way to diversify their courses and reach different publics.

Acknowledgments

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THREATS AND OPPORTUNITIES ON THE CURRENT CZECH MARKET WITH UNIVERSITY EDUCATION

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Abstract

Purpose and background: The political and economic changes that took place in the Czechoslovak Republic after the Velvet Revolution and in the Czech Republic founded in 1993, have fundamentally influenced the education market. The market has expanded considerably on the tertiary level of education. Private universities and new faculties and study programs at existing universities were established. A new educational structure has been introduced: a bachelor, magister and doctoral program. These changes bring new opportunities for students, but they also endanger the education market. Many fields of study produce a small number of graduates, which causes some faculties to become at risk of existence. Other study programs produce a large number of graduates who have little chance of applying in their field of study. The aim of the paper is to answer the question: What opportunities and threats characterize the current Czech market with university education?

Key points: The Czech education market is opening up to the international market. Czech students start studying at foreign universities and foreign students at Czech universities. There are new opportunities for cooperation, but also new problems that have not yet been explored. The reflection of the Czech education market can be inspiring for both universities and for experts coordinating international education program.

Methodology: Demographic data and documents of the state administration, especially ministries, are research objects. SWOT analysis and thematic analysis will be used. The findings will be confronted with empirical researches that dealt with the Czech education market.

Keywords: *University, education, Czech education market.*

1. Introduction

The aim of the paper is to answer the question: What opportunities and threats characterize the current Czech market with university education? Analyses of data concerning Czech universities were based on publicly available data, mainly from the annual reports of individual universities, as well as from surveys from the Czech Statistical Office (CSO, <https://www.czso.cz/csu/czso/home>) and the Ministry of Education, Youth and Sports (MSMT, <http://www.msmt.cz>). For international comparison, I used database of the Organization for Economic Co-operation and Development (OECD, <https://data.oecd.org/education.htm>) and the European Statistical Office (Eurostat, <https://ec.europa.eu/eurostat>).

According *SWOT analysis*, categories “opportunities” and “threats” are external factors in relation to universities as social and business organizations entering university education market. Two other basic SWOT categories, “strengths” and “weaknesses”, are internal factors in relation to universities (Hill, & Westbrook, 1997). The study seeks to identify these four categories (or “themes”), which represent trends in the Czech university education market between 1990 and 2018, using thematic (content) analysis in documents or sets of data (Guest, 2012). There are new opportunities, but also new threads that have not yet been explored. The analysis of the external and internal environment makes it possible to uncover perspectives and problems of the current university education system.

2. Changes in the Czech lands after the Velvet Revolution in 1989

The peaceful course of the Velvet Revolution taking place between 17th November and 29th December 1989 in the Czechoslovak Socialist Republic was given by the fact that the Czech politics was no longer governed by the Union of Soviet Socialist Republics and by its Communist Party. The evidence for this is the fact that the Soviet military contingent that remained in Czechoslovakia after its occupation by the armies of the Warsaw Pact on 21st August 1968 left the Czechoslovak territory in 1991. In June 1990 political movement Civic Forum won the democratic parliamentary elections in Bohemia and Moravia and

a corresponding political movement called Public against Violence in Slovakia. “Thus the conditions for change to the Constitution and legislation building a parliamentary and multiple-party democratic rule of law, as well as the background for the transformation of the governed socialist economics into liberal, democratic capitalism economics had been set.” (Pavelka, 2014: 87.)

The political system based on the Marxist-Leninist ideology and commanded by the Communist Party of Czechoslovakia collapsed and the newly developing and established political parties become its players. The main agent of the political, economic and social changes was the Civic Democratic Party. Meanwhile, the Czechoslovak Socialist Republic has ceased to exist and the new succession of the Czech and Slovak Federal Republics has been established (on 28th March 1990). Also, the Czech and Slovak Federal Republic ceased to exist and was divided into two new state entities: the Czech Republic and the Slovak Republic (established on 1st January 1993).

3. Opportunities and strengths on the Czech education market after the Velvet Revolution

The current Czech education market has been significantly influenced by these dramatic political and legislative changes that occurred after the Velvet Revolution. The private entrepreneurship, opening borders and travelling freely abroad, the entry of financial capital from western countries to the Czech Republic and the integration of the Czech Republic into the EU in 2004 became further bearers of these changes. The important initiating factors were also the technology-based innovation in the production, distribution and marketing practices of the various sectors of communication.

There are positive external factors, **opportunities** (O), on the Czech education market after the Velvet Revolution in 1989. New legislative changes have allowed the establishment of private schools (O-1). Innovation was mostly based on American education system. According to the Ministry of Education, Youth and Sports (<http://www.msmt.cz>), there were 18 public universities and two state universities (police and military) in the Czech Socialist Republic before 1999. First 4 new public universities have been established in 1991, 1 university in 1992 and 1 in 2001. First 2 private universities or higher education institutions have been established in 1998 and 4 in 1999. Other 34 private universities or higher education institutions were established between 2000 and 2005, since 2006 other 13 universities. According to the Ministry of Education, Youth and Sports, The Czech Republic has 26 public and 37 private universities and 149 faculties in 2017.

University education system is beginning to be open to all students, regardless of their parents' political affiliation (O-2). The prerequisite for admission to higher education is the knowledge and skills of those interested in studying. The Czech education market is opening up to the international education market (O-3). Czech students can study at foreign universities and foreign students at Czech universities. Possibilities for cooperation with foreign universities are gradually opening up.

The structure of the Czech higher educational system has been changed. The three-level educational structure has been introduced (O-4). Two-level educational programme, five-year basic and three-year doctoral, has been transformed into three-year bachelor's, two-year master's and three or four year doctoral. This system is more responsive both to the demands of secondary school graduates and labour markets. Changes in the economic status of universities have caused a major transformation of the education system. They have brought negative and positive consequences (factors). The higher education institutions were authorized to act as independent economic entities (O-5). This also began to be applied to public universities, as their costs were no longer fully covered by the state budget. The possibility and necessity to obtain new financial resources from grants and scientific research to cover the costs of higher education institutions. In this context, the demands were emerging for changing the profiles of the graduates (O-6) and for new higher education professions (O-7) from the private and public sectors.

Since the early 1990s, new digital technologies, systems, channels, and networks have begun to be used on Czech campuses. These technologies enabled the emergence of university information systems, the development of educational activities and the expansion of new forms of communication between universities and the public (O-8). Finally, there is (O-9) great interest of secondary school graduates in attractive study fields.

There are positive internal factors, **strengths** (S) of universities, after the Velvet Revolution. Not only new public and private universities are established, but also within the existing universities, new faculties and, in particular, new study fields and programme are accredited and implemented (S-1). The number of university graduates has increased dramatically (S-2). According to the Czech Statistical Office, there were 647 500 inhabitants who received university education in 1993, 954 600 in 2006 and 1,708 200 in 2017. However, the population of the Czech Republic remains unchanged. In 1993 the Czech Republic has 10 334 000 inhabitants and in 2018 10 649 800 inhabitants. Relatively low study costs (cost advantage) (S-3) as well as the location in the centre of Europe (S-4) appear to be strengths of Czech universities. This is beneficial mainly for students from Eastern Europe and Asia who are interested in studying abroad (Study in Europe quick facts, 2017).

4. Threats and weaknesses on the Czech education market after the Velvet Revolution

There are many negative external factors, **threats** (T) of Czech education market, after the Velvet Revolution. The expansion of higher education has not been supported by the demographic development of the Czech population. The population size in the Czech Republic remains unchanged but there is a long-term decline in the number of newly-born children, which resulted in a decrease in the number of secondary school graduates and thus also in the total number of adolescent students enrolling at universities. Lowest total fertility rate 1,16 was in 2000 (Rabušic, 2001). The drop in applicants for study at Czech universities (T-1) threatens the existence of some schools and the quality of their teaching (Centre for World University Rankings, 2019).

There is (T-2) lack of students in the education market. The drop in applicants for study at Czech universities is further reduced by the gradually increasing number of graduates, especially from prestigious secondary school graduates, who have decided to study at universities abroad. On the other hand, branches of foreign higher education institutions offering English language education have begun to operate in Czech Republic and reduce the number of students who could study at Czech universities. The extreme increase in the number of universities and unfavourable demographic development in the Czech Republic create a strong competitive environment for universities (T-3). Not only for new educational institutions it is difficult to obtain high-quality teachers and students and to establish themselves in science and research. These are areas that bring funding to universities. It is also very difficult to obtain funding for research activities (Růžicka, & Majer, 2019).

Due to a lack of students and therefore a lack of funding for school operations, the existence of some study programme, faculties and universities is at risk (T-4). In the situation, the lack of students and the strong competitive environment cause universities decrease study requirements and recruit students who are not eligible for a university degree. As a result, the quality of university education (T-5) and applicants for university study, university students and graduates is falling (T-6). Important and legitimate tools for struggling students and of university recruitment management are public communication (PR) and targeted building of the university brand. However, universities have insufficient experiences with those activities (T-7) Kocourek et al., 2016; Pavelka, 2018).

There is a strong disproportion between supply of university graduates focused on individual professions and the demand for these professions on the labour market, i.e. between the small/high amount of university graduates in individual study programme and the high/low demand for them by the labour market (T-8). Among other things, this is due to little/high interest of secondary school graduates in individual study fields. This situation causes graduates from some study programme have little chance to find jobs in their study fields and on the contrary graduates from another study programme are missing on the labour market. The lack of university graduates in some fields even threatens the functioning of some important social sectors (Key Indicators of the Labour Market, 2016).

There are negative internal factors, **weaknesses** (W) of universities, after the Velvet Revolution. The fundamental problem in the processes of building new universities, faculties and study programme in the course of the 1990s was the lack of highly qualified university teachers and lecturers (W-1). Only a small number of the teachers disposed of long-term experience from universities abroad and especially from Western ones. Also their practical language skills were often not at a high level. These development factors had an impact on the quality of the university education and on the applicability of the university graduates in practice. Due to very low salaries, experienced teachers from abroad were not available to the Czech universities.

Universities are not sufficiently spatially, technically and administratively equipped in the 1990s (W-2). There is a lack of classrooms, teaching technology and the facilities are outdated and the administrative background is insufficient. Universities are not ready for the surge in students in the 1990s. The costs of higher education institutions, including public universities, are no longer fully covered by the state budget. Universities do not have sufficient sources of funding (W-3). The students still remain the main source of university funding.

Some new accredited and implemented study programme have no support in the domestic academic tradition or their tradition was disrupted for a long time after 1948 (W-4) (Registr vysokých škol a uskutečňovaných studijních programů, 2018). Another negative internal factor is the declining reputation of public and private universities. This is due to the affairs of some universities (W-5). Through the media, the public is informed, among other things, of the low educational requirements placed on students and the violation of law in the awarding of university degrees (Kauzy plzeňských práv, 2019).

5. Conclusion

The Czech education market in 1989-2018 was influenced by a number of positive and negative factors, both from the external and internal social and societal environment of universities as major market players. Those factors as trends and tendencies entered the education market over a period of time, but they also changed in appearance, strengthened or weakened, and also ceased to operate in the market at some time.

The aim of the article was not to evaluate the development of the Czech education system after 1989. This article also cannot evaluate the reform of the Czech higher education, which has been a publicly discussed issue since 2007 and was approved in 2016 (Act No. 137/2016 Coll.). To achieve this, more research and text space would be needed. Much more unpretentious aim of the article was to identify the main development trends and tendencies emerging within the higher-education system and to reveal some relationships between trends, as well as the implications and impact on changes of the education system.

Thematic analysis of university and state institution documents and SWOT analysis based on researches of education and labour market have identified positive and negative internal factors and positive and negative external factors on the current Czech market with university education. The SWOT analysis of Czech market with university education (see Tab. 1) shows there are opportunities (9 types) and threats (8 types) on the Czech education market and strengths (4 types) and weaknesses (5 types) of universities.

Table 1. The SWOT analysis of Czech market with university education

	Positive Factors	Negative Factors
Internal Factors	Strengths (1) New faculties and new study fields and programs were accredited and implemented. (2) The number of university students and graduates has increased. (3) Low study costs (cost advantage) in the Czech universities. (4) The location of Czech universities in the central Europe.	Weaknesses (1) Lack of highly qualified domestic university teachers and lecturers. (2) Insufficient spatial, technical and administrative facilities of universities. (3) Universities do not have sufficient sources of funding. (4) Some new study fields and programme are not supported by Czech academic traditions. (5) Declining reputation of public and private universities.
External Factors	Opportunities (1) Possibility to establish private schools. (2) University education system is beginning to be open to all students. (3) The Czech education market is opening up to the international market. (4) The structure of higher education system has been transformed into three-level educational programme. (5) The higher education institutions were authorized to act as economic entities. (6) Demands for changing the profiles of the graduates from the private and public sectors. (7) Demands for new higher education professions from the private and public sectors. (8) Possibility to use new digital information technologies, systems, channels and networks. (9) The great interest of secondary school graduates in attractive study fields.	Threats (1) The drop in applicants for study at Czech universities. (2) Lack of students in the education market. (3) A strong competitive environment for universities. (4) The existence of some study programme, faculties and universities is at risk. (5) The quality of university education is falling. (6) The quality of applicants for university study and university students and graduates is falling. (7) Universities have insufficient experiences with PR and targeted building of the university brand names. (8) A strong disproportion between supply of university study programme focused on individual professions and the demand for these professions on the labour market.

After the demise of the communist regime, the education market has substantially expanded (S-1, S-2, O-1, O-2, O-3) and changed (O-4, O-5, O-6, O-7, O-8) at all levels. Even adolescents applying for universities are changing their value orientation as evidenced by their choice of fields of study (O-9) (Holland, 1997; Blustein, & Ellis, 2000; Sramová, & Pavelka, 2017, 2019). Among the fundamental trends affecting the Czech education system belongs establishing of new private schools (O-1) and expanding the offer of study fields and programs (S-1). Opening university education system to all students (O-2) and increasing the number of university students and graduates (S-2) represent other fundamental trends characterizing the development of the Czech higher-education system.

The biggest threats to the education market are the drop in applicants for study at Czech universities (T-1) and lack of students in the education market (T-2). Lack of domestic university teachers and lecturers with long-term experience from Western universities (W-1) is the strongest weakness of Czech universities (Mazouch, & Fischer, 2011). There are other threats on the education market. Universities have insufficient experiences with PR and targeted building of the university brand names (T-7). There is a strong disproportion between supply of university study programme focused on individual professions and the demand for these professions on the labour market (T-8).

Building-up universities as economic institutions (O-5) is a trend that has both positive and negative consequences on the education system. Economization can lead to strengthening autonomy of universities and to a higher degree of university independence from the state and the Ministry of Education if universities can obtain private and foreign financial resources. On the other side, economization can create a strong competitive environment (T3) that may even threaten existence of some study programme, faculties and universities (T-4). If universities do not have sufficient sources of funding, it can lead to a reduction in the quality of teaching, students and graduates (T-5, T-6), to the lack of spatial, technical and administrative facilities (W-2).

Not all opportunities were implemented and not all threats were eliminated by individual universities and not all strengths have been maintained and not all weaknesses were suppressed and

overcome by individual universities during the 1990s, when the foundations of a new Czech university market were considered. The Czech system of university education has been catching up the pace with the Western education (Prudký, Pabian, & Šima, 2010). If we stem from the theory of M. Trow (Trow, 1974), the situation in the Czech Republic can be described as a transition from the mass to the universal education system. Annual reports and evaluations of the Czech universities prove that the quality of the Czech education system has been increasing. However, the question is whether the trends advancing on the Czech and Western markets with education will lead to a higher level of education, or whether they – as K. Liessmann predicts – will lead to the emergence of a society of miseducation (Liessman, 2006).

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SCHOOL PROBLEMS AND TEACHERS' COLLABORATION: BEFORE A COLLABORATIVE PROBLEM SOLVING PROGRAM

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Abstract

This study precedes a collaborative problem solving intervention program with teachers (teachers, educators and school direction board) to tackle together real and complex problems at school and to promote professional development. Therefore, the main objective is to acknowledge teachers' problems, needs and collaborative context at school. In the present study we sought to identify teachers' problems and needs and the main factors associated with the development of teachers' collaborative work. Specifically, we intent to understand which dimensions act as constraints to the development of collaborative work. Ultimately, we intend to contribute with scientific evidence in this field to allow the development of an effective teachers' collaborative problem solving program at schools. Therefore, an empirical study was carried out involving 153 teachers, working in preschool, elementary, middle and secondary schools in a city of Aveiro's region, in Portugal. To this assessment, the following instrument was used: a questionnaire developed by researchers aimed to collect information about teacher's collaborative practices, problems and needs. Our study points out to four main findings: i) the main problems at school identified by teachers are teachers' work overload, physical and/or mental exhaustion, the high number of students per class, teachers' lack of motivation, students' lack of motivation and violence among students; ii) teachers' main needs are the reduction of the number of students per class, well-being and social intercourse activities, and peer support; iii) the efficacy of school direction board and teachers on school problem solving has positive significant correlation with teacher collaborative work; iv) the cumulative total of school problems identified by teachers has significant negative correlations with teachers' participation on collaborative work. The present study responds to the research gap in the analysis of the relation between school context problems identified by teachers and collaboration practices. Before beginning a collaborative problem solving program is essential that the researchers acknowledge teachers context and start with scientific data in order to set the best conditions to an efficient intervention.

Keywords: *School problems, teacher collaboration, collaborative problem solving, teacher professional development, well-being in teaching.*

1. Introduction

Work overload, bureaucracy, unstable working conditions, lack of recognition, lack of motivation and burnout are some of the main problems most teachers face nowadays in Portugal. Scientific studies reveal very demanding contexts in schools and underline them as priority and urgent challenges to tackle in education. According to the first survey in Portugal to more than 15,000 teachers, 75% have emotional exhaustion. In fact the preliminary report of this study reveals that 27.3% of teachers interviewed refer critical or extreme signs of emotional exhaustion. This survey reveals also that 84% of teachers in service wish to retire (Azevedo, Veiga, & Ribeiro, 2016; Patrão, Rita, & Maroco, 2012; Varela et al., 2018; Veiga, 2013).

Teachers' workplace dissatisfaction and burnout are intrinsically related with teachers' absenteeism, low work investment, and ineffectiveness in supporting students' learning and development. Actually, inside and outside the classroom effects arise from teachers' lack of motivation, stress and emotional exhaustion. Nevertheless, when teachers believe in their personal and collective effectiveness to motivate and promote learning, they influence positively learning environments and the level of student progress. Therefore, educators need high levels of well-being, self-efficacy, and confidence. To develop answers to these problems is a top priority in schools and a political and public duty. Policymakers and schools are challenged to promote teachers' wellbeing, value recognition and feedback systems, which are linked to improved teaching practices (Bandura, 1993; Patrão, Pinto, & Santos-Rita, 2012; Pereira, 2013; Schleicher, 2018; UNESCO, 2017).

When schools have collaborative power among groups, the development of talent increases. Collaborative cultures create a sense of responsibility and proactivity. They are transformative and crucial for schools' agents to problem solving. Teachers who engage in collaborative activities apply more innovative pedagogies, reveal greater professional satisfaction and self-efficacy (Andy Hargreaves & Fullan, 1998, 2012; OECD, 2014; Schleicher, 2018). One of the biggest challenges nowadays is to find out ways to teachers to build a common ground, set together challenges to tackle and collaborate more deeply to achieve greater impact. In turn, teachers train students more effectively in developing collaboration, and other skills, when they practice what they preach (Coke, 2005; Andrew Hargreaves & Fullan, 2013). Thereby, more opportunities should be created for teachers to collaborate and to solve real and complex problems together. A human-centered, structured and collaborative problem solving (CPS) approach promotes innovative and effective responses to current educational challenges. It is a priority to train teachers in CPS and empower these educational leaders and changemakers (Fullan & Hargreaves, 1991; Graesser et al., 2018; IDEO & Riverdale Country School, 2012; Jardim & Pereira, 2016).

2. Objectives

Our purpose in this article is to identify teachers' problems and needs at school and the main factors associated with the development of teachers' collaborative work. Specifically, we intent to understand which dimensions, problems and needs that cross teachers' work are constraints to the development of collaborative work. Ultimately, we intend to provide scientific evidence in this field and to allow the development of an effective teachers' collaborative problem solving program at schools.

3. Method

An empirical study was carried out involving 153 teachers, working in preschool, elementary, middle and secondary schools in a city of Aveiro's region. To this assessment, the following instrument was used: a questionnaire developed by researchers aimed to collect information about teacher's collaborative practices, problems and needs (Coutinho, 2014).

3.1. Participants

An empirical study was carried out involving 153 teachers. The sample comprise 26 males and 122 females (5 respondents didn't state gender), aged 38 to 63 years old ($M=49,99$; $SD=11,012$). Teachers worked at an Aveiro group of schools in various levels of education, namely at nursery school/preschool ($n=19$), elementary school/primary schools ($n=40$) and middle and secondary school ($n=69$). The sample also comprises participants that work in other functions as special education/psychology ($n=12$), and 13 participants gave no information about the level of education taught. All the sample work characteristics can be seen in Table 01.

Table 1. Work characteristics of participants.

Items		Female (N=122)		Male (N=26)	
		N	%	N	%
Function	No information	4	2,6	26	17,3
	Preschool Educator	12	7,8	-	-
	Full professor	104	68,0	20	13,3
	Management / Direction / Other Positions	2	1,3	4	2,7
Levels of education taught	No information	-	-	-	-
	Nursery school / Preschool	18	11,8	1	0,7
	Elementary school / Primary schools	31	20,3	8	5,3
	Specific subjects of middle and secondary school	53	34,6	15	10,0
	Other (Special education / Psychology / etc.)	11	7,2	1	0,7
Type of Contract	No information	-	-	-	-
	Hired (temporary)	13	8,5	6	4,0
	Full professor (permanent)	106	69,2	20	13,4
Work years	No information	-	-	-	-
	0 to 10	1	0,7	2	1,3
	11 to 20	14	9,2	7	4,7
	21 to 30	63	41,2	9	6,0
	31 to 40	38	24,8	7	4,7
	41 to 50	1	0,7	1	0,7

3.2. Instruments

A teachers needs' assessment questionnaire developed by researchers was applied and aimed to collect information about: 1) Problems at the school context (excessive number of classes, lack of motivation, overload, absenteeism, poor interpersonal relations, reduced sharing, conflict, ineffective communication with parents, violence among students, stress and malaise environment, exhaustion, or others); 2) Needs (reduction of class numbers, co-worker support, vocational training, reduction in the number of students per class, welfare and coexistence activities); 3) Frequency and type of peer-to-peer collaborative work development (joint lessons, joint work involvement with different classes, collaborative professional learning, preparation of tests or activities); 4) Participation in collaborative work (to solve school problems); 5) Training of students to collaborative problem solving at school.

A teachers' sociodemographic questionnaire was applied aimed to collect Demographic characteristics (age, gender), as well informational issues and specificities of the work (function, level of education taught, work years, type of contract).

3.3. Procedures

Data collection in 2019 January, after obtaining the authorization from the school board. The distribution of the research protocol questionnaires was made on paper after holding project presentation sessions (three in total). At the same time, the demographic questionnaire was applied. All participants were informed of the objectives and voluntary nature of participation, as well as subsequent use of the data collected through informed consent, respecting the ethical and deontological principles inherent in the development of an investigation.

3.4. Data analysis

All analyses were done using IBM SPSS Statistics® (version 25). Descriptive statistics were assessed, as well as Several Pearson's correlate analyses were conducted to assess the relation between total school context problems and identified needs relationship with collaborative work development and participation.

4. Results

Concerning the total number of problems identified in the school context, results show that most of total respondents identified an average of 5 problems ($M = 5.31$, $SD = 3.52$). Teachers' overload is pointed out as the main problem in the school context with 78,4% of the responder's votes (Table 2). When teachers were asked about other problems in school (besides the options), the high bureaucracy and administrative work was pointed out. In relation to the total number of work-related needs, results show that most of total respondents identify between 0 to 5 ($M=1.71$; $SD= 1.069$). Students per class reduction is pointed out as the main need with 52,3% of the votes (Table 2). When asked about other needs (besides the options), the reduction of bureaucracy and administrative work was reported. Regarding the results of collaborative work, 91.5% of professors affirms to participation in collaborative work, being pointed out that this is mostly provided through preparation of exams (62,1%), and activities evolvment (60,1%; Table 2). It has been reported that collaborative work is provided mostly weekly, in all modalities. Interdisciplinary activities are pointed as other forms of participation in collaborative work.

Table 2. Work characteristics of participants.

Items		N	%
Problems identified in the school context	Teachers' Overload	120	78,4
	Exhaustion of teachers	94	61,4
	Teachers' Lack of Motivation	84	54,9
	Excessive number of students	79	51,6
	Students' Lack of Motivation	57	37,3
	Violence between students	53	34,6
	Ineffective communication with parents	36	23,5
	Low peer collaboration ^a	34	22,2
	Superficial interpersonal relationships	31	20,3
	Stress and malaise environment	29	19
Needs identified in the school context	Students per class reduction	80	52,3
	Reduction in Classes	56	36,6
	Wellness and social activities	44	28,8
	Work colleague support	33	21,6
	Support needs (other)	30	19,6
	Professional qualification	15	9,8
Collaborative work participation	Preparation of exams	95	62,1
	Activities involvement	92	60,1
	Joint classes	35	22,9
	Professional Learning	35	22,9
	Others	25	16,3
	Observation and feedback	14	9,2

a. Reduced collaboration between teachers (as a big team)

Large percentage of participants claim to participate in collaborative activities so that together they can solve school problems (n=109; 71.2%), mostly through teachers' assembly (n=24, 15.7), teachers' informal meetings (n=21, 13,7%) and specific conflict resolution (n=17, 11.1%). Also, large percentage of participants refer to empowering students to solve problems at school (n=117, 76,5%). In the analysis of total school context problems and identified needs relationship with collaborative work development and participation, many positive and negative correlations were found (Table 3). Total school context problems is the domain with most significant negative correlations presented, and reduced collaboration between teachers (as a big team) as the most positive significant correlations (Table 3).

Table 3. Relations between of total school context problems and identified needs with collaborative work development and participation.

		Total school context problems	Low peer collaboration ^a	Total identified need
Collaborative work development	Total	-,256**	-0,078	-0,105
	Preparation of exams	0,108	,768**	,204*
	Activities involvement	0,067	,737**	0,07
	Joint classes	-0,019	,954**	-0,063
	Professional Learning	0	b.	0,196
	Others	-0,071	b.	-0,029
	Observation and feedback	-0,163	b.	0,179
	Collaborative work participation	-,179*	-0,111	-,189*
Empowering students to solve problems at school	-0,07	-0,038	0,003	

a. Reduced collaboration between teachers (as a big team)

b. It is not possible to calculate why at least one of the variables is constant

* $\rho < 0.05$ ** $\rho < 0.01$

5. Conclusion

Nowadays teachers, students, parents and other educational agents face a demanding educational context in a time of constant change, global sustainability challenges and of technology advancing at an exponential rate and changing how we work and live. Problems are part of each educational community can be seen as challenges and as opportunities towards human-centered and collaborative problem solving approaches. Teachers as educational leaders need effective support to tackle exigent complex problems as work overload, burnout, high bureaucracy and administrative work, the high number of students per class, teachers' lack of motivation, students' lack of motivation and violence among students.

In this study there are evidences that teachers who identify more problems in school, participate less in collaborative activities and respondents who identify less problems report higher participation in collaborative work. Research studies reveal collaborative activities have positive influence in problem solving, well-being and job satisfaction. Nevertheless, the collaborative activities in which teachers participate are focused on routine tasks and work, such as preparation of tests or activities, joint lessons, joint work involvement with different classes, collaborative professional learning. Regarding to participation in collaborative activities to solve school problems, teachers mostly do it through teachers' assembly, informal meetings and specific conflict resolution. Most of them refer to empower students to solve problems at school. However this study evidences that teachers don't experience CPS approach, nor among teachers nor with students or other school agents (Graesser et al., 2018; Hattie, 2015; OECD, 2014, 2016; Schleicher, 2018). Our purpose in this study is to contribute to a CPS intervention program with teachers and to start sparking educational innovation. Finally we also intend to underline the importance of research and action to promote teachers' well-being, significant relationships in community and recognition as educational leaders.

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RETHINKING LEARNING IN THE LIGHT OF DIGITAL TRANSFORMATION AT THE AUSTRIAN SECONDARY COLLEGES FOR AGRICULTURE AND FORESTRY – WHY AND HOW?

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Abstract

The concept of digital transformation has been setting the pace for a while now. It represents one of the most central meta-trends and takes education to a whole new level. Inexorably, the learning environment is becoming increasingly virtual – e.g. Computer Based Training or Web Based Learning, Learning Apps, etc. In order to boost this opportunity properly, there is the need to move beyond merely adding a 'digital' component to traditional teaching. In learning contexts, the idea of 'blending' is not new. Blended learning, nowadays, involves the inclusion of technology-based learning, i.e. providing online or offline activities and materials in the mix, with traditional face-to-face classroom lectures. It is not a wholly new approach to learning and teaching. The practice of including technology-based training has been around since at least the 1960s, first with cassettes, then with videotapes and television, computer and, most recently, the Internet. Given the extent, inevitability and potential of digital transformation there is a clear need to rethink all aspects of learning practices. This ongoing process of digital transformation is inducing changes in the current learning paradigm at secondary colleges for agriculture and forestry, forcing a shift from an instructional system (e.g. face-to-face teaching) to learning experience paradigm. The question of how and whether this process should be shaped, i.e. designing digital learning and flexibly applying technology tools, guides the thinking in this paper. This should not only be applicable for these colleges but transferable. As a starting point this paper looks at the status quo of digitally supported learning at these colleges based on data from an online questionnaire answered by 1,963 pupils. The need for action is clear, from updating the infrastructure and technical standards through changing learning processes to training skill and competence sets for learners and teachers. Reflecting on this data shows that the digital transformation will require the courage to implement more active learning approaches as well as gather experimental experience. Research on current *executive* development experiences also underpins this development. It is also apparent that by considering the person as a whole any new learning paradigms or perceptions of learning will no longer be restricted to the classroom thanks to digital transformation. This paradigm should form a milestone in 'continuous education' and encompass an 'omnipresent learning environment'. The paper contributes to the ongoing discussion on digital learning (in schools) and the continuous development of a research agenda for learning and teaching in the digital age.

Keywords: *Digital learning, digital transformation, holistic approach, secondary colleges, agriculture and forestry, Austria.*

1. Introduction

The rapid development of technology means that the world is increasingly being shaped by the internet and mobile digital devices (e.g. portable devices, social web, digital 3D worlds, digital games, serious gaming). Any future learning digital paradigm will forcibly involve a system of connectivity (Latz and Koutroumpis, 2012, 2), i.e. a system of blended learning. Blended learning, nowadays, involves the inclusion of technology-based learning, i.e. providing online or offline activities and materials in the mix, with traditional face-to-face classroom lectures (Cambridge Dictionary, 2019).

The digital transformation of the learning environment is not just about using digital technology and tools but also about understanding the mechanisms and rules as well as limitations of the digital world as well as adopting them productively and responsibly. More and more teaching material,

assignments and pupils' work including the taking of final exams is being transformed into digital formats. This results in the need for digital knowledge, skills and competences.

In the light of digital transformation, the question of how teaching and learning with digital media can be practiced and better anchored at the secondary colleges for agriculture and forestry is currently coming to the fore. To what extent is there a need for a guiding holistic approach? Descriptive data of the online survey amongst pupils of these 11 Austrian colleges with a research sample of 1,963 pupils serves as a starting point.

The remainder of the paper is structured as follows. Section 2 outlines the data and methods applied. Section 3 outlines the results of the survey. Section 4 looks at rethinking the learning paradigm. Section 5 concludes with a look at areas for future activity and research.

2. Data and methods

The paper is based on select data of the survey 'Digital transformation in Austrian secondary colleges for agriculture and forestry'. The pupils of the 11 colleges could participate in the online survey between 16th and 23rd March 2018. A total of 1,963 questionnaires were completed and evaluated. This corresponds to 53% of the pupils attending these colleges. The data evaluated was compiled by frequency for the sake of reporting results and drawing conclusions. The results presented are based on an argumentative-deductive research approach. Moreover, the rethinking of the learning system reflects on the survey results by including examples from a literature research.

3. Survey results – the pupils' opinions

This section presents the findings by giving a general picture of pupils' feedback on digital transformation at their colleges. For the sake of convenience, it makes sense to bracket the pupils' answers to the survey into two concrete areas: the questions of why and how referring to digital transformation.

For the pupils, digital learning is not merely interesting due to the fact that digital technology, such as desktop PCs and mobile devices, are involved but, according to the survey, digital learning opportunities make sense to them. Not only is this probably because digital media can, in terms of variety of content and media deployed, make lessons more interesting (87%) but also because there is a clear reflection of developments in the professional world and therefore the practical aspect is obvious. However, a further point of interest which was clearly shown in the pupils' answers was an awareness of the risks involved in the use of digital technology and media. The pupils see more and more online risks and feel a latent uncertainty when dealing with the internet. The topics of data security and protection are of great importance. The majority of the pupils do not believe in the security of data on the internet. 70% of the respondents currently assume that their data is unsafe. In this respect, the pupils perceive the unauthorized disclosure of their data and the threat of virus and malicious programs as well as the spying on their data as the biggest risks of internet use. By contrast, the traditional media – radio, television and newspapers (to be purchased) – are rather positively rated by pupils overall. This notwithstanding, the majority (70%) of pupils agrees on the importance of learning with digital literacy for their future educational and professional path.

Not surprisingly 57% of the pupils are in favour of an increased use of digital media in colleges. Moreover, 70% of pupils think that digital media should be used more diversely, i.e. teachers should try something new more often. In this respect, 78% of pupils agree that teaching materials should be available digitally. Nevertheless, they advocate a mix of analogue and digital forms of learning (80%), i.e. a form of blended learning. According to the responses digital technologies and media are aids to make not only the learning, but also the teaching, more pupil-friendly, diverse and modern. Moreover, pupils see digital transformation as a way to enhance their current learning model both within the classroom and without. One in four pupils uses for example social media and blogs for the homework assignments and the preparation of classes outside lesson hours. Integrating technology into the classroom begins with the teacher preparing lessons that use technology in authentic and meaningful situations. Survey results show that 63% of the pupils say the teachers prepare their class deployment of digital media well. On the other hand, half (49%) of the pupils believe that teachers should be more interested in using digital media.

4. Rethinking the learning environment at colleges

Given the results of the survey, we need to fundamentally rethink our approaches to learning and education – and our ideas of how digital technologies and media can support them. In this regard, the process of the digital transformation of learning should ensure (i) a sufficiently reliable and fast internet

connection (WLAN network), (ii) the liabilities and responsibilities for the technology have to be defined (iii) the proper and full use of the equipment and (iv) a sustainable upgrading process to guarantee an inventory that is modern and adequate. This is related to the following principles.

What pupils use for learning: The practice of including technology-based training has been around for centuries, first with cassettes, then with videotapes and television, computer and, most recently, the Internet (Web-Based learning). Equipment and software have improved (cf. Moore's Laws). The evolution and the adoption of digital technologies in classrooms, has enabled next-generation learning environments – both physical and virtual – with better connections (e.g. WLAN networks, Chromebooks), easier communication paths (e.g. social media, WebUnits), more robust collaboration capabilities (e.g. blogs solutions, The cloud solutions, G Suite), special training and assessing tools of the learning successes (e.g. asynchronous learning environments, apps for vocabulary training, e-learning platforms, Google Expeditions and Classroom, Open Roperta) and sharing tools (GitHub and Creative Commons). In this context, the teacher is the main person in helping pupils to have access to technological potential by paying attention to individual's needs, talents, interests and differences (cf. Bertelsmann Stiftung, 2015a, b). In doing so, digital transformation can support new learning approaches that engage learners, driving new revenue streams, decreasing operational costs, and preserving and expanding highly valued college brands. (cf. CISCO, 2018, 3f)

How pupils learn: This ongoing process of digital transformation will also contribute not only to the redesign of the classroom (cf. Envision, 2017) but also to a change in the learning system from instructional (e.g. face-to-face teaching with teacher delivering information to a roomful of pupils) to more active learning approaches as well as experimental experience. The possible initiatives of learners are strengthened in two ways: Dialogic participation and democratic negotiation, and creation and sharing of knowledge and digital resources (Sorensen and Brooks, 2017). This entails and comprises the meta-learning output of the learning process in a pupil identity as an active democratic-oriented citizen (Sorensen, 2008). Moreover, it is associated with (a) agency and communicative initiative, (b) digital dialogue and collaborative knowledge construction, (c) open educational resources (OERs). Additionally, we should focus on themes and projects that cut across the disciplines, i.e. combining different disciplines for example maths, science and language, by taking advantage of the rich connections among different domains of knowledge. Furthermore, instead of dividing pupils according to age, we should encourage pupils of all ages to work together on interdisciplinary projects, enabling them to learn from one another and to learn by teaching one another in the sense of a social learning experience (e.g. small group exercises, learning networks). This also includes pupils working on projects for a certain period of time, enabling them to follow through more deeply and meaningfully on the ideas that arise in the course of their work. In this context, the task of education at these colleges is to create a framework for the pupils so that they can perceive, use and actively participate in the opportunities offered by digital transformation in the, and without the, colleges.

What pupils learn: Much of what pupils learn in colleges today was designed for the era of paper-and-pencil. Colleges shall assist pupils in their preparation with the new skills and ideas that are needed for living and working in a digital society. At the same time, the expansion of knowledge associated with the new technologies requires an intensified focus on competence-oriented learning (cf. Albrecht and Revermann, 2016, Sauter, 2018). It is about integration of digital learning and implementing digital tools into the pupils' learning environment in order to gain professional, general, holistic and expansive skills and competences. Against this backdrop, learning success is usually defined as knowledge gain, improved problem-solving ability or better transferability. They are based on the generative theory of multimedia learning (cf. Mayer, 2001), the so-called cognitive load theory (cf. Sweller, 2005) and the LOM Standard (IMS Global Learning Consortium, 2006). Today these set standards in the development of digital learning as done by BMB (2016). More subtly new technologies are changing not only what pupils should learn, but also what they can learn. As new technologies contribute to the change in learning and all parts of our lives, learning to become a better learner is far more important than learning to multiply fractions or memorising the capitals of the world. For example, pupils can now use for example computer simulations or games to explore the workings of systems in the world (everything from ecosystems to economic systems to immune systems) in ways that were previously not possible.

Where and when pupils learn: Although technology and media can never replace the human mind, it can intensify it, and increase the pace of learning. In fact, the digital can include the traditional methods such as providing a learning environment but also make use of the technology to impart knowledge to the pupils. Digital transformation enables learning at any time, at any place, in a variety of ways: alone or in communicative exchange, oriented towards or dissolving classical forms of teaching. There is a need for new concepts for lessons within a digital environment; an example is the integration of a virtual classroom (moodle Adobe Connect). Furthermore, in the years ahead, the Internet as well as

other digital technologies will open up new learning opportunities, enabling new types of 'knowledge building communities' in which people of all ages around the globe collaborate on projects and learn from one another, e.g. Learning Lab Denmark (<http://learninglab.dk/>).

The role of teachers: Although digital learning creates new opportunities the role of teachers is still central and irreplaceable, albeit changing. Other roles such as learning tutor, advisor or personal mentor are becoming more important. For example, (i) when working on projects the teacher supports the work in planning work schedules and provides technical support, while the pupils are free to organise their work independently and (ii) the teacher also show pupils that there is a need for practical exercises and not only the digital studying or simulation of learning issues, i.e. applying information and knowledge in practice such as driving a tractor or mowing grass with a scythe. In that way pupils combine mind and heart, reality and emotions, theory and practice as well as training and learning. So pupils are able to become more critical, active and independent learners. This underpins clearly, especially in view of the risks mentioned previously, that the teaching of responsible interaction with and the use of digital media at colleges have to go hand in hand. This can only be done with the help of digital Pedagogy. Digital Pedagogy is a procedure which helps in improving the instructions of the learners. In short this term is an amalgamation of technical information, teaching and understanding of the learners. The values of digital pedagogy are open education, sharing syllabi, sharing teaching resources and self-directed interest based projects. (Christie, 2017, Morris and Stommel, 2015) In this context, teachers should be given the opportunity to acquire these through further education and joint teaching development. It should also be noted that teachers need resources and time for lesson planning and development with digital devices and media.

Values: Digital learning (cf. Park, 2011, Berge and Muilenburg, 2013) provides unique characteristics like portability, user mobility, pervasiveness, ubiquity and immediate interaction with the external environment making the learning experience more engaging and interesting for pupils. Through this constructive confrontation with digital media and their use, the pupils are empowered to use them 'critically and in an emancipatory way' and thereby to develop a 'critical and healthy' attitude towards the media. This will lead to a new paradigm and perception of learning – leading to a strategy – which goes beyond traditional learning in the classroom (see above what pupils learn). This paradigm should form a milestone in 'continuous education' and encompass an 'omnipresent learning environment'. We also have to look at a set of values, such as simplicity, community, mobility, participation, integration, openness and utility that we can use to navigate this rethinking of the learning environment wisely and fruitfully with ethical and moral respect. For progress to endure, it may need a guiding holistic approach based on the needs of the body, mind and soul (Akmeççe et al., 2015) within the framework of the given roadmap (Bundeskanzleramt and BMWFW, 2016) and masterplan (BMBWF, n.d.) of digital transformation. This approach should also focus on 'why something needs to be learnt', 'how it is connected to the learner's life' and on 'how it is going to be used in real life' (cf. Akmeççe et al., 2015).

5. Conclusion

Digital transformation has been, without doubt, changing the learning in colleges, but one cannot say that it has diminished the value of the 'old-school' learning in classrooms. The best part about this digital transformation is that it is combined with the aspects of learning methods, i.e. classroom and online or virtual learning. Eight out of ten pupils advocate a mix of analogue and digital forms of learning. The positive impact of digitally transformed colleges will not come by simply arranging and presenting content in virtualised or even in more personalised ways. Rather, it will come through the synergetic combination of benefits for pupils, teachers as well as these colleges itself, e.g. image factor or further target group with respect to the further educational and professional path, as stated by 70% of the pupils.

Learning is a process that involves experience, study and teaching that is directed at the whole person paradigm. Therefore, the best approach to learning is one that is holistic. However, a human being is a whole consisting of both matter and sense. In that sense, to achieve perfection in education is to balance the factors including body, mind, soul, feelings and thoughts equally. Its importance gains more value when one thinks about the problems in education in recent years. From this point of view, a holistic approach intends to consider every aspect of the pupils' learning process during their education, so it requires the teacher to notice the pupil's features which are neglected. On the other hand holistic education should improve the pupils not only mentally but also all other aspects.

In order to develop such an approach the following areas of further research emerge: (i) it is paramount to understand the technology skills and knowledge of both teachers and pupils with respect to future employability, to discover their respective needs, and to aim for a mutual understanding of both perspectives (bottom-up), (ii) which human, social, economic or other causes are affected positively as

well as negatively by the digital transformation and (iii) what personal maxims or priorities are affected by this change in teaching and learning, which are so important that they should be preserved. Beyond that, a sustainable and smart digital transformation within a holistic approach can only succeed if is grounded within the current context of the Austrian education system, and is supported and pushed by the administration and policy (top-down) within the framework of digital transformation of education.

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DEVELOPMENT OF INTERDISCIPLINARY INSTRUCTION USING INQUIRY BASED SCIENCE EDUCATION

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Abstract

The task of current educational system is to give all students competences they will need to prosper in global economic competition. However, students very often consider learning content as useless for their everyday life. In the context of natural sciences, this is not only about the choice of learning content but also about the way in which science subjects are taught. Students are not usually able to connect knowledge from individual natural science subjects and to solve interdisciplinary problems so typical for everyday life. It could be one of important reasons of lack of student interest in study of natural sciences. However, teachers are not usually educated in interdisciplinary instruction and they do not know appropriate educational methods supporting interdisciplinarity. Inquiry based science education is one of suitable educational strategies for interdisciplinary teaching/learning. Research findings confirming the effectiveness of pre-service teacher education in interdisciplinary instruction using IBSE are presented.

Keywords: *Interdisciplinary instruction, inquiry based science education, teacher education.*

1. Introduction

Current educational systems of developed countries have many tasks according to priorities of individual countries. But the main ones include providing all students competencies they will need to prosper in global economic competition during their professional life and to equip them for solving everyday problems. Scientific knowledge very quickly develops and grows and subsequently scientific progress has an influence on everyday life of people. In particular, the development of natural sciences significantly affects people's lives. But natural science educators especially in Europe and USA face the decline of interest in the study of natural science and technology (OECD, 2006; Kires & Šveda, 2012).

Educational experts and researchers try to find reasons for this phenomenon (Bolte, 2006; Dostal, 2015). Unsuitable educational methods appear to be one of the main factors leading to this situation (Rocard et al., 2007). According to PISA findings only 15 % of European students are satisfied with the quality of natural science teaching/learning in schools and nearly 60 % state that natural science teaching/learning is not interesting for them (Ministry of Education, Youth and Sports CR, 2010). One of significant reasons of lack of student interest in study of natural sciences could be traditional educational strategies which very often prefer acquisition of separate knowledge such as data, formulas, equations, theories, etc., that students only memorize without understanding and forget them very easily (Ministry of Education, Youth and Sports CR, 2010).

Very important reason, why students consider natural science school subjects useless, is that they are not usually able to connect knowledge from separate natural science subjects and to solve interdisciplinary problems so typical for everyday life. According to our research findings, even though students think natural science educational contents are important for society, on the other hand they consider them unnecessary for their everyday life (Trnova, 2012). Based on ours and above mentioned research findings it is necessary to innovate educational strategies of natural science instruction and to take into consideration interdisciplinary attitude supporting student motivation and deeper understanding. According to research findings (Trnova, 2014) Inquiry Based Science Education (hereafter IBSE) is appropriate for interdisciplinary instruction of natural science subjects.

2. Rationale

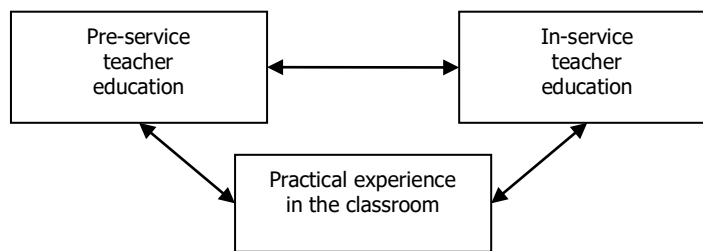
Teachers are a significant factor affecting student learning outcomes (Darling-Hammond, 2000; Osborne, & Dillon, 2008). Therefore, it is very important to pay attention to their education, beginning in pre-service education and ongoing throughout their continuing professional development (hereafter CPD).

It is necessary to educate them how to carry out interdisciplinary instruction to satisfy students' requirements for linking teaching/learning to everyday life. They do not often know educational strategies suitable for interdisciplinary instruction or they are not able to implement them into natural science instruction.

Teachers' professional competences have to be created through three main parts: pre-service education, in-service education and practical school experience (see Fig. 1). The high educational level of the three components mentioned in Fig.1 and their linking are important conditions for quality teacher education. Teachers take part in this educational system in five possible roles: teacher as learner, teacher as teacher, teacher as reflective practitioner, teacher as leader and teacher as researcher. The role of teacher-learner is typical for teacher-candidates. This role is often underestimated and neglected during continuing professional development (CPD). But it is very important because according to experts, teachers are strongly influenced by their own school experience as learners and many teachers have minimum experience with interdisciplinary teaching/learning from their schooling.

The role of teacher-teacher is connected with teacher's classroom practice and university students (pre-service teachers) go through this role during teacher training at schools. The role of teacher-reflective practitioner is based on experience and is expected at the level of the CPD. Teacher-leader is involved in teacher training management and this role is usually fulfilled by experienced teachers or education specialists (expert in didactics, educationalist, etc.). Currently action research is very popular. Researchers of our University engage in-service teachers (some pre-service teachers as well) in action research as much as possible. It is beneficial for both sides - university experts and teachers.

Figure 1. A diagram of systematic teacher education (Trnova, 2014).



2.1. Interdisciplinarity

Interdisciplinary instruction is generally defined as the integration of two or more disciplines. The term "interdisciplinary" is applied to a variety of curricular arrangements and has got a variety of synonyms (multi-disciplinary, transdisciplinary, thematic teaching, integrated learning). The degree of integration and what will be integrated is very important to consider. Relan and Kimpston (1991) arrange interdisciplinary approaches to the curriculum along a continuum of operational schemes, indicating the degree of integration. Thus, one extreme of the continuum would be structuring the curriculum plan around each separate subject, with the opposite extreme being an "eclectic" or "problem-oriented" approach. Techniques such as the intermingling of disciplines (sometimes called "multi-disciplinary") or the integration of across-the-domain skills such as problem-solving or writing across the curriculum are between these opposite poles.

In the Czech Republic pre-service teachers are usually educated in two separate subjects of their choice and interdisciplinary instruction is on the edge of interest. But current multidisciplinary paradigm of natural science education requires an integrated approach. Faculty of Education at Masaryk University in Brno solves this deficiency in the pre-service teacher education and establishes the course Didactics of Natural Sciences which is aimed to interdisciplinary instruction. Students (teacher-candidates) acquire educational strategies appropriate for interdisciplinary instruction. First, they get to know them theoretically and then apply them in practice at schools.

2.2. Inquiry Based Science Education (IBSE)

IBSE also belongs to strategies which are relatively new in the Czech Republic, and therefore students (teacher candidates) and teachers have usually minimum experiences with IBSE instruction and they have to gain them. According to our research findings (Jeskova, Kires, Ganajova, & Kimakova, 2011; Trnova, 2012) teachers are able to implement IBSE in appropriate way when they acquire it in both roles (teacher as learner and teacher as teacher) under supervision. After they can develop their acquired professional skills in next roles. But it is necessary to show teachers how to develop interdisciplinarity within IBSE. Not every IBSE learning content includes an interdisciplinary dimension. Interdisciplinarity

places demands on teachers not only in the field of didactics, but also in other sciences that they do not have in their teaching qualifications. Teachers themselves must understand the interdisciplinary issues that pupils should learn through IBSE.

Teachers must learn to collaborate with colleagues to prepare an interdisciplinary instruction. Teamwork is very important for quality interdisciplinary teaching/learning and it enriches all participants in the educational process. In Faculty of Education at Masaryk University in Brno students learn this skill in the frame the course Didactics of Natural Sciences. They create interdisciplinary teams, members are experts in individual natural sciences and they collaborate to prepare quality interdisciplinary topics. University teachers, experts in natural sciences, didactics, pedagogy, etc. are in the role of mentors. This interdisciplinary teaching/learning can facilitate students to learn about approaches, theories and methodologies from various disciplines of the social and natural sciences.

3. Methodology

The aim of the research was to verify the development of interdisciplinary instruction of natural science subjects using IBSE. The research was focused on education of in-service teachers, pre-service-teachers and pupils' educational outcomes. Considering limited scope, this study presents only research findings connected with education of pre-service teachers. Therefore, the research question is:

How IBSE implementation in pre-service teacher training influences development of interdisciplinary instruction?

The research sample was composed of 36 students (pre-service science teachers) from Faculty of Education, Masaryk University, the Czech Republic. These students were preparing for interdisciplinary instruction using IBSE in the course Didactics of Natural Sciences. During this course students gained experience with interdisciplinary instruction using IBSE first in the role as learners. It means they carried out inquiry, fulfilled tasks as pupils in order that they could better imagine feelings or learning problems of children. In this role they also acquired the necessary pedagogical knowledge and skills for teaching. After that students in the role of teachers realized interdisciplinary instruction using IBSE under the guidance of experienced teachers during their practice at schools. Pre-service teachers built up their pedagogical knowledge, skills and competences using their own experience from the role as learners and after during practice at schools as teachers, they connected pedagogical theory and practice, which is known as teacher constructivism (Magoon, 1977). The university teachers of natural science subjects were in the role teacher-leader and teacher- researcher.

A research-method of triangulation (semi-structured interviews, questionnaire and analysis of teachers-candidates' products) was used as a specific method to answer above mentioned research question. First, semi-structured interviews were carried out with all (36) research participants and questions were focused on the professional competences connected with development of interdisciplinary instruction using IBSE. Based on the answers of research participants, items of questionnaire using Likert scale were created (Pulpan, & Kulicka, 2015). The verification of the research findings was completed using the analysis of educational products created by research participants. The collected data were analysed. The research was conducted in the period 2016-2017.

4. Results

As mentioned above, the questions in the semi-structured interviews were focused on competences of pre-service science teachers connected with interdisciplinary instruction using IBSE. Research participants stated what professional competences connected with interdisciplinary instruction using IBSE they had acquired during the course. In the next research tool – questionnaires - research participants expressed their subjective assessment of the extent of acquired professional competences. To determine the level of acquisition, the 5-point Likert-type rating scale (*1-Very weakly, 2-Weakly, 3-Normally, 4-Strongly, 5-Very strongly*) to measure development of their professional competences were used. Tab. 1 provides an overview of the main professional competences mentioned by pre-service science teachers. Subsequently, analysis of teachers-candidates' products and verification of collected data were performed.

Results of the questionnaire are presented in Table 1. The collected data showed that the main pre-service teacher professional competences for interdisciplinary teaching were developed significantly. If we consider only the highest category *Very strongly* of the Likert scale, this option was chosen by more than a half of respondents for four professional pedagogical competences important for interdisciplinary instruction (*to motivate pupils, to encourage students to solve interdisciplinary problems, include interdisciplinary topics from everyday life relevant to pupils, to develop lifelong learning skills*).

The great development of most of respondents' monitored professional pedagogical competences is even more apparent, when the category *strongly* and *very strongly* is combined. In this case, except of "integration of natural science and social issues in interdisciplinary instruction", pre-service teachers stated significant development of their professional competences for interdisciplinary instruction. It was confirmed by research findings of pupil educational outcomes and analysis of educational products created by research participants.

Research findings confirm the quality of teacher education is reflected in the quality and effectiveness of education (Pellegrino, & Hilton, 2012; Osborne, Simon & Collins, 2003; European Commission, 2004). According to experts, teachers are the significant factor influencing learning outcomes of pupils ((Darling-Hammond, 2000; Osborne & Dillon, 2008). Based on these facts and the presented research findings, it is possible to answer the research question *How IBSE implementation in pre-service teacher training influences development of interdisciplinary instruction?* Because teacher competences were developed, it is possible to confirm development of interdisciplinary instruction using IBSE. IBSE implementation in teaching/learning supports development of interdisciplinarity. Our next research results (pupil outcomes and analysis of educational products created by research participants) confirmed this conclusion as well.

Table 1. Pre-service teachers' questionnaire - data.

Using IBSE in interdisciplinary instruction I am able to:	(1) Very weakly (%)	(2) Weakly (%)	(3) Normally (%)	(4) Strongly (%)	(5) Very strongly (%)	Mean values (1)–(5) N = 36
motivate pupils for natural science	0	0	0	31	69	4,69
encourage pupils to solve interdisciplinary problems	0	0	0	42	58	4,58
include interdisciplinary topics from everyday life relevant to pupils	0	0	3	39	58	4,56
develop lifelong learning skills	0	0	8	36	56	4,47
develop skills of pupils to connect information from different natural science subjects	0	0	0	58	42	4,42
integrate natural science and social issues in interdisciplinary instruction	0	0	20	36	44	4,25
develop pupils' interdisciplinary experimentation	0	0	8	73	19	4,11

5. Conclusions

In the frame of the course Didactics of Natural Sciences advantages and disadvantages of interdisciplinary instruction were defined. Pre-service teachers were led to reduce impact of disadvantages and effectively used advantages. IBSE was confirmed as appropriate strategy for development of interdisciplinary instruction. Main advantages are listed in Table1. It is necessary to highlight the development of lifelong learning skills that are essential to pupils' future education as well as their lives and future success, and increasing of pupil ability to solve interdisciplinary problems. According to outcomes of the course, advantages of interdisciplinary instruction for teachers are: collegial environments, high level of innovativeness, high levels of energy and enthusiasm, support for personal growth and learning.

Considering that quality of teachers is the fundamental factor affecting learning outcomes, it is necessary to pay a lot of attention to their education, especially in the area of innovative educational strategies. To increase the effectiveness of science teacher education, it is necessary to implement innovations already into pre-service teacher education. It is important for teacher-candidates to construct their professional pedagogical skills based on experience acquired first as learners and later as teachers

with support of experienced teachers and experts. This method of teacher constructivism connects teachers' own experience from instruction with pedagogical knowledge and skills and creates high-quality professional pedagogical competences.

The presented research findings confirm that a properly implemented innovative component in pre-service teacher education can improve the quality of professional competences and teachers are not afraid of its implementation in their teaching. During pre-service training students should have possibility to acquire core knowledge and skills connected with innovative educational strategies, which they do not experience during their studies. The presented pre-service teacher education in the course Didactics of Natural Sciences could be example how to educate future teachers of natural science subjects.

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IT TAKES A VILLAGE: IGNITING THE SCIENTIST IN LOWER TRACK STUDENTS THROUGH PARTNERSHIPS

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Abstract

The paper presents a study on a partnership between schools, a community welfare organization, Science Centre and the National Institute of Education to design, study and implement new approaches of learning for lower track students. Singapore as an inclusive society has sought to address the diverse educational needs of children in the country. This partnership seeks to ignite students' interest in learning Science and address the affective needs in learning, which includes developing students' confidence, competence and social skills. Leveraging on the diverse expertise and experiences, the partners designed tinkering activities to anchor students' learning experiences in exploring, testing and constructing Science ideas. The activities are designed and enacted with linkages to the existing Science curriculum. However, setting a partnership with stakeholders from different backgrounds and domains is challenging. We will describe the journey of setting up the partnership, developing shared goals, building capacity and knowledge, and designing for learning. Also, we will share students' learning and affective outcomes because of the partnership and participation in the designed tinkering activities. Our goal is to highlight how meaningful partnerships can be formed to better understand and meet lower track students learning and affective needs through collective social responsibility according to the familiar proverb "It takes a village to raise a child".

Keywords: *Partnerships, learning, science, lower track students.*

1. Introduction

In Singapore, after the Primary School Grade 6 national examinations, students at the age of 13 years old are tracked into various streams in Secondary schools based on their academic performance results. Students who performed well are tracked into the Express stream where they will take the GCE "O" levels examinations at the end of their fourth year, at the age of 16. For students who did not qualify for the Express stream, they are allocated to the Normal stream, which is deemed a lower track. Rather than attributing poor academic performance results to natural abilities, we postulate that these lower track students have diverse needs that require attention other than academic assistance. Therefore, we propose a partnership between schools, Science Centre, Student Community Services and an education research institute to design and implement new approach for Normal stream students. This Tinkering approach, which combines elements of fun and learning in Science, could potentially meet the social, affective and academic learning needs of lower track students.

2. Design

Using Design-Based-Implementation Research (DBIR) approach, schools and external agencies, formed partnership with the National Institute of Education (NIE) research team to design, plan and execute learning programmes to meet the diverse needs of lower track students. The ecology in this partnership is brought together by a shared goal to improve Normal stream students' learning and well-being through Tinkering approach in Science curriculum. With the iterative design processes put in place through common platforms such as meetings and workshops, partners get to share different perspectives on students, learn and unlearn new things about Tinkering approach and teaching ideas, as well as experimenting, creating and executing new Tinkering lessons in schools. In which, these learning outcomes of students will affect and inform the partnership outcomes, that builds a feedback mechanism within this interaction system. We hope that such mechanism can be an effective model of partnership and learning that is benefiting.

2.1. Lower track students

Lower track students in Singapore are divided into Normal (Academic), NA, and Normal (Technical), NT, stream students, where the former will sit for GCE “N” levels examination and the latter one, for GCE “NT” levels examination. Typically, the percentage of NA and NT comprises about 25% and 12% of students entering Secondary 1 respectively. Throughout the Secondary school education, the system hardly allows the flexibility of transferring to a better stream for better future paths, should the lower track child exhibits some level of potential to do well. In other words, their future paths are structured in a fixed way that they sit for different national examinations where the subject content has been reduced and adjusted to a certain extent, which is different from Express stream students. However in recent years, there is an increasing effort to widen opportunities for Normal stream students, especially for NA students who do well and show promising potential in a specific subject. Instead of shifting to a better stream, they remain in the original track but are offered an opportunity to study only that subject at a higher difficulty level. For example, a student does well for Science at the “N” level may be offered to do “O” level Science subject under the Subject-based Banding scheme in this flexible system structure.

Usually, school teachers will teach both “O” and “N” level subjects to students in the same level since the content and syllabus requirement are almost similar. But they may have neglected other differences these two categories of students have, possibly diverse needs other than academic abilities. Due to this negligence, the teaching approaches remains almost the same without taking into consideration the different learning needs of NA students. Prior studies (Tan, Wang, Ee, Koh & Liu, 2009; McInerny, Liem, Ortiga & Qi, 2008) on NA students found that they have stronger feelings of closeness to a social group and working with others rather than alone. They have a tendency towards learning for rewards which demonstrates their competence to produce the desired outcome towards achievements. Without the awareness of such diverse needs, this has resulted in lower track students who learn by memorizing instead of engaging in critical thinking. This mode of learning is reinforced by the way subject matter is taught to the lower track students. Learning materials presented emphasised on rote learning instead of challenging ways that foster critical thinking and problem solving skills (Wang, Teng & Tam, 2014). Such approach to teaching Normal stream students could be due to teachers’ perception that lower progress students are only capable of learning less complex content and skills (Kramer-Dahl & Kwek, 2011). Kang’s report (2005) on Normal Stream students’ perception about their teachers’ expectation of them, concur that teachers do not expect them to master the depth of content materials compared to their express stream peers. Teachers define NA students by their weakness rather than their strength through a deficit perspective or thinking (Groski, 2008).

Typically, instructional approaches in the classroom also run counter to how lower track students’ tendency to learn socially. Students often lack the opportunity to present their ideas and thoughts to their peers (Kaur & Ghani, 2012) as teachers tend to have students work individually, apprehensive that the students would go off task in groups. Besides that, NA students’ self-concept affect their learning in the subjects as well. Tang and her colleagues found that NA students’ self-view in Science Learning and their views of the nature of Science were the strongest predictor of their Science inference competencies. (Tang, Goh, Aye & Yeo, 2018). Their findings showed that NA students lacked confidence in their abilities in learning science. Additionally, they may have limited knowledge of what Scientists do and how Scientists go about experimenting and discovering new knowledge, in which this part of Scientific Endeavour is essential to attitudes in learning Science. Thus, this shows NA students’ lack of understanding of what is involved in doing Science. As such, we proposed that NA students should be engaged in doing Science through complex problem solving that would develop their higher order thinking skills, a learning experience afforded by Tinkering approach. This will then give them another opportunity to prove themselves and enhance their self-concept that would lead to better academic outcomes.

2.2. Partnerships

Seeing the diverse needs of NA students in learning, this partnership between schools, the Science Centre (SC), Student Community Services (SCS) and the National Institute of Education (NIE) aims to design and develop learning programmes that help to promote and sustain their interests in Science. Traditionally, entities like the Science Centre and Student Care community are seen as service providers of after-school educational programmes for students, engaged by schools for short-term purposes. Schools periodically send students to visit the Science Centre where they can interact with interesting exhibits or attend hands-on workshops through experiential learning experiences anchored around science phenomena. As for Student Care community, they run student care centres where they provide after-school care for students through mentoring programmes or counselling services that would meet students’ affective needs. In Singapore, an increasing number of such community welfare organisations provides welfare services to families, particularly to those who are in the lower income, who lack resources on mentoring and attending to their child. However, the programmes in the Science

Centre and Student Care Services often run in isolation from the school curriculum and enrichment activities. They are perceived as meaningful “add-ons” to the numerous school activities that students are required to participate. In fact, some impactful learning episodes from these programmes are not effectively leveraged on by schools to complement the schools’ mission and vision to the holistic development of students in general, an aspect especially important to NA students. We see this gap in the school-vendor relationship to be a great potential for the development of a meaningful and effective partnership in positively affecting NA students learning.

This project was initiated by a research team from NIE with a grant from the Singapore Millennium Foundation to propose and study innovative approaches to learning in Schools. The research team reached out to several schools and community services, and Science Centre to form the partnership. The Science Centre was interested in the partnership at the onset, as they were keen in developing students’ interest in Science through tinkering approach, which is a fun and creative way of learning Science. Meanwhile, two public schools and one community services organisation also expressed interest in forming this unique partnership. Both schools see this project as an avenue to level up NA students’ learning outcomes in Science education as well as improving their emotional well-being, while Student Care centre was more interested in the social emotional aspect of NA students through mentoring. Therefore, with the Science Centre providing expertise in tinkering approach, Student Care centre equipped with Positive Youth Development (PYD) knowledge and school teachers who are knowledgeable in Science curriculum, these three partners embarked on a research adventure with the research team, attempting to address a challenging issue.

At the start of our project, we focused on the following critical processes: 1) building capacities of partners; 2) designing for learning; and 3) understanding NA students. These processes were critical as we understood the need for all partners to undergo the same learning experience of students in tinkering and understand the process of learning, hence empathize with the learners. Therefore, tinkering workshops are organised for partners to experience constructing classic tinkering activities such as Marble machines, creating circuits, and building scribbling bots using a diversity of familiar or recyclable materials. All partners shared their perspective and experience of tinkering and how it may benefit the NA students in Science learning or their well-being. These workshops presented opportunities to learn from the expertise of partners and build capacity of each partner. For example, the student care centre partners often shared about how to relate and converse with students to build confidence, and urged the rests to think about students’ feelings that are sometimes played down in the process of designing for learning. Hence, their inputs represent students’ voices that serve as reminders to partners about the important of understanding our learners in our design for learning processes.

As the project progresses after 16 months of partnership, those critical processes naturally evolved as many factors come into play, for instance the change in learning context for Tinkering from informal setting to a formal setting. Out of the four different tinkering activities designed and enacted thus far, first two activities were led by the Science Centre while the last two were led by teachers. In the first two activities, teachers observed how the Science Centre planned and executed Tinkering activity whereas in the latest two activities led by teachers, the Science Centre observed and supplied useful materials and information on possible ways to re-design tinkering activity to fit into the school curriculum and context without compromising much of the tinkering spirit, which often demands a great deal of resources and time. On the other hand, in order to enhance the well-being aspect in tinkering activities, the Student Care center partner recommended a structure that would better improve students’ connections with their peers in learning, which would meet their needs to learn socially. Each partner contributed to the design by providing resources, ideas and the recommendations based on their expertise. Data and observations about the students collected in the tinkering activities were then shared to the partners by the research team. The perspectives of various partners as they interpret the data add to a more comprehensive understanding of NA students. These refined insights then enable the partners to better design learning experiences that lead to improved engagement of cognition and emotions in students’ learning.

2.3. Tinkering for science learning

The Science Centre has been an advocate of tinkering as an approach to learning Science, inspired by the Tinkering Studio at the Exploratorium, a Science museum in San Francisco. Tinkering means ‘thinking with your hands’. In short, while you are doing something, you figure out what is happening. It is an alternative approach to the familiar ‘plan-then-do’ method. The famous Noble Prize Physicist, Richard Feynman is an example of a Tinkerer. He played to discover Science. This tinkering experience is what we believe will benefit NA students.

The tinkering activities are characterised by their low floor and high ceiling design principles (Resnick & Rosenbaum, 2013). By low floor, it means that the entry point to starting a tinkering activity is easy without much effort in thinking or planning. A variety of materials that are familiar or easily learn to use could trigger off the intuition in participants to start an activity. Also, there could be multiple starting points and pathways for the participants to pursue and complete the goal, or even complexify

their products by having complex solutions, which marks the high ceiling. Tinkering activity afforded such learning experience for students to generate multiple ideas and solutions to a problem, as opposed to ‘the best and probably the only solution to a problem’ mindset, typically found in classroom teaching. Tinkering also provides an authentic Science learning experience that characterize the real world that is often complex and intriguing.

Tinkering focuses on the process undertaken by the participants to achieve the goal of the project and solve problems they may encounter during the task. They will iteratively test different ideas to solve the problem. The partners found that tinkering may be an approach that would interest students in learning science as it involves them in doing Science in more engaging ways than the traditional way of listening and thinking about Science. Constructing the marble machine and creating circuits covers aspects of school Science curriculum such as Energy, Friction, Materials, and Electricity. Students can learn and apply concepts such as a Kinetic and Potential Energy, Frictional force, or current flow as they are working on the tinkering projects. The iterative nature of tinkering can imbue a sense of perseverance and develop confidence as they overcome failed ideas and challenging moments. Working with others can meet NA students’ need for affiliation while learning together. To them, collaborating with their friends is considered ‘fun’; working with their partners create bonding opportunities that they treasure in the learning process, as shown in some of the students’ excerpts from the recent surveys and interviews about Marble Machine activity with the 13-year olds (Table 1):

Table 1.

Student’s engagement	Students’ excerpts
Discovering Science through doing	<ul style="list-style-type: none"> • “We used rubber bands (on the track) to make the ball (marble) go slower as there is friction.” • “Yes, yeah (we see Science in our Marble machine). Kinetic energy. Potential energy, like when you’re holding the marble. Then it’s kinetic energy all the way until you drop down to fall.”
Collaborative learning with friends	<ul style="list-style-type: none"> • “Yes, because I get to bond with my friends better by improving their ideas and it is fun when solving the problem.” • “Yes because I could interact and spend time more with my friends. I also learn a lot of stuff from this activity like in future, if I have activities like this, I can apply what I’ve learned.”
Having fun while learning	<ul style="list-style-type: none"> • “Yes, I would consider the activity fun because I got to generate ideas with my partner and I also got to spend time with her”. • “The activity was fun because while building the machine, we kept laughing because most of the parts kept on collapsing and we thought it was funny.”
Learning important values	<ul style="list-style-type: none"> • “Teamwork. Me and my partner was having difficulty at first. But when we came up with a solution, it was easier.” • “Always ask for help and never give up.” • “I’ve learned to become a better person by asking the other groups if any help is needed when they look like they are in a difficult situation.”
Thinking like a Scientist	<ul style="list-style-type: none"> • “Yeah, I think I was (working like a Scientist) coz in my head I was, when we were ..that time I took the purple colour, the sheet, then I said that this can make the marble move faster. Yeah I was thinking like friction and the surfaces of the marble, what’s the difference between the surface of the marble and the object...”

As seen from students’ comments, Tinkering provided a rich and diverse learning experience where it engages the emotion and cognitive aspects of learning. Thus, we believe that introducing Tinkering activities to NA students could be an effective approach to interest and sustain that interest of Science in them, where learning science concepts through doing, and meeting their affective needs.

3. Discussion

Due to the different needs of individuals, organizations, roles and responsibilities of various partners in this complex ecology of partnership, decision-making process is often time-consuming and tedious, even for a simple decision on deciding a workshop date and time that favours all partners. Many times, such decisions also require efforts to align back to research purposes. For instance, in planning a workshop for building the capacities of partners in tinkering approach, instead of adopting the typical

workshop structure that the Science Centre team has been comfortably doing, the research team suggested a new structure – shorter duration and more targeted to the needs of teachers, as part of the Design-based Implementation Research (DBIR) approach. This suggestion came about after a 3-week period of struggle to confirm a workshop date, that used to be a fast decision made in our first year of the project. The research sensed the shift in needs and goals of teachers but not for the Science Centre team. Since the emerging focus of the 2nd year of project is about implementation of Tinkering lesson in schools, the research team successfully persuaded Science Centre team to explore a new structure to meet the needs of teachers, despite of a last-minute change. Surprisingly, the outcome of the decision benefitted a school greatly but not the other school. The exact reason is still unclear but confusing moments like this make the research team think harder and wonder, how could we better align the different and shifting needs of the partners as we progress? Such is the complexity of a typical decision the research team needs to make in this multiple agency partnership project. Despite the challenge, one thing for sure is that we have a clear direction and shared goal - to develop the NA students' well-being, promoting their interest in Science and improving their learning outcomes. This shared goal often reminds partners to be open minded, understanding towards each others' perspectives, and be aligned back to the research goals, as the project progresses. This in turn leads us to make collective and mindful decisions through thoughtful negotiation processes. We are realizing the importance of a shared goal as one of the key factors to keeping a healthy partnership growing.

4. Conclusion

Preliminary findings showed that such dynamic design processes allow partners to build new relationships and produce new knowledge, enhancing capacities and stretching their abilities in ways that would not have been achieved if not for such a unique partnership. We believe that such partnership holds a promising potential to create a positive impact in lower track students' learning of Science.

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EDUCATING DESIGNERS TO SUSTAINABLE INNOVATION. A REFLECTION ON THE CONTRIBUTION OF DESIGN IN PROJECTS WITH SOCIAL AND ENVIRONMENTAL IMPACT

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Abstract

Design for sustainability is not necessarily a new subject. Research and studies about it rapidly increase, given the current conditions of the planet and the way lifestyles, production and consumption continually move towards unsustainability. The concept, which was initially treated as a design specialty with ecological concerns, has today a broad theoretical and practical scope, recognizing the important role of users, communities, and society in general. Thus, designers are increasingly expected to have more than technical skills. Existing methods and tools taught at universities, and applied to design practice, are currently challenged by the global changes that affect the planet, by transforming the role and responsibility of designers in building a more sustainable and inclusive material reality. With this scenario, universities play an important role on training professionals rather than just researchers, highlighting the need for teaching methods and processes focusing on preparing designers for the complexity of the contemporary world. In order to bring students closer to this new reality, a module was developed within the Master Program in Product and Industrial Design (MDIP) of University of Porto, in which, by applying the Project Based Learning methodology, students were confronted with a real problem and challenged to create innovative solutions on an experimental basis. The We Won't Waste You initiative, presented as a challenge to the students, is a social design project developed in the Design Studio FEUP, in partnership with the City Council of Matosinhos, which aims, through design, define strategies to transform waste into raw materials for objects to be produced by vulnerable social groups. The students, organized into teams, were responsible for all project management, and had the opportunity to share knowledge and learn from each other. The challenge of balancing the social, environmental and technical concerns was supported by the application of methods and tools suggested by the professors, who also played the role of advisors, encouraging discussions and suggesting appropriate tools. This paper presents a case study of this project, followed by a brief analysis of the applied methods and tools, and the results of a survey with the students. To conclude, the final considerations are presented, aiming to indicate new questions to be addressed, in order to encourage academia to respond to global challenges, rethinking the role of design for sustainable innovation.

Keywords: *Project based learning, design research and education, design for sustainability, sustainable innovation, social design.*

1. Introduction

The planet goes through a time of intense transformation. Economic growth and an increasing production acceleration have faced imminent resource depletion, loss of biodiversity and the deterioration of the life-giving support provided by global ecosystems (Fuad-Luke 2009). According to Manzini (2008), the transition towards sustainability requires a systemic discontinuity, which will represent a process of social learning where human beings should gradually learn to live better by consuming less and regenerating the quality of the environment in which they live. For this reason, it is increasingly important to encourage innovation. It is necessary to find creative solutions with the least possible impact, capable of leading humanity in this transition process. According to Thackara (2005), the challenge of sustainability is a matter of design. Eighty percent of the environmental impact of the products, services or systems around us is determined at the design stage. Thus, the designer can help to reverse this tendency, and to promote that the culture of sustainability in the university turns into a strategic action searching of a perspective change in future designers' mindset.

2. Project based learning

The issues related to the essential skills that designers need to develop to act in contemporary society are increasingly addressed by various authors (Margolin 1998) (Thackara 2005) (Christian Wahl and Baxter 2008), (Krucken 2008). All point to a new design thinking, which implies seeing the product (or tool, or transport device, or building, or city) as a meaningful link between man and the environment (Papanek 2005). In this sense, the importance of a learning environment that offers opportunities for experimentation through this new sustainable approach is emphasized in design education, and is highly interactive, providing relevant feedback to the student.

Considering the importance of the thematic, the Master's program in Product and Industrial Design of the University of Porto (MDIP) is a course based on the methodology of Project Based Learning (PBL). The program is based on integrated curricular units through which the students develop several projects simultaneously, always having real companies as clients. Students, organized in groups and with the teachers' guidance, have the opportunity to face real problems. This creates good learning conditions as it involves both individual and co-operative activities, interactive discussions, theory and practice. During this process the students can develop, besides the professional capabilities, their personal skills, like cooperation and management (Graaff and Kolmos 2003).

Whereas the interaction and partnership processes are considered as great potential for innovation (Krucken, Mol, and Mouchrek 2016), the importance of collaborative approaches in design teaching promoted by the PBL methodology becomes clear. The role of the teacher, in this scenario, is that of guiding, promoting experimentation, strengthening strategic thinking and suggesting appropriate tools, in a innovation driven program (Krucken and Mol 2014).

3. Design methodologies

Design methodologies are based on tools to stimulate the creative process in different ways for new products' development. Scholars have organized ways and techniques along the history, aiming to structure the development process in order to achieve efficient results, framing design as an almost accurate tool that requires the use of creative skills as well as organizational and analytical skills in problem solving (Munari 1981), (Baxter 2011), (Löbach 2001), (Bürdek 2010). In recent years, new sustainable approaches have been increasing emphasis in the world context: Participatory Design, Co-Design, Slow Design, Metadesign, Inclusive/Universal Design (Fuad-Luke 2009), User-centered design (IDEO 2011) and others, in attempt to reformulate the theory and practice of design, reinforcing the environmental and social sustainability awareness (Manzini 2008). The proposal is not a complete change in the way design works, but the goal is for designers integrating business needs with society and environment concerns. The selection of methodology and the combination of tools to be used in the project depends on the problem's complexity and nature, and the ability to decide which methodology to use in each situation, in order to obtain the best results, should be part of the designer's training (Bürdek 2010). To deepen these reflections about the design practice and the learning processes of design, focused on training specialists aware of this new role, the following case study describes a project carried out in the academic field, where the students were confronted by a real project.

4. Case study

This challenge describes the product development for "We Won't Waste You" project, a partnership between ADEIMA - Association for the Integrated Development of Matosinhos and Design Studio FEUP. The purpose of this workshop is, through design strategies, to transform wastes from the industry and local commerce in raw material for objects to be produced by vulnerable social groups. The project is based on three pillars of innovation: social, environmental and technological (Figure 1).

Figure 1. The "We Won't Waste You" project innovation pillars.



The achievement of a positive social impact occurs through the involvement of a group of socially vulnerable people from the council, in a training program for development and manufacture of products, thus generating an income that allows a social re-inclusion of those involved. The environmental impact is achieved through the use of waste as raw material that aims to extend the materials' life cycle and reduces waste, and the technological innovation through the university's participation in research and product development by students and teachers, as described in this case study.

This challenge has been applied to the students of the same course, in the past years of 2016, 2017 and 2018. Several products were developed using as main raw material, wastes from the Matosinhos city, such as fishing nets (Monteiro et al. 2016), eggshells, plastic caps, algae (Fernandes et al. 2018), coffee grounds (Canavarro, Rangel, and Alves 2016), among others. The present case study was developed in the context of the Design Project subject with the first-year students of the MDIP. The activities took place from August/2018 to January/2019, amounting to a workload of 32 hours devoted to lectures and tutorials. The actors were two guiding teachers, one researcher as assistant and thirty-eight students with diverse backgrounds and professional experiences. The briefing was the development of products for the WWY project, having as requirements: 1 - use at least 90% of recycled materials, wasted materials from the municipality itself; 2 - present a concept that values the history, culture and territory to which it belongs, in addition to the social responsibility represented by the initiative, and 3 - being manufactured through simplified processes, to allow the future production in the workshop of the "We Won't Waste You" project. The products were developed during one semester and at the end of this period were presented to all the partners enrolled.

5. Methodology

The activities were organized in three phases: 1 - diagnosis and theoretical foundation, 2 - research and definition of the concept, 3 - development. Throughout the project development, teachers' role was creating a learning environment based on reflections and experimentation, following the guidelines suggested by Hansen and Jensen (Kolmos et al. 2008) for a successful facilitation: focus on optimizing communication among students, encouraging reflections, introducing communication diagrams and participating in project design. The first two classes were addressed to collaborative activities, through presentations about the target groups, context and materials' research made by the teams to the whole group. On the following meetings, individual sessions by team were made, in which the professor, an environmental engineering specialist and an assistant researcher took turns offering references, stimulating discussions and pointing out directions.

5.1. Phase 01 - Diagnosis and theoretical basis

In the first phase, the students focused on analyzing the city's context (historical, environmental, cultural aspects), available materials (wasted from industry and local commerce), and the target public. The main objective of the diagnosis phase was drive students to explore the context and identify opportunities through research. This phase also included lectures, presentation of methodologies and design tools. At this stage, the Empathy Map (Osterwalder and Pigneur 2011), Personas (R. Floyd, Jones, and Twidale 2008) and Moodboards (Bürdek 2010) support the definition of specific target profiles.

5.2. Phase 02 - Research and concept definition

Some teams, focusing on user needs, have choose to deepen analyzes about needs and habits through observation surveys and interviews (Carmo and Ferreira 2011). Other teams, focusing on the reuse of materials, intensified their research about it. In this phase, the Material Driven Design methodology (MDD) (Karana et al. 2015) was presented to the students, suggesting intense experimentation, not only considering material's technical properties, but also aiming to understand how it is perceived by the people, how people react to it, as well as the 'MET Matrix', an environmental impact analysis tool for an overview of environmental priorities and that does not require a high degree of accuracy (AEP 2013).

5.3. Phase 03 - Development

The third phase concerned the materialization of the concept, product development, prototyping and communication, as well as the validation of results, ensuring that all the briefing requests were considered. At this stage the students applied the "Value star" tool (Krucken 2009), which provide dimensions for evaluating the quality of products and services, assisting the designer in the construction of the product experience.

6. Results and challenges

The PBL approach organizes learning around a problem and is accomplished through the development of a project. This is a central principle to increase student motivation (Kolmos et al. 2008).

The challenge is a starting point, and students work on a single task, performing complex problem analyzes and outlining their own problem-solving strategies. The theory-practice relation happens as the theory is used in the analysis of real-life problems and empirical methods are applied in solving these problems.

In this case study, it was possible to realize how the accomplishment of the methodological exercises made possible different project approaches. The exercises Empathy Map, Persona and Moodchart were important drivers for the Luza (Figure 8), Cinzé (Figure 1), Traineira (Figure 4), and Quibom (Figure 7) projects, which have in common a concept built around a single user profile, resulting in products that try to meet a specific need, focusing on usability. The phase of materials' experimentation, guided by the MDD methodology was fundamental for the Escama (Figure 5) and Poisson (Figure 3) projects. In these cases, the product concept was structured from the materials' tests and experimentations. Both are good examples of material driven design projects.

Figures 2 to 10. Products developed by students (Source: courtesy of the authors).



7. Survey with students

After completing this process, a survey was held with the group of students of this course, in order to evaluate the level of enrolment and interest provided by the proposed activity. The questionnaire was applied digitally through online form. Twenty eight students (out of 38) participated on the survey (74%). Of this sample, 68% are female and 32% are male, 93% are between 21 and 30 years and 7% above 31 years. Most of students (70%) are graduated in design and its different areas, 10% in architecture and 7% in engineering. Regarding professional experience, 37% never had professional experience with design. Regarding specific design skills, empirical academic knowledge predominates in the group.

The results show that to be involved with a real problem helps the student to get involved and to be motivated. All the interviewees considered the possibility of seeing the final product manufactured as "very interesting". Being in contact with a real customer and the contact with suppliers and real experts was highlighted by 93%. The greatest difficulties listed were time management (64%), prototyping (54%) and team management (43%). Regarding the learning perception, students pointed some project phases that brought them knowledge and skills they did not have previously: to develop a project with social/environmental approach (68%) and material tests in laboratories (68%). 71% of students cited as main motivation the possibility of cooperating with an environmental action. Regarding theoretical and practical learning levels, 38% did not know and 29% had only theoretical knowledge about the used design methodologies (Empathy Map, Moodboard, MDD, Values Star, MET Matrix). On this experience, they had the opportunity to apply them in a real case for the first time. Among them, the MDD, the Empathy Map and the MET Matrix were the least known.

8. Final considerations

Considering the importance and urgency of the transition towards sustainability, and the need to rethink design to cooperate with the construction of this new way of life, it is fundamental to educate new aware and engaged professionals to this new reality. To do so, this research looks for methodologies to sensitizing and raising awareness among students, who may act in the future as connectors and facilitators, quality producers, and designers as catalysts for change (Fuad-Luke 2009). According to Papanek, no environment can strongly affect a person unless it is strongly interactive. To be interactive, the environment must be responsive, that is, must provide relevant feedback to the learner (Papanek 2005). In this activity, the use of the PBL methodology was fundamental to provide great involvement and extra motivation, as it allows the students themselves to establish project objectives and means to reach them. The tutors offered tools and a safe orientation, but the self-management of the teams was crucial for the fundamental personal skills development to a future good performance. The positive experience evaluation as well as the indicators of knowledge improvement and increasing environmental and social components valorization in design practice point to the necessity of new studies in the same line of research, thus seeking to contribute to the academy in training designers for sustainable innovation.

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BUILT ENVIRONMENT EDUCATION FOR YOUNG PEOPLE: ARCHITECTS AND URBAN PLANNERS USING CULTURAL HERITAGE AS A LEARNING RESOURCE

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Abstract

Built environment education (BEE) uses tangible objects produced by humans, which constitute our built environment (BE) (i.e. buildings, bridges, monuments) to enrich learning for children. Monuments as facets of our material culture can be focal points of BEE. Cultural heritage has been used as a teaching resource in social studies, cultural geography, (art) history, and sustainable development. Although architects use monuments as BEE curricular resource; looking at the existing academic literature the topic is difficult to discern. Therefore, the article will critically reflect on Lost Traces projects - a Bavarian project for school children on cultural heritage. In 23 projects, through creative spatial interventions pupils had an opportunity to interact with historic relics, archaeological traces, abandoned buildings and constructions, rediscover and bring the *'lost places'* in into the public awareness, thus transforming the relics into a common European future. In order to critically reflect on the practice of architects and urban planners as educators using monuments as a curricular resource, and a learning context, a further debate is needed regarding the understanding of cultural heritage and the educational processes around them as constantly evolving cultural constructs, the role of *the educative planners*, and the quality of design and planning tools as educational tools.

Keywords: *Built environment education, cultural heritage, monuments, architects and urban planners, youth participation.*

1. Introduction

Built environment education, also named architecture education, utilizes settlements, buildings and landmarks – as a subject, a context for learning and a curricular resource (Million and Heinrich, 2014). BEE incorporates educational activities related to cultural, arts, democratic, and environmental education using BE facets. BEE aims to support pupils' development of critical thinking in connection to spatial issues and high-quality BE, foster environmental stewardship, inform about participatory and democratic decision making processes, and ultimately help pupils understand *"the interrelationships of humans with their environments in the past and present and in different parts of the world"* (Graves, 1990: 2). Monuments as facets of our material culture can be focal points of BEE. Cultural heritage can enhance teaching of curricular subjects, can provide *par excellence* cross-curricular opportunities; transforming abstract concepts from textbooks *"into tangible realities and intriguing stories about their everyday world"* (Hunter, 1993: 2), while assisting pupils to appreciate local history and culture, and comprehend the importance of historic preservation. Educational projects involving monuments as a BEE curricular resource can be found internationally. Important contributions are coming from the English Heritage (Bradley et al., 2011) in the UK, *'Baukultur Aktiv'* (active building culture) program from Switzerland (Fachwerk, n.d) *'Denkmal aktiv - Kulturerbe macht Schule'* (active monument - cultural heritage makes school) program from Germany (DSD - Deutsche Stiftung Denkmalschutz, 2018), and Teaching with historic places (2016) from the USA. This paper seeks to discuss *'LOST TRACES'* (LT) project as a mean to illustrate architects and urban planners' ways of working as educators, specifically focusing on using cultural heritage as BEE curricular resource, as well as to distil topics to initiate the future debate in this field.

2. Literature review

Preliminary analysis revealed three groups of literature. The first group of studies consists of policy documents. On the European level the issues of teaching with BE, and monuments as a facet of BE, are addressed through Davos Declaration (2018) and Council of Europe (2005). ‘*Baukultur*’ or building culture in German, “*embraces every human activity that changes the built environment*”, it embraces all designed and BE facets and their relation to natural environment; it includes planning and design processes, landscapes, cities, villages, infrastructure, buildings, monument and cultural heritage elements (Davos Declaration, 2018: 10). The Davos Declaration (2018) stressed that: “*There is an urgent need for a holistic, culture-centered approach to the built environment and for a humanistic view of the way we collectively shape the places we live in and the legacy we leave behind.*” (p.10) In a similar fashion the Council of Europe (2005) through Faro Convention aimed to enhance participation in cultural heritage, stressing that cultural heritage should be understood as a legacy in a built form, resultant from the people-places interactions through history, with “*which people identify, independently of ownership, as a reflection and expression of their constantly evolving values, beliefs, knowledge and transitions*” (p. 2). These policies accentuate the importance of active engagement and citizen participation in decision making processes about space, as well as the knowledge about the origin and the effects of space and its facets. BE should be made a central educational topic, addressed at all levels of education (Art. 13, Council of Europe, 2005: 5-6; Davos Declaration, 2018: 12), as this so far was rarely the case.

The second group of studies reveals that monuments can teach about local cultural heritage in heritage and history (Moreeng, 2014), social studies (Hunter, 1993) and sustainable development (DSD, 2018). The empirical evidence highlights including cultural heritage in the curriculum, as 58% of teenagers from a study by Bradley et al. (2011) perceived at least one historic building in the local area, as distinctive, and personally significant. Yet, Moreeng (2014) calls for the reconceptualization of the cultural heritage teaching in schools to allow critical approach able to enhance pupils` deeper understanding of the heritage. The work of architects and urban planners as educators can hardly be discerned in the existing academic debate. Brković Dodig (2018) mentioned the role of architects when teaching BEE with historical buildings in a museum context. Plein (2009) explored *Denkmalpädagogik* (monument pedagogy) projects in German schools where architects and urban planners took part. Heinrich and Million (2016) researched the engagement of young people in neighborhood development projects including the (re-)use of cultural heritage.

Observing the work within the third group of literature consisting of educational guides for teaching/learning with monuments (Fachwerk, n.d.; Schmidt-Breitung and Michels, 2018; DSD, 2018), the role of architects as creators and facilitators of BEE programs with monuments in focus can be seen. However, their contribution to the existing academic debate is scant. Architects and planners seldom find time to critically reflect on their practice as educators; thus, we lack constructive criticism, knowledge exchange and stronger evidence base. This paper ventures into narrowing this identified gap.

3. Objectives and methodology

The aim of this paper is: to examine and provide a brief overview of this emerging field through literature review, in order to contextualize the work of architects and urban planners as educators when using cultural heritage as a BEE curricular resource; to explore one illustrative case study to provide critical analysis based on it; and ultimately develop key points interpreted through existing theory and literature, coming from both architecture, pedagogy and education, in order to formulate important points which can hopefully initiate the future discussion.

A qualitative methodology and an inductive approach was adopted, to explore a deeper meaning behind human experiences, and to “*document the world from the point of view of the people*” participating in the research – from the architects` and planners` working as educators point of view; and in that way provide a “*deeper understanding of social phenomena*” (Silverman, 2008: 8) - the use of monument as a BEE teaching resource. A case study strategy offered the opportunity to build a rich picture of this phenomenon, in a particular context (Yin, 2008). Case studies are flexible allowing exploration while the research unfolds, they accentuate in-depth context, and lead to creating hypothesis that can be later tested. An illustrative case study of ‘*LT*’ project was adopted as a mean to make the unfamiliar work of architects and urban planners-educators more familiar. Illustrative case studies are useful in describing what the situation is like, in interpreting other data, thus creating a common language between authors and readers coming from different professions (Davey, 1991). A qualitative research technique - focus group discussion was select as it allowed us researchers to: “*assembles a group of individuals to discuss a specific topic, aiming to draw from the complex personal experiences, beliefs, perceptions and attitudes of the participants*” (Nyumba et al., 2018: 21). Five architects and urban

planners, including the authors, working as researchers and practitioners in this field held three workshops. In the first one they reviewed available knowledge in the field, and in the second one they in-depth discussed the 'LT' project. The first two workshops were audio recorded and later transcribed. For analyzing the transcripts, qualitative content analysis as explained by Mayring (2000) was applied. The first and the second author coded the transcripts in search for the categories that kept reappearing. Through a feedback-loop categories were reviewed, and ultimately reduces to the main ones. Afterwards the third workshop was facilitated so that all participants could reach consensus and establish themes able to initiate further discussion. Interpretation of the data was further supported by existing theory and literature from the fields of architecture, pedagogy, and education. This process ultimately led to the development of a key set of messages that might usefully inform the work of architects and urban planners as educators within the BEE field.

4. Case study

'LT' project was selected as an illustrative case study. As this study does not aim to infer from this sample to a general population, non-probability convenience sampling was adopted. It fitted this small, pilot, exploratory study aiming to generate the first hypothesis to be further tested, discussed and refined. *'Lost Traces... eine baukulturelle Spurensuche'* (search for traces of cultural heritage) was a part of the 2018 European Year of Cultural Heritage. It was developed by the Landesarbeitsgemeinschaft (LAG) Architektur und Schule Bayern e.V. (regional working group Architecture and School in Bavaria). The project aimed to encourage young people to actively engage with historic relics as traces of European cultural heritage, and through a series of educational and artistic engagements, transform them into the elements of a common European future (the future perspective is probably the greatest difference of how historians and conservators use monuments in education). All the projects stressed examining the cultural heritage in relation to its context. 'LT' used historical relics in the landscape, hidden archaeological traces, urban wastelands, abandoned buildings and constructions which reveal European cultural heritage. These places over time have: *'fallen into oblivion'* and their *'demolition, conversion or development is currently publicly discussed'* (LT, n.d.: 6). Locally significant buildings that still do not have the official monument status were included. 'LT' comprised of 23 individual projects, mainly carried out in secondary and high schools (age 10-18) in Bavaria and implemented through a cooperation with local partners. Teachers worked with professionals from monument conservation, archaeology, urban development, architecture, and creative industries in order to connect teaching with monuments and cultural heritage themes. The projects took place during 2017/18 and 2018/19 academic year, lasting from a few days to a whole school year. The authors participated in several project workshops, which enabled them to have a closer look at how teaching with monuments was organized within the project.

'LT' projects were based on self-directed and practice-oriented learning. Each project began with the site exploration – photo and video documentation were made, books were researched and locals interviewed so that the places could be personally and collectively experienced. Drawings, photography, collages, maps, and 3D models assisted pupils to deepen their thinking about the place, as well as to showcase individual and group sentiments and ideas. Afterwards pupils researched the archives, analyzed the maps, and develop their own question in order to understand the potential of the place as a cultural heritage site. The last phase tasked pupils to find new spatial qualities, thus new functions and usages for the sites. Pupils ideas and suggestions were developed through creative spatial interventions, artistic scenography, street art, light installations, guided tours, exhibitions, concerts or communal meals. In this way pupils actively engaged with the site, its history and its potential, rediscovered it, draw public awareness, stimulated discussion, tested new uses, and provided ideas for future development.

5. Discussion

Through the group discussion the experts reached consensus around four following themes that should serve as an invitation, trigger and stimuli for further debate.

BE features as curricular resource should be perceived as a constantly evolving cultural construct. Architects and urban planners' understanding of space, thus of monuments as learning objects, is informed by the works in sociology and architecture that challenge conventional understanding of space. In particular they are informed by Lefebvre's work stating that space is produced through social action, and should be seen as a dynamic construct, consisting of physical location, actors and activities, which are continually transforming each other. The educational practice of architects and urban planners goes in line with the criticism coming from education and cultural heritage studies. Cultural heritage should not be perceived as a collection of factual data, and should not only be read through the standardized notion that history is a sum of information about the past without being contextualized in the present (Moreng, 2014). Pupils should have an opportunity to (re-) negotiate *"the representation of a*

collective memory through the creation of their own monument” (Uhrmacher and Tinkler, 2007: 11). The accent should be put on cultural heritage interpretation. In the ‘LT’ project called *Raumlabor Spitalkirche* different generations – pupils, teachers, parents, grandparents and other residents, explored history of the local church through personal family stories and negotiated interim future uses. While one group at the end built a huge chandelier as an architectural installation, the other shot a VR film to explore their church vision virtually. Understanding that space is not a fixed construct architects and urban planners as educators invited pupils to enter a personal, critical and creative dialectic relationship, embrace the visions of others, in order to explore current monument and transform them into ‘their own’.

The knowledge as well as the space is constantly evolving cultural construct. Therefore, architects as educators put stronger accent on the quality and richness of the educational experience. The learning was not result, goal and assessment oriented. The ultimate task was not a production of a piece of work (essay, photos, presentations etc.) that could be later marked; as it is often the case in schools. Instead, the accent was on iterative learning cycles, where one stage manifested in the form of an essay, a photo or a presentation could inform and initiate the next one, thus forming an educational continuum. The goal was to convey to others a tangible sense of individual learning experience of the topic learned. In order to explore and analyses ‘lost traces’ in different ways pupils combined inspiration collages, plan analysis, with photo documentation and search in archives. Gathered historical information was paired with personal impressions of a monument. The pedagogical value of such educational experience is in the performative relationship between the pupil and the monument. Teaching with spatial features defines pedagogy not as a “*curricular craft whose goal is the transfer of knowledge, but rather as the production of conditions that make movement to and from bodies of knowledge possible*” (Lee, 2008: 194). Ellsworth (2005) argues that space as pedagogies are about putting into relation the inside (inner thoughts, memories, ways of knowing and being, fears, and desires) and the outside (others, events, history, culture, and socially constructed ideas). In her words: “*Architecture becomes pedagogical, pedagogy becomes architectural when they create fluid, moving pivot place that puts inside and outside, self and other, personal and social into ... a mutually transforming relationship*” (p. 38, 41) (Ellsworth, 2005).

Architects and urban planners as educators work as ‘*the educative planners*’; they take the role of “*a facilitator of personal empowerment and social transformation, and foster social learning and participation*” (Million and Parnell, 2017:78). Their work is informed by Vygotsky’s (1978) ‘*Zone of Proximal Development Theory*’ as they assume that children co-construct knowledge with more experienced adults; as well as by the concept of transformative pedagogy by (Giroux, 2011) suggesting that teaching is an emancipatory reciprocal process impacted by political, ethical and moral realm. As one of the ‘LT’ projects shows a central concern of *the educative planners* working with pupils was on making cultural heritage experience available for the public. In the ‘*Regensburg Anatomy Tower*’ project they decided to present the results in a form of a guided tour of the tower, offered at a local festival, thus transforming the tour into a dialectic educational experience, where pupils could benefit from the knowledge and perspective of the visitors, and vice versa. The quality of such learning process is in stimulating the pupils to act as curators of their own educational experience while working alongside architects, urban planners, teachers, restaurateurs, conservators and craftsman as advisors and partners.

Architects and urban planners appropriate design tools, learned at university and used later in practice, and transform them into BEE tools. In ‘LT’ project mapping, photography, scratching, painting, drawing, dance and performance, were combined to enable engagement with the learning materials according to each pupil’s personal predispositions and learning style. These tools stimulate personal and often sensory engagement with the learning materials, making the feelings and the impressions an inextricable part of the learning process. The learning process aided with these tools reassembles the architectural design and planning process, where numerous iterative phases must be carried out, with the help of several tools, so that one object is designed.

6. Conclusions

The success of the BEE project as learning experiences with monuments in focus can be attributed to several factors. When using cultural heritage as curricular resource for children, architects and urban planners as educators, challenge the standardizes and general perceptions of a monument and its meaning through a learning processes designed to be personally relevant, self-directed, with self-initiated topics; allowing a multitude of learning styles, personal interest, individual capabilities and creative impulses to be enacted through the educational experience. They ventured into creating a longer lasting ‘*relationship*’ with the monument, thus longer lasting educational effect, that stays vivid in children’s memory as it was personally relevant and personally experienced. Such educational processes can potentially transform pupils into the cognizant future citizens, able to identify locally important BE issues, and take knowledgeable action towards them; value the importance of local heritage and initiate their preservation – important aspects advocated by both Davos Declaration and Faro Convention.

The goal of this paper was not to make any great claims and provide conclusive answer, but instead to start a reflection on educational practice of architects and urban planners when using cultural

heritage as curricular resource. If we argue that space as educational object, as well as the knowledge, is a constantly evolving cultural construct what practical consequent for teaching does that has? Also, what theories are framing and informing our work? So that the larger number of children can benefit from such educational programs who is the most appropriate facilitator - schools that cater to the needs of the widest children population, but are assessment, goal and final product driven; or museums and children`s clubs who can facilitate such open ended educational experience, but are usually costly? How can we advance our teaching practice without critically reflecting on our work as educators? How do we modify and appropriate design tools to be successful educational tools? The ability of *the educative planners* to foster good quality educational experiences in the future, using monuments and other facets of our BE as curricular resource, will heavily depend on our ability to answer previously posed questions, open up the debate, and exchange knowledge with educators, pedagogies, psychologists and other relevant professions, so as to critically reflect on our successes as well as failures.

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FLIPPED FOR CRITICAL THINKING: EVALUATING THE EFFECTIVENESS OF A NOVEL TEACHING APPROACH IN POSTGRADUATE LAW MODULES

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Abstract

Flipped classroom is a novel model that can help students develop their learning skills of critical thinking in postgraduate law program. The assumption is made that the flipped classroom benefits students by fully engaging in learning experience through team working and pre-designed class activities with tailor-made questions. The literature about flipped teaching reveals that the flipped model is still underutilized and underexplored in the higher education law teaching. This study thus aims to fill in this gap by developing a model that can provide a foundation for further research and practice for flipped learning in higher legal education. This study presents information about how this model promotes greater critical thinking. The proposed research and design model is a threefold dimension. Every dimension is at the right angles to other dimensions comparing flipped classroom effective rating with: i) different communicative learning stages, ii) engaging experiences, and iii) final grade). This model was implemented in a flipped classroom environment and evaluated based on Module Evaluation Questionnaires and final module grades.

Research was conducted using eleven-week-long postgraduate law modules of “international trade law”, “international human rights law” and “international criminal law”. The participants in the study were 65 postgraduate students who were attending the above three law modules at Coventry University in the academic year 2017/18 and 2018/19. Data was collected from students who completed module survey in each term and submitted summative assessment for their final module grade.

Result shows that over 90% post graduate law students found the flipped classroom model to be either effective or very effective to promote critical thinking. Students who perceived effectiveness of the flipped classroom had a significant association to their academic performance in the course as measured by their final grade. However, students who found the flipped classroom to be effective were more likely to be satisfied with their learning experience with their counterparts and interaction with lecturers.

Keywords: *Flipped classroom, critical thinking, learning experience, problem-solving activities and team working.*

1. Introduction

The face of legal education is ever changing and constantly evolving. A growing body of literature suggests that recent advances in high technology is shifting the law teaching and learning into a new direction in high education. Advances in high technology have led to a number of “blended learning” (Bergmann and Sams, 2012) initiatives which combine classroom and online learning across the global and in the United Kingdom. These initiatives are now seen as playing an increasingly more influential role in the way today’s law students assimilate information and learning within an educational setting. It is submitted that blended learning can help maximize lecturer efficiency, increase student engagement, enrich students learning experience, and improve retention rates. One of the applications of blended learning that has been widely recognised by scholars and practitioners (Baker, 2000; Bate et al., 2012; Lage et al., 2000) is the flipped classroom. The flipped classroom is a new pedagogical teaching and learning approach that can helps students develop their learning skills of critical thinking. The most common features of the flipped classroom involve providing instructional resources for students to use outside of the class with the aid of social media and online networking and freeing up class time for more engaging activities facilitated by lecturers.

Attitudes towards the flipped classroom differ among different authors. Supporters of the ‘flipped classroom’ describe it (Millard, 2012) as a creation of a video lecture, screencast, or vodcast that teaches students the concept, freeing up class time for more engaging and often collaborative activities typically facilitated by the lecturer. Miller (2012) defends flipped classroom by addressing “students prepare for class

by watching video, listening to podcast, reading articles, or contemplating questions that access their prior knowledge.” Conversely, critics claim that there were some gaps in the area of this pedagogical design, including the lack of a comprehensive research model, insufficient discussion of digital learning platforms, and lack of design guidelines for course activities (Baker, 2012; Driscoll, 2012; Fulton, 2011). Some scholars have criticised the flipped classrooms saying that “it privileges the educator’s view and ignores the student’s point of view” (Chen et al., 2014), other argues that the flipped classroom “lacks specifications about individual learning space (both formal and informal) and learning platform (Hamdan, et al., 2013).

Yet, none of these views identify how many dimensions/aspects should be included in a flipped classroom implementation for law teaching, and what learning skills students are expected to develop under the different dimensions. Therefore, my flipped classroom model will fill in this gap by flipping the traditional in-class lectures and contents outside of the classroom with self-directed home learning and collaborative activities, and freeing up classroom time for active learning, including group presentation/debate, tutor’s clarification and knowledge application. This study aims to provide a foundation for further research and practice for flipped learning in higher education of law teaching with a threefold dimension focusing on i) different communicative learning stages, ii) engaging experiences, and iii) final grade). The principal aim of flipped classroom is to help students develop study skills of critical thinking, which will be of crucial significance for law students. The development of critical thinking could, on the one hand, hinge on students’ final module grades and facilitation of their learning experience by more effectively interact with and learn from their peers. On the other hand, the lecturer was given more flexibility to cover a wide range and depth learning materials, provide in-class applied learning opportunities based on problem-solving activities and offer timely feedback and guidance to students. Yet in my study, the flipped learning approach had its fair share of challenges, which were largely dependent on the use of and management of IT technology on Moodle module website. Despite these challenges, the flipped classroom is an effective teaching approach at the postgraduate level setting for developing the skills of critical thinking.

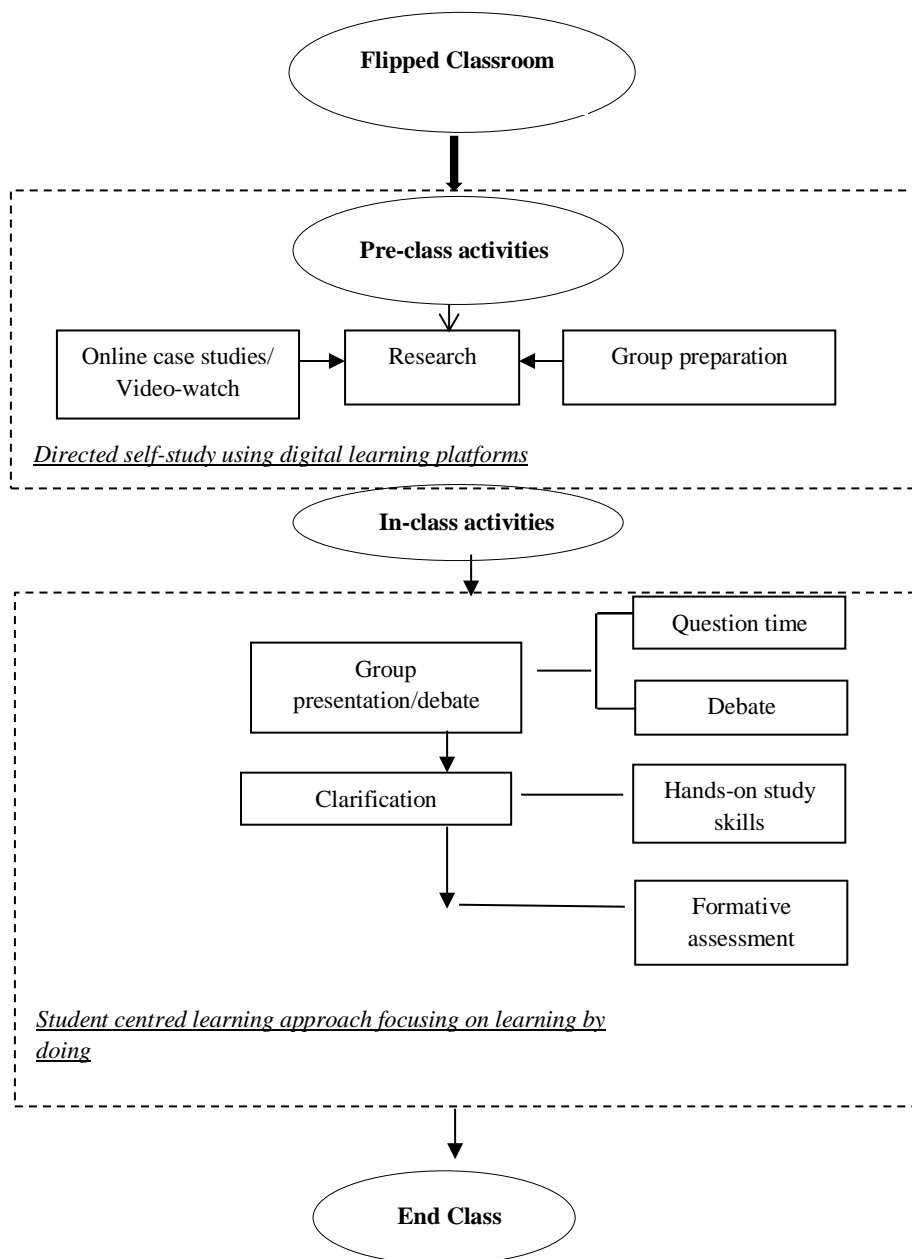
2. Structure and setting of the flipped classroom

The objective of the postgraduate law flipped classroom was twofold: i) to help students develop learning skills of critical thinking and; ii) to promote student’s self-responsibility for their studies by fully engaged in the learning experience. To this end, my flipped classroom was designed into two stages with four components. Two stages are in-class and outside class stages. The four components are pre-class activities, in-class activities, tutor’s clarification and knowledge application with the aim to promote a positive learning environment so as to stimulate flexible learning, intentional contents, self-responsibility and team work environment. The setting of my flipped classroom emphasized a “learning cycle” (Gerstein, 2011). Students prepared for class individually by conducting out-of-class activities at home with tailored questions directed by the lecturer. In order to make meaningful connections between homework and in-class activities, students were assigned into adversary groups preparing for their presentation after individual activities. The pre-class learning pedagogy improved students’ communication skills by working with their study groups conducting research and preparing for class, which provided students with opportunities to tackle and resolve problems in the topic, to identify legal issues of the case under discussion, and be able to work effectively with culturally diverse individuals. In class, students were allocated into adversary groups for group presentation and debate in order to promote their skills of critical thinking. After the students’ presentation and debate, the lecturer clarified the issues relating to the subject matter under discussion to enable students to comprehend the subject matter in great depth.

My flipped classroom contained a cycle beginning with an-individual-online-case study or individual-home-video watch on the Moodle module website; followed by a period set aside to work in teams and then a session of feedback from the lecturer. The final and crucial component of my flipped classroom was the knowledge application to test the efficiency and effectiveness of learning experience. The mode to conduct such a test was to ask students to write a case note in a manner of formative assessment directly relevant to online cases or video watch. My flipped classroom served to emphasize every learning process – pre-class digital aid learning activities, in-class student-lecturer interactive activities and knowledge application.

In this pedagogical design, students researched the norms or principles of the topic they came across while studying online cases or watching online videos, and they are more competent, active and self-became motivated. To boost pre-class activities, online discussion was launched for students to share their views of the topic under discussion, and the Moodle lecturer-student communication platform was also adopted in order to answer students’ enquiry timely and support those students who are confused.

Figure 1. A typical flipped classroom showcases a learning cycle for critical thinking.



My flipped classroom excelled in the flexible learning environment, classroom culture, lecturer’s steering gear and learning by doing, characterized as following:

- To support a flexible learning environment, a variety of learning modes has been launched to enable students choose where and when they learn - reading online case studies or video watching at home, in campus, on the train and so forth.
- The classroom culture shifts from a lecturer-centred learning approach to a student-centred learning approach, freeing up valuable class time for exploring topics in depth via group presentation/debate, thus creating rich learning opportunities.
- The lecturer gears in-class presentation/debate to clarification by prioritizing legal issues in order to develop students’ learning skills of critical thinking.

The above components for pedagogical design facilitated “learning by doing” (Dewey, 1916) and deep learning, which computer platforms playing an important role as students participated in and evaluated to their learning using computers. The term “Learning by doing”, in Jone’s (Jones, et al., 2008) view, means “Learning by Networking”, where students rely heavily on social media and online networking as a supplementary learning tool. Both “Learning by doing” and “Learning by networking” reflects a current trend in higher education emphasizing the activities-oriented nature of flipped learning. Students preferred the flipped classroom because of the individual learning pace and learning platforms, where students

learned using any device, at any location, and through a multitude of competing platforms (Chen, et al., 2014). The lecturer adjusted his/her methodology to accommodate students who might be reading online cases or watching videos from different parts of the UK to promote active learning and promoted students fully engaged in the study experience.

The flipped classroom also aims to promote classroom culture. The shift from a lecturer-centred culture to a student centred culture aimed to enrich the student learning experience and keeps students alert, enthusiastic, and engaged in knowledge acquisition and construction. The student learning experience is a crucial factor for gauging whether a new learning method is successful (Teng, et al., 2012) because how students experience their education determines the effectiveness, efficiency and success of flipped learning. Therefore, keeping students alert, enthusiastic, and engaged in a flipped classroom determines the success and effectiveness of a flipped classroom.

For law teaching, critical thinking skill is a skill that lecturers should help students to develop. The critical thinking skill can be stimulated by inputs from both lecturers and students. Simply a more robust model of flipped classroom must include students and lecturers' perspectives – lecturers content planning and activity design and students contribution to their point of view of the topic through pre-designed in-class and out-of-class activities to support deep learning, thus develop critical thinking skills.

3. Participants and data collection

The participants in the study were 65 postgraduate law students who were attending the modules of either “international trade law” or “international criminal law” and “international human rights law” at Coventry Law School in the academic year 2017/18 and 2018/19. Data collected from students who completed Module Evaluation Questionnaires (MEQ) during the period of studying these modules and submitted summative assessment for their final module grade. MEQ surveys were administrated to students in class with an online survey code through an independent module survey team and teaching staff was required to leave the room for a 15-minute survey while students were filling in the forms of MEQ. Data collection was on the same day in class, normally in week 8 of each term. Participation in this study was voluntary with no tangible incentives provided to the students. Participant anonymity was maintained throughout the MEQ. This survey code will be returned to teaching staff after the survey team completed data analysis and teaching staff was required to provide feedback on the Moodle module website. The survey contained 22 questions in total, 20 of which were selected response range from definitely agree, mostly agree, neither disagree nor agree, mostly disagree to definitely disagree and 2 were open-ended questions.

Table 1 of Module Evaluation Questionnaires shows the survey result relevant to the questions of effective learning and learning engagement based on 65 students who completed the MEQ. The survey questions are listed on the first column, the second-to-the-sixth-column demonstrates the percentage of student's feedback on the modules, ranging from agree to disagree. The numbers in brackets are the reflection of student's agreement with the survey questions.

Table 1. Module Evaluation Questionnaires.

Module Evaluation Questionnaires	Definitely agree	Most agree	Neither disagree nor agree	Most disagree	Definitely disagree
I have had the right opportunities to work with others to enhance my learning	50% (33)	37.5% (24)	12.5% (8)	0	0
CU Online is used effectively to support my learning”	42.9% (28)	42.9% (28)	0	14.2% (9)	0
I have received helpful and timely feedback on my work	37.5% (24)	62.5% (41)	0	0	0
This module is intellectually stimulating	45.5% (30)	54.5% (35)	0	0	0
This module has provided me with opportunities to apply what I have learned	80% (52)	20% (13)	0	0	0
This module has challenged me to achieve my best work	81.8 (53)	18.2 (12)	0	0	0
This module has prompted me to explore ideas and concepts in greater depth	72.7% (47)	27.3% (18)	0	0	0
Sufficient academic advice and guidance are available on this module	54.5% (35)	36.4% (24)	0	9.1% (6)	0
Moodle and/or other online learning environments are used effectively to support my learning	54.5% (35)	36.4% (24)	0	9.1% (6)	0

4. Assessment of the modules

At the beginning of each term, a module guide of course syllabus was provided to students that concisely introduced them to the nuances of the flipped classroom while clearly articulating the assessment aspects for the module. In this study, the flipped classroom used both formative and summative assessment of students' learning.

The formative assessment was predominantly centred on in-class assessment as articulated in the preceding section. The in-class formative assessment permitted students to be purposively engaged in their own learning by consulting lecture notes, books, statutes and cases while it enabled the tutor to provide real-time guidance, and as appropriate fill in the students' gap in knowledge. The formative assessment was composed of one title for students to write on. The priority concern of formative assessment is to provide feedback to students to enable them to write a high quality coursework for summative assessment. The summative assessment was consisted of two topics for students to choose: one is an essay and the other one is a case study, which assessed the students' ability to critically read, extract, footnote and analyse information and encouraged students to use higher critical thinking and reasoning skills that reflected the learning outcomes and skills of the modules. The blending of both summative and formative is good to develop reflective practice in our students and encourage them to revisit completed work for their further development. Students make progress dramatically from failed in their formative assessment up to around 50/60 marks, some students achieve a mark up to 70 marks in their summative assessment for the modules.

Undoubtedly, the flipped classroom brings student's different learning styles into play and improves their study skills of critical thinking and self-responsibility for their studies as they participate in and evaluate their learning. Moreover, formative and summative assessment demonstrated that student learning outcomes are improving year by year in the past two years.

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USE OF BEHAVIOR MANAGEMENT STRATEGIES IN CHILDREN WITH AND WITHOUT DISABILITIES: A COMPARATIVE STUDY OF GREEK PARENTS' AND TEACHERS' OPINIONS

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Abstract

Behavior problems either at school or at home are a great challenge for all people that are responsible for a child's upbringing and education, that is mainly parents and teachers. Teachers often encounter intense stress and discomfort about the classroom management. Moreover, family tranquility and balance are disrupted, since the behavior problems management on the parents' behalf causes stress and anxiety to all members. Thus, taking into account parents' and teachers' physical and psychological exhaustion in their everyday life, the use of positive discipline strategies seems to be a great challenge. The aim of the current study is the investigation of the similarities and differences in the use of behavior management strategies by teachers and parents, as they state them. The research questions were a) which strategies do parents most often use and which do teachers use? and b) do parents or teachers more often use positive discipline strategies? Participants, 110 parents and 200 teachers (of primary and secondary education), were randomly selected and came mostly from cities in Central and Northern Greece. The instruments used were the Teacher Classroom Management Strategies Questionnaire (TSQ: Webster-Stratton, 2002) and the Parent Practices Inventory-Interview Form (PPI: Webster – Stratton, 1998). The results show that, in general, Greek parents manage behavioral problems mostly by using positive verbal discipline strategies, while Greek teachers state that they mostly use coaching, praise and incentives and they, also, almost equally use proactive and SEL strategies, even though only 30% of them have applied a social and emotional learning program in their classroom. Concerning the second research question, teachers seem to use positive strategies more often than parents. The current study has important implications for the scientific field, as its results could form the basis of the design and implementation of a Social Emotional intervention or training program for teachers and parents, who constitute a basic factor in the management of a child's behavior problems.

Keywords: *Teachers, parents, children with disability, behavior problems management.*

1. Introduction

The role of the family in the child's social development is extremely important and may even be a risk factor or a protective factor, one of which is the way parental education. According to some researchers, there are three types of education: authoritarian, permissive or democratic (eg, Herbert, 2000), while others add to the neglected way of education (eg, the British Medical Association Board of Science, 2013). Equally important is the role of the school, in particular the teacher, in the social and emotional development of the students through the interactive relationships within the school. According to Glickman and Tamashiro (1980, 460), teachers' beliefs towards discipline on a continuum of control reflect the extent to which teachers want to exercise control on their students' behavior. So, teachers can be: interventionists, non-interventionists or interactionalists.

Several studies have been carried out to compare parents 'and teachers' views on what is a behavioral problem (eg, Phares, Compas, & Howell, 1989) and their causes (eg, Snyder et al. 2005). In addition, for each group, investigations have been made on the use of a specific dimension of parental behavioral behavior management such as hard discipline (McKee, Roland, Coffelt, Olson, Forehand, Massari, Jones, Gaffney, and Zens, 2007) or for using teacher techniques (eg Tillery, Varjas, Meyers, & Smith Collins, 2010). Also, in the context of Incredible Years Project surveys, there have been studies on the use of management techniques of the two groups before and after the corresponding training program (Fergusson, Horwood, & Stanley, 2013; Rosanbalm & Christopoulos, 2011). Therefore, the comparison of

parents' and teachers' views on the behavioral management techniques they use is a research that has not been done so far and constitutes a matter of a great pedagogical research. Moreover, because of parents' and teachers' stress and fatigue, and often negative attitudes, positive behavioral support and the use of positive discipline strategies to tackle behavioral problems at home or at school are challenging and will be a research question for the current study.

2. Objectives

The aim of the current research is to investigate similarities and differences in the use of behavior management strategies by teachers and parents, as they state them. Specifically, to achieve this purpose, the following research questions were formulated:

- a) Which strategies do parents most often use and which do teachers use?
- b) Do parents or teachers more often use positive discipline strategies?

3. Methodology

3.1. Participants

Two separate surveys were conducted, so that conclusions would be extracted concerning the use of behavior management strategies used by teachers and parents, as they state them. Participants in the first survey (Leonidou & Kartasidou, 2016) were teachers from schools in Central and North Greece, mostly working in primary than secondary education. There were 146 women (73 %) and 54 men (27%) in various ages ranging from 23 to 59 ages with 47.8% of teachers at the age range 44-54, 25.3 at the age range 20-34, 18.3% between 35 and 44 and last 8.6% of the teachers aged 55 or older. There were 98 special educators (36.5% of whom were working in special primary schools, 11.5% in integrative classes and 1% in parallel support) and 102 general educators (51%). In a question posed to them about whether they have ever implemented a Social Emotional Learning (SEL) program only 31% answered positively.

Participants in the second survey (Leonidou & Kartasidou, 2018) were 110 parents /caregivers from Central (31,5%), North (57,7%), South Greece (5,4%) and greek islands (5,4%). Mostly mothers (83,8%) completed the questionnaire and only 12,6% fathers and 3,6% guardians, who are authorized to act as the child's parent (in the current study, the term *parents* will include both biological parents and guardians of a child).

3.2. Procedure-Analysis

The survey concerning teachers was conducted during school years 2013-14 and 2014-15, after a personal contact with the participants in order to inform them about the aim of the survey. The second survey, concerning parents, was conducted during school years 2015-16 and 2016-17 after a written contact with the participants to inform them about the aim of the survey. The questionnaires were anonymously completed either in written form or in google form available online by the researchers. The answers were analyzed separately with the statistical package of SPSS 20.0 and 24.0 respectively. Finally, results of similar sections of the two instruments were compared, so as to draw conclusions concerning the research questions.

3.3. Instrumentation

Two different instruments were utilized for the collection of information. The Copyright of the instruments belongs to the Incredible Years project (IY), which is a series of interlocking, evidence-based programs for parents, children, and teachers, supported by over 30 years of research by Webster-Stratton and her scientific team. Their goal is to prevent and treat young children's behavior problems and promote their social, emotional, and academic competence. The programs are used worldwide in schools and mental health centers, and have been shown to work across cultures and socioeconomic groups (<http://www.incredibleyears.com/>). Indeed, Incredible Years project is listed as a validated, evidence-based program by many organizations, as stated in the official project's website (<http://www.incredibleyears.com/about/awards-and-recognition/>). Both instruments were translated in greek with the back-translation method after written permission from and in cooperation with the Incredible Years project's Administrative manager. Only some, mainly, linguistic changes were made, such as adding articles, because in Greek they cannot always be missed out (Leonidou, & Kartasidou, in press). The scoring directions for both instruments were retrieved from the IY program's official page (<http://incredibleyears.com/for-researchers/measures/>).

Teachers anonymously completed the Incredible Years (IY) Teacher Classroom Management Strategies Questionnaire (TSQ: Webster-Stratton, 2012), which consists of four sections: A, B, C and D. These sections were: A. Teacher's confidence in managing current and future behavior problems and

confidence in promoting emotional, social and problem solving teaching, B. frequency of use and usefulness of five categories of teaching strategies [(Coaching, Praise and Incentives (8 items), Proactive strategies (8 items), Social & Emotional teaching strategies (7 items), Limit-setting strategies (5 items), and Inappropriate strategies (9 items)], C. frequency of use and usefulness of positive approaches with parents and, last, D. planning and support related strategies. The answers are offered on a 5-point Likert scale, ranging from: 1- rarely/never, to 5- very often to measure the frequency of use and the usefulness. For achieving the objectives of the current study only Section B measuring the frequency of use of strategies was administered to the participants.

Parents anonymously completed the Parent Practices Interview (PPI: Webster-Stratton, 1998). It is a 72-item questionnaire adapted from the Oregon Social Learning Center's Discipline Questionnaire and revised for young children. It is composed of seven subscales: a) Appropriate Discipline (12 items), b) Harsh and Inconsistent Discipline (15 items), c) Positive Verbal Discipline (9 items), d) Monitoring (5 items), e) Physical Punishment (6 items), f) Praise and Incentives (11 items) and g) Clear Expectations (6 items). The items in each section are offered on Likert scales, different for each section e.g. ranging from: 1-“Never” to 7-“Always” or from 1-“None or almost none” to 5-“All or almost all” e.t.c. depending on the type of question.

3.4. Reliability

The reliability of the scales of classroom management strategies utilized for the teachers' study, as measured with Cronbach's Alpha are: .737 for Coaching, Praise and Incentives, .740 for Proactive strategies, .828 for Social and Emotional Teaching strategies, and .594 for Inappropriate strategies. The reliability score for the whole section of Specific teaching techniques is .941. The reliability of the scales of parents' management strategies for the present study also measured with Cronbach's Alpha are: .762 for Appropriate Discipline, .846 for Harsh and Inconsistent Discipline, .276 for Positive Verbal Discipline, .568 for Praise and Incentives. The reliability score for the whole questionnaire, also measured with Cronbach's Alpha, is .739.

4. Results

Even though the use of different instrument for each group of participants does not allow for a direct comparison of means, still there can be a comparative presentation of the results in order to extract some results concerning the research questions. Only answers to certain parts of each questionnaire were exploited, which were thought to be relevant to both groups of participants and therefore comparable. For example, questions about physical punishment were extracted from the parents' questionnaire as irrelevant to teachers and in the same way questions about planning of teaching and support were extracted from the teachers' questionnaire as irrelevant to parents.

In the teachers' survey, in a scale ranging from 1-5 the mean frequency of use of coaching, praise and incentives is 3.6885, the mean frequency of use of proactive strategies is 3.5437 and SEL strategies' mean frequency of use is 3.5327. Frequency of use of inappropriate strategies demonstrated a relatively low mean ($M=2.2649$). According to parents' statements, in a scale ranging from 1-7, they state that they mostly use *Positive Verbal Discipline* ($M=4.98$) and *Praise and Incentives* ($M=4.08$), *Appropriate Discipline* strategies ($M=3.73$), and least of all *Harsh and Inappropriate Discipline* strategies ($M=3.00$).

On the individual item level for teachers, the least used ($M=1.12$) technique was considered to be 'sending child home' for aggressive or destructive misbehavior, while 'praising positive behavior' was considered/deemed the most frequently used one ($M=4.68$). At the level of individual items, in the parents' survey, regarding the subscale *Positive Verbal Discipline*, the most preferred technique seems to be "discussing the problem with the child or asking questions, in case of their child hitting another child" ($M=6.29$) and the least preferred technique is praising children when they do well ($M=2.64$). In the subscale *Praise and Incentives*, when the child behaves well or does a good job, parents state that they quite often give their child a hug, kiss, pat, handshake or "high five" ($M=6.52$), and the least used technique on the same occasion is giving points or stars on a chart ($M=2.41$). Regarding the subscale *Appropriate Discipline*, parents state that when their child fights, steals or lies, they will most likely punish their child ($M=5.64$) and they would least likely have the child correct the problem or make up for his/her mistake in case of non-compliance ($M=1.85$). In the subscale *Harsh and Inconsistent Discipline*, Greek parents state that if their child hit another child, they would most probably raise their voice, scold or yell ($M=4.12$) and they would least likely ignore their non-compliance ($M=2.08$).

In addition, for teachers, T-tests and one-way Anova tests revealed statistical significance ($p < 0.005$) between the two genders on the item concerning frequency of use of reward targeting positive behaviors with incentives, e.g., stickers, with women ($M=4.29$) using it more often than men ($M=3.57$). For parents, no statistically significant differences were revealed between genders.

5. Discussion

The results of the present research were examined in comparison with results in other countries since, to the best of our knowledge, this is the first study in Greece that examines parents' and teachers' management strategies of their children's behavioral problems.

Regarding the first research question about "which strategies parents more often use and which teachers use", according to the current study, Greek parents state that they mostly use *Positive Verbal Discipline strategies*. This result is not consistent with previous studies of Harman and Blair (2016) in North Carolina, U.S.A., according to which parents manage behavior problems by stating *Clear Expectations* or another study in Colorado, U.S.A., the results of which showed that parents mostly use *Monitoring strategies* (OMNI, 2011). This difference could be explained in terms of different cultural contexts or even different methodological choices in each study (Leonidou & Kartasidou, in press). Unfortunately, no similar research has been conducted in Greece, so that the results could be compared within the same cultural context.

As far as Greek teachers are concerned, they state that they prefer using coaching, praise and incentives and the result is confirmed by their preference to the technique "praising positive behavior", which is stated to be the most useful and most frequently used one (Leonidou & Kartasidou, 2016). In Greece, research by Andreadakis, Xanthakou and Kandianaki (2006) shows that teachers assume responsibility for creating a positive communication climate in the classroom as they accept that their behavior can either facilitate or undermine the creation of a learning-oriented communication climate. According to modern pedagogical approaches teaching is approached in terms of active participation, meaningful negotiation, interaction, effective communication, development of pupils' self-esteem, and can be facilitated by the development of interpersonal relationships. All these concepts are in line of course with the concepts of Social Emotional Learning, according to which the positive classroom climate promotes students' emotional and academic development. In that sense, possibly Greek teachers use praise and incentives as a means to achieve the development of interpersonal relationships and the positive climate in their classroom along with the academic gains.

Concerning the second research question if Greek parents or teachers more often use positive discipline strategies, it seems that teachers seem to prefer using positive ones rather than inappropriate, which are only used sometimes according to the mean scores indicated. That is because they consider positive strategies very important in classroom management, which is in line with previous research studies such as the one by Arbuckle and Little (2004). Moreover, parents state that, overall, they quite often use Positive Discipline strategies, either in the form of Positive Verbal Discipline or Praise and Incentives and they least of all use Harsh and Inappropriate Discipline strategies. Preference for positive methods of discipline is particularly encouraging, as it is scientifically proven that a child-centered parenting style, high levels of positive family relationships and warmth, parental supervision, rule-setting and positive reinforcement of appropriate behaviors are associated with fewer behavioral problems, increased self-confidence, better academic performance and cognitive development (Hutchings, Bywater, Daley, Gardner, Whitaker, Jones, Eames, & Edwards, 2007). These results allow us to think that teachers and parents almost equally use positive strategies in general in different forms, for example teachers use praise and incentives, while parents use positive verbal discipline strategies, mainly discussing the problem with the child.

However, to a lesser extent, but both teachers and parents use Harsh or Inconsistent Discipline strategies. Parenting practices that have been found to have negative effects on emotional and behavioral adaptation include tough and inconsistent discipline, high levels of criticism, poor supervision, poor child care and lack of warmth in parent-child interaction (Patterson, Baryshe, & Ramsey, 1989). Teachers also state that they often use prevention and limit setting strategies, such as discipline plan, clear rules etc, because they consider them important, as it was also concluded in previous research studies (e.g. Dutton Tillery, Varjas, Meyers, & Smith Collins, 2010). Therefore, there seems to be room for improvement for both groups of participants, possibly by participating in behavior management trainings.

In conclusion, these results are hopeful, of course, since the whole school philosophy has started changing and the aim is no longer to burden students with loads of knowledge, but to engage them in developing as a whole person with mind, heart and soul, and parents could surely help since education and even more character education starts at home. In addition, even though both groups of participants state that they prefer positive strategies, still there seems to be a need for further training so that negative strategies would no longer be needed.

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INDIVIDUAL SUPPORT FOR INDEPENDENT LEARNING AT THE LANGUAGE CENTER AT UNIL: FROM TEACHING TO ADVISING

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Abstract

The Language center at UNIL offers a twofold language training combining communication skills in a foreign language classroom with a professor as well as independent learning skills while working with advisors on independent learning skills in a multimedia center. Students from beginner level to A2 level have one hour and a half in the classroom with a professor and two times 45 minutes in the multimedia center where they can go at any time they want. Students from A2/B1 level to B2 level have one hour and a half in the classroom and 45minutes in the multimedia center. This setting in which the students are working independently in the multimedia center is based on the theories of autonomy, and more specifically, on the concept of individual support for independent learning as defined by M.-J. Barbot (2006). M.-J. Barbot advocates for engaging the learner in his/her learning process by making him/her responsible for the path taken. In this perspective, the learning environment should provide tools and support to guide rather than teach the student in order for him/her to be able to pursue the learning process on a life-long basis. Based on this research, the goal of the action research project led at UNIL aims at improving the quality of the support an advisor can give to a student in his/her independent learning path. However, one of the major challenges for this support – as the advisors in the multimedia center are also the professors in the classroom but playing a different role – is a horizontal, nondirective, computer mediated communication between the learner and the advisor. Indeed, the advisor's role is not to teach, nor to follow the progress of a student but rather to take a student at a T-moment and manage to engage with him/her to understand what are his/her needs and expectations to then be able to suggest activities, strategies, etc. in order to help the student experiment new ways of learning and thus provide him/her with tools on a more and more independent path. Therefore, this computer mediated communication requires new skills and implies a paradigm change that has caused some hesitations from the professors in their new role of advisor. Initial hesitations by the team members included the fear to interact on a punctual basis with students they don't know, fear to interrupt and bother a student who is already engaged in an activity, unease to observe what students do on the computers as if they were spying, insecurity in the validity and quality of a feedback they could give to someone they don't "follow" in a classroom. Following these hesitations, the Language center led an action-based research to address the challenges in computer-mediated communication. To do so, the action research seeks to questions the system and the representations about the system by the users (advisors and students). The advisors were given a questionnaire about how they understood the concept of independent learning, about how they felt in their advisor role, what were the strengths and weaknesses of the system according to them, what would they change to improve it, etc. This questionnaire also had a list of ideas of what an advisor could do and the latter were asked whether they had already tried these actions or not, if they would like to try it or not and why. At the same time, the students received as well an online questionnaire about their practice, their use of the multimedia center, their feedback on the type of advice they received by the advisors, etc. In a second part, sessions in the multimedia center were observed by the researcher following an observation protocol sent to all the advisors beforehand with again the list of possible actions/interactions. After analyzing this data, the results were presented to the team and then some individual interviews were conducted in order to get an opportunity for each one to close the process and say what they felt during the study and if this had helped them to a certain extent or on the contrary provoked a supplementary stress. Finally, the team worked together on new tools to respond to the needs that came out of the study. This paper presents briefly the theoretical background and the data that has been used. It, then, discusses the results of this action-based research as well as the current and possible forthcoming tools and training that can be developed based on the findings.

Keywords: *Language learning-teaching-advicing, independent learning, computer-mediated learning.*

1. Introduction

The Language center at the University of Lausanne (UNIL) offers to the academic community (students, PhD, postdoc, faculty, staff) language training in 7 languages: English, German, French, Italian, Spanish, Russian and Chinese. Many of these courses consist of a twofold training targeting language learning and the acquisition of independent learning skills at the same time. The training takes place partly in the classroom with a teacher (90 minutes for all the levels) as well as in a multimedia center (90 minutes for beginner level to A2 level and 45 minutes for A2/B1 level and above). The multimedia center is a room with 30 computers and a database with a lot of materials of all kinds to practice the different skills at one's own pace and according to one's personal goals and needs. When at the multimedia center, students can choose what they would like to work on – go further on what has been learnt in the classroom, repeat what has been done or work on personal objectives for their work and/or personal life. They work independently but an advisor is present in the room to answer questions as well as to give support and tools to help the learner develop some learning strategies to improve his/her language learning skills. The advisor can see the 30 computers from his/her own computer and s/he can call students through headphones when needed and vice versa. The first week of the semester is dedicated to an introduction of the system for students to understand the concept, what they can find and what kind of support they can get. It is also important to note that the advisors are the language teachers but playing a different role following the theories of autonomous learning and particularly the work by Marie-José Barbot (2006, 2012).

2. Theoretical framework

In this setting, the teachers are asked a few hours per week to work as advisors at the multimedia center. Marie-José Barbot (2006) defines the “advising approach” as being “different from the traditional heterotraining educational system which takes as a starting point contents to radically move to the learner's side and thus toward complexity¹”. She explains that one of the great difficulties is for the teacher to leave his/her usual and expected role to work toward a new role that will require a constant adaptation to the individual s/he is dealing with. According to M-J Barbot and M-J Gremmo (2012) a deconditioning phase is needed to go from a prescribing role to an advising role. The advising role provides support and tools for the development of language learning at the same time as the development of a learning culture. The advising role also provides with methodological support by suggesting activities and approaches to experiment and finally it also provides a psychological support by helping the student to objectify his/her difficulties and successes.

M-J Barbot and M-J Gremmo (2012) insist on the difficulty to change one's habits to reach this new role because there is a risk to use the computer-mediated approach to reproduce a transmissive and directive approach instead of developing autonomy and independent learning. They also underline the risk for the teacher to feel reduced to a secondary role without any clear goals and actions to do. This change of paradigm requires greater adaptability skills as it is necessary to be able to observe and listen to actually start from what the student needs – even if we meet the student for the first time – and not from a predefined content the teacher might have in mind.

3. Challenges

These challenges mentioned by M-J Barbot (2006, 2012) put the teacher in his/her new role of advisors often in an uncomfortable situation that demand to leave one's comfort zone and to take some distance with one's usual practice to start almost a new job.

The main challenges that team members at the Language center at UNIL felt really come from the change of paradigm: fear to interact with student one doesn't know and fear of not being able to give the appropriate support; fear of interrupting a student while s/he is working; discomfort with the idea of communicating through headphones while being in the same room; fear to be intrusive because of the possibility to view students' screen, etc.

Some team members often complain about this part of their work and question the efficiency of such a system and also wonder if students actually find any gain with this twofold learning environment. Some team members raised the issue of a potential paradox in claiming to train for independent learning but making it compulsory in the training while some students might prefer to work on other platform with other material. The latter is also a point of complaints from the team members that find the material too

¹ Our translation. Original text : « *l'accompagnement se démarque du système classique éducatif d'hétéroformation qui part de contenus, pour se déplacer radicalement du côté de l'apprenant et de la complexité* »

old fashion and no longer adapted to today's learning culture. It became then necessary to question the system and try to put the light on what can be attributed to representation / projection and what actually are the strengths and drawbacks of such a system, to try, then, to tackle these hesitations.

4. Methodology

An action-based approach was chosen because the study aimed at improving the situation for the advisors as well as the students. This is why, the tools described below were also tools which allowed the users (advisors and students) to reflect on their practice and get new ideas through the study.

The coordinator of the project started with a literature review of the theories of autonomous learning. Then, a set of different methods were gathered to try to get a global view of the system: 1) the 29 teachers-advisors were asked to fill in a questionnaire regarding their understanding of the approach implemented at the Language center, the positive aspects and negative aspects of the system according to them and to mention what type of support/interaction they give / have while advising in the multimedia center. For this last part of the questionnaire a list of 26 items which were also ideas of what an advisor could do was given. 2) students were asked to fill in a questionnaire as well in order to gather information about whether they were going on a regular basis or not and why (not), what are the strengths and drawbacks according to them and how do they use the system. For this last part, like for the advisors, a list of items was given. 419 students (about 30% of the total number of students who received the questionnaire) answered. The two questionnaires were then analyzed and put together in order to cross teachers' and students' speech to see where they meet and where they diverge. 3) a series of observations of sessions at the multimedia center were conducted. Each advisor was observed 3 times: once at the beginning of the semester when the system is presented to the students, once in the middle when students get some weekly ideas of what to do as they log on, and once toward the end when students no longer receive the suggested activities. These observations followed a protocol that was presented to the team beforehand to be able to get their comments and feedback. These observations were analyzed and then crossed with what advisors said they did or not in the questionnaire. 4) Individual interviews were conducted with each advisor in order to get a final feedback on how they felt throughout the study, on what they would like to say about the approach, etc. 5) Finally, the results were presented to the team and the team collaborated in order to produce new tools to help the advisors' work.

5. Results

5.1. Understanding the concept

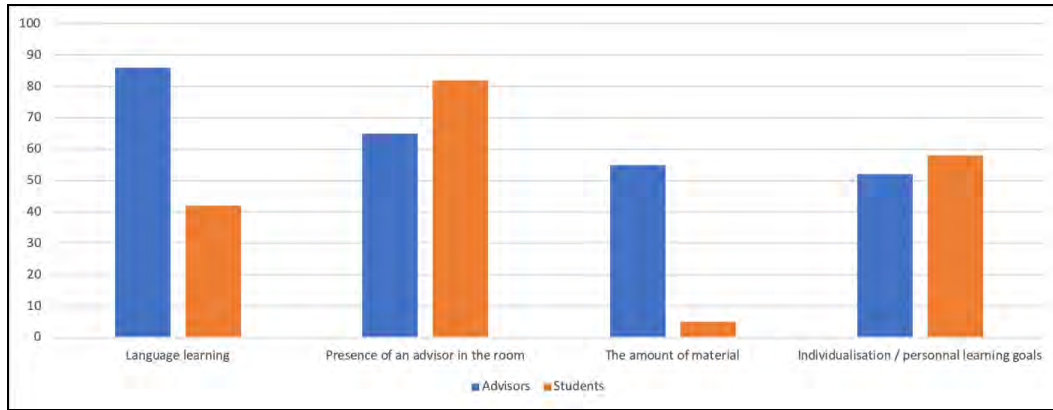
The answers from the teachers-advisors to the question on how they would define the concept of advising/counseling in the context of an independent learning environment such as the multimedia room at the Language center at UNIL show a general understanding and agreement on the objectives even though a close look at the wording show that the definition are all going toward a centration on the learner but the actions that are mentioned can be divided in three categories: diagnostic actions ("observe", "listen", etc.), support actions ("support", "help", "advise", etc.) and structuring actions ("follow", "oversee", "supervise", etc.). The two first categories are fully part of the work of an advisor but the third category matches more what is expected of a teaching situation with a program to follow knowing the learners and being able to supervise their progression which is not possible in the current setting as in each session new students can come and the advisors are expected to be able to make a diagnosis and provide support for this specific session.

5.2. Perception of the dispositive

The figures below show the way some aspects of the learning environment are perceived by the different users: advisors and learners based on answers to the questionnaires about the strengths and weaknesses of the system.

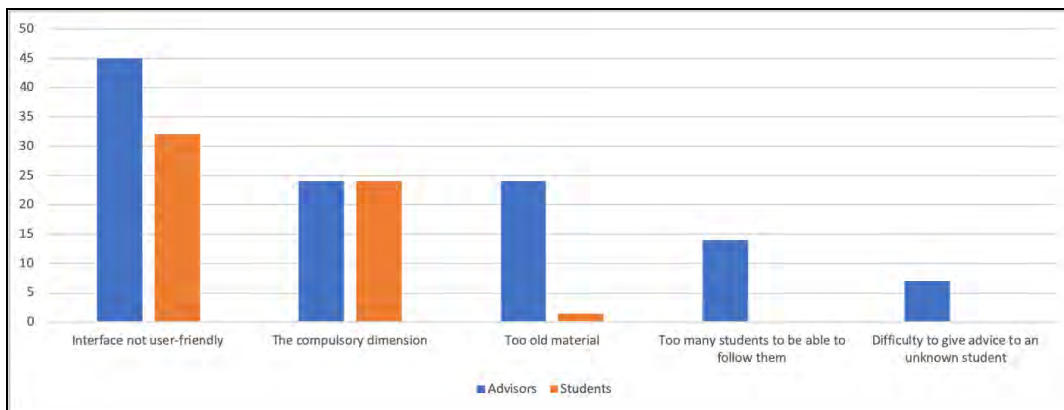
The first figure shows that globally students and advisors agree on the positive aspect of having the presence and support of an advisor and with the possibility to work on personal learning objectives. Teachers-advisors have put more values on the amount of available material while students don't mention it as much in the strengths of the dispositive.

Figure 1. Strengths of the dispositive according to the users.



The second figure show also a very similar perception of the drawbacks for teachers-advisors and students except for the oldness of the material for which students don't really comment on while teachers-advisors point at it as a main drawback of the system.

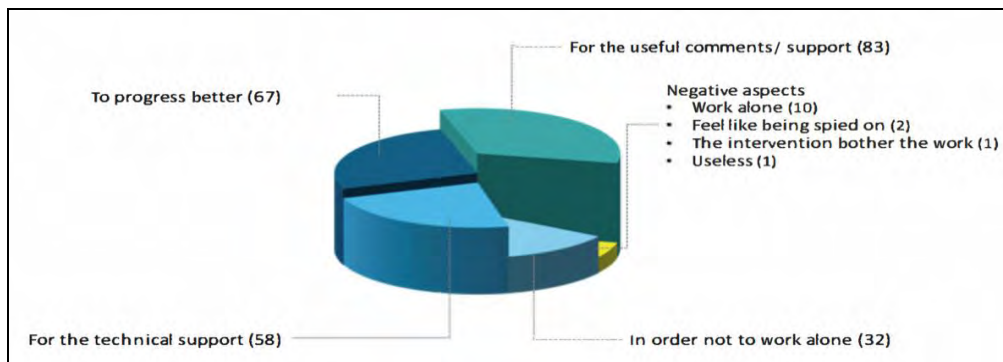
Figure 2. Drawbacks of the dispositive according to the users.



Both students and teachers-advisors agree on the fact that the system is not very intuitive or user-friendly. Students don't always easily find activities that match their expectations and level. This shows a problem that can come from the available material and/or the search engine of the data base.

The fact that the sessions are compulsory are equally mentioned by students and team members. There is a demand for the system to be online for more flexibility. However, the current system allows students to be sure to be able to receive feedback as they are working which is seen as a strength as seen in the first figure. In the second figure above, we also see the challenges of the advisors to work with students they don't know and the feeling of not being able to do a quality job as there is no possibility for a real follow-up. However, the third figure below somehow contradicts this impression of the teachers-advisors. This figure below shows the answers of the students to the question on why they were attending (or not) the independent learning sessions. It is clear that, globally, students are satisfied by the support they receive from the advisors and the fear of the teachers-advisors of being intrusive, of interrupting the work is only felt by very few students.

Figure 3. Reasons given by students on why (not) they attend regularly the independent learning sessions.



These results show some representations and/or projections from the advisors' point of view that is not perceived strongly in the answers of the students.

When looking at the teachers-advisors answers to the question about what type of support they were giving (choosing from a list) and crossing these answers with the observations, it is also interesting to mention that we find a total adequation between what advisors say they do and what is observed when dealing with short targeted interventions (answering a question, suggesting an exercise, explaining how to find material in the room, etc.). When it comes to actions that are more related to the development of independent learning we see a gap between what advisors say they do and the answers of the students, who say they did not receive this type of support and the observations that didn't show this type of intervention. These actions – such as referring to the plurilingual profile of the learner to help comparing and understanding the target language, helping the student to set goals, helping the student to experiment new strategies, etc. – are very meaningful but also very demanding as it requires time to be able to understand where the student is in his/her learning process, what are his/her needs, what s/he has already tried, etc. Teachers-advisors feel they have to give the same amount of support to everyone in each session as if it was a class. These actions requiring more time, are thus much less used. This shows a challenge in the change of paradigm from teaching to advising: they know what is expected from them in their advisor role but it is still challenging to put it all in practice as some habits are deeply anchored in the practice. In fact, in the individual interviews conducted at the end of the project, advisors showed some insecurity toward the strategies they are asked to use to help the students and it appeared that the interactions were maybe too often put into place through “weak questioning” such as “how are you?”, “Is everything going well?” in order to gain time but which does not necessarily engage the student toward questioning his/her work. So, some students might just say they are fine ending this way the interaction. This might be one aspect that create this impression of not being able to help in a meaningful way the students.

6. Impact

This action-research has already had several impacts: the ideas given in the questionnaires were felt as an actual help with more support and ideas. Some of the team members said that the fact of being observed by another colleague pushed them to try to interact more with students and felt more useful as the interaction was often more fruitful than they thought.

The other impact of the action-research is that the study allowed us to get feedback and ideas to develop tools to tackle the existing insecurities. The team shared all the strategies that they had in mind and these were organized by skills/objectives (listen, read, setting goals, etc.) in an Excel sheet. This repertoire of strategies is now available to all advisors who would need more ideas. The team also worked on how to start an interaction with the students to avoid weak questions that don't engage the learner in the learning process. The team came up with a timeline of different stage of the student's activity and ideas of questions to start the communication.

7. Perspective for the future

This study has shown that this twofold learning environment is appreciated by the users however the idea of a computer room can seem a bit out of date and rigid for students with very busy schedule. At a time when everything can be found on the Internet it might seem old-fashion to impose on students to come study in a computer lab. However, this type of setting does have benefits. We see a need to dematerialize space, to increase flexibility and easy access but in cities the co-working spaces are booming, libraries are still used by students as working spaces. This reveals that despite the flexibility the technology can offer, many people still need to be able to create time and space dedicated for one's activity. This prevents being interrupted, or find other things to avoid doing an activity. Dedicating time and space for an activity give incentive to be more regular and guarantee better quality in the learning process. This is why, for the future, it is important to question how can we offer the incentive while also offering more flexibility and a setting more in adequation to today's use of technologies.

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SELF-EFFICACY AND ATTRIBUTIONAL STYLE IN GIFTED STUDENTS

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Abstract

The contribution, starting from the general construct of self-efficacy, examines the mechanisms of construction of a motivational attributive style, to achieve academic success in gifted students.

The models of interpretation of cognitive giftedness agree in retaining motivation and perseverance as factors determining the success of learning and the transformation of the giftedness into real talent. The perception of self-efficacy and the attributive style guide the motivation and in the persons with high cognitive potential they are not always present. This can lead to a non-directional potential.

What is the function of self-efficacy in promoting talent in students with high cognitive potential? What is the most appropriate type of attributive style to promote in these students? And the role of teachers to enhance motivation, in order to avoid the risk of underachievement and dropout?

The contribution, after having analysed the constructs in the literature proposes an answer to the questions.

Keywords: *Self-efficacy, motivational attributive style, giftedness, talent.*

1. Introduction

Self-efficacy is a necessary and central personal resource in human growth. It acts on the cognitive, motivational, affective and decisional processes, determining paths of development, effective adaptation and change.

Every type of behavior during the life span of an individual is configured as intentionality, premeditation and self-regulation. People draw up action plans and strategies to implement them, analyze in advance the possible results of the actions to be taken and activate self-regulation processes to guide behavior. Control and reflection on one's own functioning determines the conviction of personal efficacy which in turn activates different ways of thinking and interpretative schemes: negative and ruinous or positive and "self-enhancing" (Bandura, 2000).

In practice, those who have a low consideration of their abilities in a given domain avoid difficult tasks, show little aspirations, pursue objectives with disengagement, linger on the obstacles they encounter, and finally present a low level of resilience. On the other hand, those who believe in their own active capacities activate functional modalities to the achievement of the objectives, demonstrating interest and involvement in the tasks that they carry out and fix the focus on commitment and perseverance for the achievement of success (Bandura, 1993). These modes of functioning are determined by the profound conviction of being able to produce changes in one's academic, work and social environment, with one's actions. It can be said that the belief in being able to exercise internal and personal control over the situation is fueled by a sense of self-efficacy.

Rotter (1966), elaborating the construct of the locus of control, has differentiated the methods of evaluation of the causes of the results achieved, both positive and negative, in terms of external and internal. Clarifying that people with an external locus of control perceive themselves as powerless, attributing the results obtained to external factors such as luck, chance or circumstances beyond their control. On the contrary, an internal locus of control determines in the subject the conviction of being able to achieve the predetermined results, because these depend directly on one's actions, on one's behavior or on one's own personal characteristic. Rotter's locus of control appears in its bipolarity as a general and stable psychological dimension of attribution, in which not only ideas of impotence or devaluation are understood, but also the sense of security, self-esteem and the ability to face the events of one's life and to manage their changes.

Weiner, subsequently, in an attempt to propose a theory of motivation and emotion based on causal attributions, focuses not only on the perception of internal and external causality, but also on the stable or unstable nature of the cause and its consequent controllability. Three fundamental dimensions derive from this: the stability / instability of the cause, the internal or external locus attributed to it, the controllability /

uncontrollability on the part of the subject (Weiner, 1985; Pellerey, 2003). The three dimensions of causality influence a variety of positive and negative emotional experiences including gratitude and pride, guilt and shame. These emotions guide and motivate behavior (Weiner, 1985).

The Weiner model, exploring the main causes attributed to success or failure in learning situations, highlights the role of the main causal variables such as the commitment and the skill (internal locus), the ease of the task, the help received or luck (external locus). Each of these causes is distinguished by two characteristics: stability and controllability, so that commitment is an unstable internal cause that can be controlled by the subject; on the contrary, luck is an external, unstable and uncontrollable cause for the individual. People interpret their successes or failures by referring to one or more of these causes, constructing a stable personal scheme that determines one's own attributive style.

There are different styles that are characterized by being more or less functional to the achievement of objectives in the academic or work field. The *strategic commitment style*¹ that attributes success primarily to commitment (understood not only as a physical or cognitive effort, but also as an ability to analyse the task, to select and activate adequate resolving strategies), seems to be the most suitable for achieving good results especially in contexts of school learning. In fact, even in the event of failure, positive expectations of success are maintained. (Ravazzolo et al., 2005).

Different attributive styles, which do not recognize the centrality of commitment and personal agency, are often linked to negative emotional and behavioral experiences. The mistaken belief that failure is due to lacking personal skills can generate a sense of learned helplessness, with a renouncing and passive attitude, accompanied by an experience of inadequacy, resignation, and disengagement, with a tendency to develop performance anxiety and depressive forms (Ravazzolo et al., 2005).

Taking up the research of Collins (1982) and Bouffard-Bouchard, Parent and Larivée (1991), Bandura states that pupils with the same level of cognitive development and knowledge differ in intellectual performance depending on the strength of their self-efficacy convictions. Consequently, the author claims that perceived self-efficacy is a predictor of school successes or failures better than cognitive abilities alone (Bandura, 2000).

Considering what has been said, we will address below how the sense of efficacy develops and is structured in the process of personal growth the sense of efficacy in subjects with high cognitive potential and the role of teachers in this process.

2. The role of self-efficacy in subjects with high cognitive potential

The intellectual giftedness is a condition that affects approximately 2% of the school population (Novello, 2006). In our school system children with high cognitive potential still do not enjoy an official recognition that guarantees specific and shared identification criteria and adequate training paths. Although scientific research has provided valid evidence in arguing that giftedness is a characteristic *in potency*, an attitude that emerges and develops only in interaction with an inclusive and supportive context (Gagné, 1999), the false myth about having a high potential is in itself a guarantee of success in life is still widespread (Zanetti, 2016). In reality, the gifted student is not always able to recognize and manage his own abilities in the context, risking experiences of suffering and demotivation (Novello, 2016), which manifest themselves in situations of *underachievement*, *dropout* and general malaise (Zanetti, 2016). As a potential attitude, talent emerges and is configured as excellence only through the interaction of personal and environmental factors. Gagné talked about these factors in the Differentiated Model of Giving and Talent (DMGT) representing them as the interpersonal and environmental catalysts necessary for the transformation of the gift into talent. Its promotion is a process that due to its importance and complexity cannot be left to the individual, but needs the support and commitment of the whole society (Gagné, 1999, Sorrentino, 2017). Bearing in mind the cognitive and emotional-relational characteristics (Zanetti, 2016; Novello, 2016) and the profiles of a gifted subject as suggested by literature (Betts, Neihart, 1988), the process of promoting talent cannot be separated from considering processes that structure the convictions of effectiveness of a subject. Bandura (2000) also recognizes the interdependence of human agency with the social context, affirming that the conviction of personal efficacy is based not only on personal agency, but also on a type of agency that arises from and in the context and defines collective.

In the exercise of collective agency, people combine their knowledge, skills and resources, form alliance and working together to achieve the goals (Bandura, 2005). This type of agency promotes a sense of collective efficacy that allows the pursuit of higher goals, promotes motivation and stimulates commitment, strengthens resilience in the face of adversity and improves group results. An integrated

¹On the distinction and the characteristics of the main attributive styles see: Ravazzolo, C., De Beni, R., Moè, A., *Stili attributivi motivazionali. Percorsi per migliorare le capacità di apprendimento in bambini dai 4 agli 11 anni*. Trento, Erickson, 2005, pp.14-15.

causation system is generated where socio-structural factors meet individual psychological variables to produce effects on behavior.

An inclusive context is a context that is perceived collectively as effective that creates opportunities and builds paths for the success and well-being of one's own. The school context is recognized as an effectively inclusive community when it activates every resource necessary to support the learning and participation of all students. Searching for these resources both within the school, in its cultures, in its practices, in its teaching and non-teaching staff, in the physical environment, in teaching tools; both outside the school, in families, administrators and in the community. The mobilization of these resources increases the capacity of the school to accept the diversity of each student, so as to recognize and value it equally, designing training courses that take into account the different starting points, interests, experiences and learning styles of each individual student. If these students are people with a high cognitive potential or with different education, living an effective school context becomes an important protection factor against the emergence of behavioral and adaptive problems. If an effective context is first and foremost an inclusive context then it is precisely at school that we must begin to become aware of the potential of gifted children and provide them with adequate paths to foster the thirst for knowledge, support divergent thinking, develop creativity (Zanetti, 2016). The gifted boys need a cognitively stimulating curriculum, which guides them towards interesting goals in order to maintain a high commitment and motivation. They must learn to recognize themselves in their cognitive functioning, to feel able to control processes (internal locus of control), to persevere in commitment when challenges become difficult and to develop resilience in the face of failures, to be, therefore, protagonists of the training course mastering one's talent. In summary, to favor the construction of that profile of gifted more inclined to success that Betts and Neihart (1988) define *autonomous learner*² and which turns out to be, recalling Weiner, endowed with an attributive *strategic commitment* style.

A school and family context that favours and supports these processes with a common commitment, must exercise a *collective agency*, that is a sense of collective self-efficacy based on the conviction that only by combining resources, skills and knowledge can the desired objectives be achieved. Encouraging a sense of self-efficacy and an attributive style functional to educational success helps to avoid the waste of talents, as instead happens in situations of under-performance or early school leaving. In these negative scenarios, the subject passively suffers the will of an environment that does not recognize it, is unable to use its *agency*, to exercise causal power, is at the mercy of external events over which it has little control (external locus of control) with serious repercussions on motivation and personal performance (Landis, et al. 2013).

3. Conviction of efficacy and role of teachers

Overcoming the misconception that the gifted student, for the gift possessed, is already predestined for success, implies in the teacher a critical reflection on the role he/she plays in building an effective and inclusive learning context. Above all, it makes it possible to focus attention on the educational and didactic processes and interventions necessary to face special training needs and to question the effectiveness of the methodological tools at its disposal to achieve successful objectives.

The research showed that specific training based on experience and educational practice plays an important protective role for teachers against the influence of stereotypes and false beliefs. "Training strengthens positive attitudes, acts on motivation and a sense of security and self-efficacy, freeing teachers from the fear of failure" (Fiorucci, 2017, p.62).

The student with high cognitive potential is the bearer of a complex formative demand that is configured in the need to engage personally in something meaningful, which gives him a sense of accomplishment and self-efficacy and which guides his efforts towards successful goals. In this perspective the role of teachers is crucial not because it is a dispenser of curricular contents, but because through his convictions, expectations and judgments they influence the convictions of effectiveness of the pupil himself.

Biasi et al. (2014) observed that professors with a high sense of efficacy manage the class competently, they stimulate discussion and support students in difficulty and are a source of gratification for those who experience academic success.

Unlike teachers with low levels of effectiveness are not very supportive and are very critical towards those who fail in the task assigned, are more stressed and not confident in the progress of the class, invest little in the relationship, are demotivating and punitive.

The teacher's sense of effectiveness is strongly linked to enthusiasm, commitment, persistence, has a predictive value on students' learning outcomes, their motivation and their sense of self-efficacy.

²For a detailed description of the different types of gifted and talents, see BETTS, G.T., NEIHART, N. (1988), *The profile of gifted and talent*, *Gifted Child Quarterly*, 32 (2) pp. 248-253.

(Biasi et al., 2014). “*Teachers who are confident in their own training skills create mastery experiences for their students. The uncertainty of their abilities build class environments that tend to undermine self-efficacy and cognitive development*”. (Bandura, 2005, p. 26).

We can therefore state that the teacher, in constructing a learning context suited to the training needs of pupils with high potential, must surely engage in choosing the most appropriate and functional teaching and educational strategies for educational success. The teacher must also invest resources to promote students an agentic capacity that guides them towards a proactive and generative attitude in all contexts of life. The teacher is also called upon to work on the pupil's perception of abilities, on his expectations of success of the task, on his motivation, and on causal attributions, emphasizing the importance of commitment and perseverance. For the promotion of an attributive style functional to the pupil's academic success, teachers must first know their own attributive style and their convictions of effectiveness.

We have seen how the construct of self-efficacy is important in the life of an individual, because it generates more or less positive beliefs and beliefs that determine its behavior. Even more decisive it becomes for a subject with a higher rating, whose emotional and relational fragility makes him easily a victim of demotivation, incomprehension and isolation, especially in school contexts.

This is why teachers' educational self-efficacy convictions play a fundamental role in building an inclusive learning environment. This in turn must promote a high sense of personal efficacy in young talents, so that they can perceive themselves as creators of their own destiny, managing to live their talent as an opportunity for growth and realization not only for themselves but also for the whole society.

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PERSONAL AND EDUCATIONAL VALUES OF PUPILS FROM DIFFERENT CULTURAL BACKGROUNDS: COMPATIBILITY OR CONFLICT?

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Abstract

One of the most important and traditional values imparted by schools is that of education. However, schools are not the only institutions which channel this value. Preference for the value of education amongst elementary and secondary school pupils is strongly influenced by cultural background, represented in particular by the family or community in which the pupil is growing up. Thus the question arises of whether culture influences the preference for this value, and if so in what way. It is our conviction that the answer to this question is important for the teaching and education of individuals within schools.

As such, in our research survey we are focusing from a qualitative perspective on the significance of the value of education in the values preferences of pupils from different cultural backgrounds and on the description of partial determinants affecting the individual conception of this value, in order to acquire a comprehensive picture of how specific groups perceive education as a value. We are concentrating on two entirely different minority groups living in the Czech Republic, specifically pupils from Roma families, and pupils from intercultural families. We utilised projective method, which gave our research sample sufficient space to describe their concept of life values. For a more complete approach, we also included in-depth interviews with representatives of both groups of pupils in our investigation. In light of the research findings, we then compare personal value preferences with the values which have a basis in curricular and strategic documents regarding teaching and education at a state-wide level.

Keywords: Pupil, different cultural backgrounds, education, value, Roma, Intercultural.

1. Introduction

Cultural diversity is a fundamental characteristic of humankind. It is the common heritage of all human civilisations, races, ethnicities and groups, and it should be nurtured and preserved for the benefit not just of all group members, but also to help enrich other groups living in coexistence with them. In the current mobile and globalised world, various cultures which used to be more or less strictly separate frequently encounter each other, and because they do not understand each other well, severe social tension and conflicts arise. From the perspective of the cultural relativism concept (as the opposite of judging cultural differences from an ethnocentric perspective), it is presumed that individual cultures are unique and irreproducible entities and as such each culture should only be judged within its own context, in relation to its own values, ideas, norms and traditions. This is because it is clear that many cultural elements which conform to the values and manners of the cultures they are a part of do not conform to the norms and customs of other cultures. How do schools deal with this modern phenomenon of cultural diversity?

Diversity, or heterogeneity, of pupils is surely a reality in all elementary and secondary schools, which today ever more face the demand that all pupils be educated together. In practice, meeting this demand, however, stokes a whole range of issues. How specifically can one work with pupil cultural and social diversity? How can one maintain the fundamental principles of tolerance and respect for difference? How should one handle prejudices, stereotypes and labelling, and not just within education? Differences between pupils in terms of age, gender and personality are multiplied as a result of social stratification, migratory movements within society, and also as a result of the variability of conditions in which children live and grow up. From this perspective, the different cultural background of many pupils is one of the facts which the school environment must handle, or accept. Teaching and educational objectives are formed in accordance with the values society considers important. Nevertheless, these values may suppress values acknowledged within specific cultures.

School is an institution which plays a large part in educating individuals. It seeks to ensure not just that pupils within its environment acquire merely theoretical and practical knowledge, but also that it helps shape pupils' characters in terms of attitudes and values. For education today, it would appear that the issue of values is a hot topic in terms of educational and teaching priorities. It is very important to understand values and interpret them correctly. According to Göbelová (2008), "all educational areas, all educational activities are always played within the dimensions of a certain worldview and related values focus." There are further more and more experts who are of the opinion that it is essential to help shape children's values structure within the educational process, and that this process must begin early, effectively and systematically. This worthy task would undoubtedly rise to *values education*, however within the Czech schools environment this important area is not a separate taught subject, in contrast to many countries in the world (e.g. values education, moral development, moral education or character education). Nevertheless, even curriculum documents at a national level accentuate the role of values within the school environment.

The requirement for values education is secured in the curricular document for elementary education in the Czech Republic, specifically the Framework Educational Programme for Elementary Education (Rámcový vzdělávací program pro základní vzdělávání, RVP ZV), which naturally monitors the appropriate ethical, moral and values objectives and tasks of teaching and education. Amongst the objectives of elementary education here we find more detailed characteristics for key competencies, which according to the RVP ZV represent a "set of knowledge, skills, abilities, attitudes and values which are important for the personal development of an individual and for the individual's participation in society." (RVP ZV, 2017, p. 10). Values education is most clearly seen within the so-called cross-curricular subjects, where we see it not as a by-product of teaching the contents of individual subjects, but as its own topic (even though "values education" is not expressly stated here).

Table 1. Cross-curricular subjects and their objectives in terms of forming pupils' attitudes and values.

Cross-curricular subject:	Attitudes and values within the cross-curricular subject:
<i>Moral, Character and Social Education</i>	<ul style="list-style-type: none"> ✓ helps the pupil create a positive (non-harmful) attitude towards oneself and others ✓ guides the pupil towards realising the value of co-operation and assistance ✓ guides the pupil towards realising the value of human diversity, differences in opinions and approaches to solving problems ✓ contributes to realising the moral dimensions of various types of human behaviour ✓ contributes to the primary prevention of sociopathic phenomena and harmful forms of behaviour
<i>Civic Education for Democracy</i>	<ul style="list-style-type: none"> ✓ guides the pupil towards adopting an open, active and involved approach to life ✓ teaches respect for the law ✓ develops discipline and self-criticism ✓ teaches self-esteem and self-confidence, independence and engagement ✓ contributes to the formation of values such as justice, freedom, solidarity, tolerance and responsibility ✓ develops and supports the pupil's ability to take his/her own stance in a plurality of opinions ✓ motivates the pupil to be considerate and willing to help others, particularly those weaker than he/she is ✓ makes it possible to judge and evaluate social phenomena, processes, events and issues from various perspectives (local, national, European and global dimensions) ✓ guides the pupil towards respecting cultural, ethnic and other differences ✓ guides the pupil towards being assertive and being able to compromise
<i>Education towards Thinking in European and Global Contexts</i>	<ul style="list-style-type: none"> ✓ helps the pupil overcome stereotypes and prejudices ✓ enriches the pupil's views of him/herself in terms of his/her own life prospects expanded by the possibilities of choosing in European and international dimensions ✓ cultivates attitudes towards Europe as his/her broader homeland and towards the world as the global environment ✓ forms positive attitudes towards otherness and cultural diversity ✓ encourages positive attitudes towards traditional European values ✓ supports the acquisition of behavioural patterns for the proper conduct of a European citizen and a sense of responsibility

<i>Multicultural Education</i>	<ul style="list-style-type: none"> ✓ helps bring the pupil by means of information to form attitudes of tolerance and respect towards different socio-cultural groups, reflect on the cultural background of members of other socio-cultural groups and recognise them ✓ helps the pupil become aware of his/her own identity, be him/herself, reflect on his/her own socio-cultural background ✓ stimulates, influences and corrects the pupil's behaviour and value system, and teaches him/her to perceive diversity as an opportunity for personal enrichment and not as a source of conflict ✓ helps the pupil to realise the incompatibility of racial (religious or other) intolerance with the principles of living in a democratic society ✓ guides the pupil towards engagement in fighting manifestations of intolerance, xenophobia, discrimination and racism ✓ teaches the pupil to perceive him/herself as a citizen who participates actively in forming the society's relationship to minority groups
<i>Environmental Education</i>	<ul style="list-style-type: none"> ✓ contributes to the pupil perceiving life as the highest value ✓ guides the pupil towards becoming responsible in his/her relationship to the biosphere, nature preservation and conservation of natural resources ✓ guides the pupil towards understanding the importance and necessity of sustainable development as a positive prospect for the further development of human society ✓ stimulates activity, creativity, tolerance, being accommodating and considerate in his/her relationship to the environment ✓ contributes to the pupil shaping a healthy lifestyle and becoming aware of the aesthetic values of the environment ✓ guides the pupil towards becoming engaged in solving issues associated with environmental protection ✓ guides the pupil towards adopting a perceptive and sensitive approach to nature and natural and cultural heritage
<i>Media Education</i>	<ul style="list-style-type: none"> ✓ develops the pupil's sensitivity to stereotypes found in media content as well as to the manner in which a media message has been treated ✓ guides the pupil towards realising the value of his/her life (in particular leisure time) and his/her responsibility for its fulfilment ✓ develops sensitivity to prejudices and simplified judgements of society (in particular of minorities) as well as individuals ✓ helps the pupil realise the possibility of freely expressing his/her personal attitudes and responsibility for how they are formulated and presented

Source: RVP ZV, 2017

From the above table, it is clear that elementary education at Level 2 (ISCED 2) in the Czech Republic helps pupils to acquire the knowledge, skills and habits which will subsequently enable them to learn independently and form such values and attitudes which will lead to judicious and cultivated conduct, to responsible decision-making and to respecting the rights and responsibilities of a citizen of our country and the European Union (RVP ZV, 2017, p. 8)

2. Objectives/methods

The objective of our research was to identify what personal values pupils within selected research samples prefer, and whether these values are in accordance with the educational values within the Czech education system.

In the research, pupils were selected who met the criteria determined for the following two research samples:

1st research sample

- Pupils within an intercultural family environment. *
- Pupils in lower secondary education (ISCED 2).

2nd research sample

- Pupils in lower secondary education (ISCED 2).
- Roma pupils

* Due to inconsistencies in the definition of an intercultural family environment, we included in the criteria for selecting families those families in which partners came from different cultures and spoke different native tongues.

Research model

Since we wanted our pupils to think about their values, we didn't want to merely fill in submitted tables with values, and the following written task was given to them using a projective method:

What do you consider important in your life and why?

They were given sufficient time and space to order and write out their own thoughts, leading them to expand not just on their naming of values, but also on their interpretations of why the particular values are important to them.

3. Results

Below, we provide a comparison of the most significant values which the lower secondary-level education pupils stated in their responses. The values are ordered in accordance with frequency.

PROJECTIVE METHOD DATA

Table 2. Values the pupils consider the most important in life.

Order	Roma pupils	Pupils from intercultural families
1.	<i>Family</i>	<i>Family and children</i>
2.	<i>Love and relationships</i>	<i>Friends</i>
3.	<i>Children</i>	<i>Education</i>
4.	<i>Good health</i>	<i>Sport</i>
5.	<i>Work</i>	<i>Happiness</i>
6.	<i>Education, intelligence</i>	<i>Fun</i>
7.	<i>Self-fulfilment, interests</i>	<i>Hobbies</i>
8.	<i>Friends</i>	<i>Creativity</i>
9.	<i>Home</i>	<i>Having enough money</i>
10.	<i>Money</i>	<i>God (faith)</i>

DATA FROM IN-DEPTH INTERVIEWS

Table 3. The most significant values which pupils consider to be important in life.

Roma pupils	Pupils from intercultural families
<i>Mutual help within the community</i>	<i>Family, home</i>
<i>Family and community belonging</i>	<i>Education</i>
<i>Family and relationships</i>	<i>Privacy</i>
<i>Education and self-development</i>	<i>Peers</i>
<i>Value of life</i>	<i>(Future) occupation</i>
<i>Quality work</i>	<i>Having enough money</i>
	<i>Developing own personality</i>
	<i>Leisure time</i>
	<i>Faith</i>

4. Conclusions

The values systems of pupils from different cultural environments are not the same, and as such these pupils must be worked with individually within values education. Roma pupils are more altruistic, which is apparent from the values they spoke of in the in-depth interviews (mutual help within the community, family and community belonging). Within their culture, these values are natural. These findings should be exploited in education and training, such as through group and co-operative learning. Values are preferred which are linked to the family and relationships in general; Roma pupils are particularly sensitive within this area, and the development of social relationships comes naturally to

them. On the other hand, the preference for the values of education and their own self-development needs to be strengthened.

Pupils from an intercultural environment work as a counterpole, and since from a young age they have encountered the mixing of at least two cultures and different mother tongues within the family environment, they are focused more on their own personality, rewards and materialism. This is clear from the values they described (education, having enough money, (future) occupation, development of their own personality). On the other hand, faith is regularly positioned low in their rankings, and they do not mention community at all within their values rankings. This is confirmed by Breger and Hill (1998), who state that these individuals, or specifically their parents, do not have a faith and are well-educated. Staňková and Venterová (2017) came to similar conclusions. For these pupils, it is therefore appropriate to strengthen co-operation and cohesion within the group. In terms of RVP ZV cross-curricular subjects, this involves more intensive strengthening of the cross-curricular subject Moral, Character and Social Education.

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ENABLE- ASC: ENABLING COLLABORATION IN THE ASC CLASSROOM WITH YOUNG CHILDREN AND TOUCHSCREEN DEVICES

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Abstract

Young children with autism have many talents and special interests among which can be their affinity with digital technologies (Porayska-Pomsta et al. 2012). Despite the increasing use of mobile tablets in schools, and the motivation of the children to use them, there is limited guidance and research on how teachers use touchscreen technologies in the classroom to support children with autism develop specific skills, such as social communication (Kagohara et al. 2013). Specifically, the literature about the impact of teacher training on developing social communication skills in class is scarce (Mangafa et al. 2016). This study explored the effectiveness of iPad teacher training on improving teachers' practice and interactive style and the child's behaviour and engagement in joint interactions.

An action research methodology was followed at a primary special school in England, UK. Video recordings and semi structured interviews were used to collect data. Video recordings of four children with autism aged 10-11 were conducted as they interacted with iPads over a period of five weeks. Interviews with teachers were carried out to explore their experiences of teaching autistic children and using new technologies in their teaching. Teachers also participated in a training workshop to share experiences and learn about new ways of using touchscreen technologies in class.

Children were more actively engaged in joint interactions when using iPads with their teachers than without the use of technology. During the training workshop, teachers mentioned that discussions about iPad use and autism strategies grew their confidence and helped them reflect on their practice. Following the workshop, teachers were found to adjust their communicative style (e.g. by allowing time for the child to respond), make changes to the environment (e.g. by minimising distractions) and use resources (e.g. by using symbols/pictures) to engage with young children while using the iPad.

Teacher training on iPad use and autism specific teaching strategies is an effective approach that can improve teachers' confidence in using mobile devices in the classroom in more collaborative and engaging ways. Future studies should incorporate the active involvement of school staff and investigate their personal experiences in developing social communication skills in autistic children for the use of touchscreen technologies in real world settings.

Keywords: *Teacher training, autism spectrum condition, technology in teaching and learning, social communication skills.*

1. Introduction

Autism spectrum disorder is a lifelong neurodevelopmental disorder characterised by difficulties in a) social communication and interaction and b) restricted, repetitive behaviours (APA, 2013). It is one of the fastest-growing developmental disorders that affects more than 1 in 100 in the UK (NAS, 2014) and 1 in 59 in USA (CDC, 2018), which means that every teacher will at some point in their career teach a child with autism. Social communication skills do not often come naturally to children with autism, who may struggle to socialise with others especially in school. Despite the fact that early intervention targeting these skills is a widely researched area, studies using digital technologies in classrooms to support their development are few (Hourcade et al., 2013).

A systematic review of studies from 2009-2012 concluded that 'iPads are viable technological aids for individuals with autism and other developmental disabilities' which can be used to teach specific skills, such as communication, academic and transitioning skills (Kagohara et al., 2013). Yet according to the authors, no studies were discovered which investigate the potential of iPads for the development of social skills such as greeting, conversation and commenting (Kagohara et al. 2013, p.155).

Current social attitudes to the use of iPads and other tablet devices for supporting children with autism are contrasting. In a study of parental attitudes to iPad use by Fletcher- Watson (2015), parents reported that technology has helped their children with autism but that they were concerned about the amount of time their children spend on the device. Also, according to Clark et al.'s (2015) survey of 90 parents and 31 professionals about attitudes towards iPad use, iPads were more positively perceived by parents than professionals. The authors added that both teachers and parents needed training on how to use the devices as they lacked confidence and that evidence-based research investigating the benefits of tablets for the development of particular skills was needed.

Even though there are iPad guides in the market (CALL Scotland 2014, Foster 2016) as well as video tutorials and websites on how to use the iPad for teaching the curriculum and adjusting the device's settings (Hammersley 2016), there is still limited literature offering recommendations in the form of guidelines on how to use the mobile tablets for encouraging social communication skills in children with autism.

Mangafa (2017) addressed this gap in knowledge by developing guidelines in collaboration with teachers, parents, researchers, and professionals. These guidelines were used in this study as a teacher training material to explore the impact that iPad training can have on teachers' practice and children's social communication skills.

2. Methodology

The aim of the study was to investigate the potential that iPad training can have on primary school teachers' teaching practice and interactive style as well as on children's behaviour and engagement in joint interactions. The study was conducted in a special school in England, UK that caters for children with autism spectrum disorder and speech, language and communication needs. In this school, all teachers receive autism training as part of their induction course. iPads were recently introduced to support the curriculum but no training has been provided to staff. According to Ofsted (2018) report, staff understands pupils' needs and effectively adapts their teaching strategies to address pupils' emotional and social challenges. Two teachers and four children from a year 6 class gave consent to take part in the study. The children were aged 10 and 11 years old and they all had a diagnosis of autism. They were all competent communicators but had difficulties in socially interacting with others, taking turns in conversations and understanding social norms (e.g. when to naturally start or stop a conversation).

Initial interviews were conducted with the two school teachers to explore their understanding of social communication skills in children with autism and their experiences in using mobile technologies in the classroom. At the end of the study, interviews were conducted again so that teachers could offer their feedback on the training workshop and the impact this may have or not on their teaching and child's behaviour. The interviews were supplemented with class observations where the teachers were observed interacting with the pupils while using the iPads and other non- technology resources (e.g. books, worksheets, board games) for the duration of 5 weeks. An observation checklist developed by the author (Mangafa, 2016) was used to record the strategies that teachers used to gain, sustain and redirect child's attention (e.g. the use of visual supports, positive reinforcement, extra time allowed to answer questions, modelling the task) as well as the children's behaviour when initiating or responding to communication acts (e.g. keeping eye contact, responding to teacher's comments, asking questions). These observations were continued after the training workshop to note any differences.

During the training workshop a set of evidence-based strategies and recommendations (in the form of guidelines) (Mangafa 2017) about the use of mobile tablets was shared with the teachers explaining how, when and why to use this training material in their classroom. This paper presents the results from the interviews, the workshop as well as initial results of the observations' coding as observations are currently blindly coded by two researchers.

3. Results

3.1. Pre training interviews

From the thematic analysis of the interviews two major themes emerged.

Teachers' experiences of teaching autistic children: Teacher B.M. had been teaching children with autism for over 10 years while teacher K.L. has only started working in a special school this year, however she has been teaching children with autism in her previous role in a mainstream school more than 14 years. Teacher B.M. was offering training to school staff about autism strategies and delivering interventions for the development of social communication skills, such as Lego Therapy (the use of Lego bricks in a small group where children collaborate to build a model), and Socially Speaking (a social skills programme where children learn about social interaction and building relationships through play).

The teaching strategies mentioned were visual supports, a highly structured timetable, creating social stories, using positive reinforcement and offering rewards to engage learners and boost their confidence. Teachers' experiences of using iPads in school: They minimally used the iPads in school as they were not confident users. For instance teacher B.M. mentioned:

'Again I find teaching ICT lessons very difficult because there has not been enough training for non-specialist teachers. I don't have an ICT background, so training in ICT lessons would be very useful'.

The teachers also mentioned that they need good ICT support to help them with the technical glitches, downloading apps and for ensuring there is good Wi-Fi connection in the classrooms. For instance teacher B.M. mentioned:

'We have an IT team based across the hallway that work across the trust, but I have always sensed there was a reluctance to put any new stuff on the iPads. Initially we were updating the iPads with new apps and then I think the IT team found it was not manageable. It is quite a busy job in a special school I think because there is a lot of work just managing the hardware, it just gets broken so much and damaged'.

3.2. Pre training observations

The teachers were observed interacting with the children in different lessons throughout the day for 5 weeks. Each teacher was observed twice every week. Initial results of the observation analysis showed that teachers did not offer many opportunities for the students to collaborate and interact with each other but worked independently on the iPads and the teacher was only helping them when they needed support.

3.3. Training workshop

During the training workshop, a booklet including teaching strategies and recommendations of tablet based activities were shared with the two teachers. The content of the guidelines was discussed and teachers expressed their interest in trying the tablet based activities and download the recommended applications to teach specific lessons that they had planned. Teachers did not give consent for the workshop to be recorded but they mentioned they would like to share the training material with their colleagues at the school.

3.4. Post training observations

After the training, teachers were more aware of how to structure the iPad lesson in order to offer more opportunities for social communication and collaboration. Both teachers created more interactive lessons and used more teaching strategies to engage the students. As a result of this, the children were more actively engaged in the lesson.

3.5. Post training interviews

Teachers were asked to reflect on their last lesson observation and discuss whether they were satisfied or not with the lesson, how the training may have or have not helped them and what their future plans are with using iPads in class. Both teachers were pleased with their lesson because the children were engaged and interacted with them due to them feeling more comfortable using the iPads to do their work rather than writing their answers on paper. Also the teachers frequently mentioned that after the training they were more confident to try new things and experiment with the iPads in class more often. For instance teacher B.M. mentioned:

'I think the training material gives us something to refer back to if we need new ideas. It's also created this conversation between me, Kate, Nat and the IT team that, you know, "we've done this, we need paid version of Book Creator please. We have these machines, let's actually use them for lessons properly.'

Also, teacher K.L. mentioned:

'So, I was pleased with how it [the lesson] went, yeah. And it's probably something I ... before talking to you and before the training I probably would have felt a bit nervous of doing all of that in one session but I think actually it helped it run more smoothly because of typing things in can lead to frustrations for them and actually it sent them straight to the link.'

Teacher K.L. also commented that the teaching strategies mentioned in the training material helped her reflect on her teaching style and she followed the advice on giving more structure to the lesson and clear instructions by for instance using a now (a symbol showing what the child is currently doing) and next (an image of what the child does next) visual board.

However this was not the case for the other teacher as she mentioned she already knew the teaching strategies mentioned in the workshop. But she mentioned that her behaviour changed when she

was using the iPad with the children. For instance, when teacher B.M. was asked whether she changed her teaching style she mentioned:

Yeah, I kind of want to say that I probably haven't but then you do probably behave slightly differently in a lesson that involves the children using a device. In terms of the way I communicate with children, probably not. I mean some, interestingly, might find it easier, that we're both staring at a screen as opposed to them having to look at me. So, that might be easier. I mean, I kind of slightly noticed that with Charlie that when he's showing me his work and all he has to do is actually look at the screen and he knows I'm looking as well, that's a little bit easier than having to interact with me one on one.'

At the end of the interviews when teachers were asked about their future plans they mentioned that the training workshop made them be more active and make plans what apps they would like to buy and share good practice with fellow teachers.

4. Discussion

This study showed that iPad training can boost teachers' confidence in using the devices in class to encourage collaboration and the development of social communication skills in children with autism. It was also shown that children were more motivated to interact with their teacher while they were using the iPads. However, it was expressed that reliable technical support, ICT resources and ongoing training and positive attitudes to technology use are all necessary factors for a smooth implementation and integration of iPads in the classrooms.

This is supported by previous findings. For instance, Clark and Luckin (2013) mention that technical infrastructure, such as ongoing maintenance and network availability, and the pedagogical use of the device are equally important for an effective technology adoption in schools. Burden et al. (2012) evaluated a pilot study in which four schools (two primary and two secondary schools) in Scotland were loaned tablets and notebooks for one year in order to investigate the impact and potential of mobile devices to learning. Online surveys, interviews, observations and documentary analysis showed that teachers, even those who were not confident in using the devices, were positive about the benefits that the mobile devices can have on pupils' learning. Pupils were engaged and motivated to collaborate and do research and creative based activities, such as making movies and animations. Technical problems, such as network failure and lack of digital storage, as well as lack of digital resources were common in the schools; nonetheless over the course of the study, teachers' levels of confidence and comfort in using the devices grew and many teachers engaged in CPD (continuing professional development) opportunities. The authors suggest that as the use of mobile devices, such as iPads, is increasing, senior school leaders should consider changing teachers' attitude and engage parents in the pupil's learning.

King et al.'s (2014) descriptive study explored the use of iPads and mobile applications by 6 children and young adults (aged 6 to 20) in a special school. Naturalistic observations over a three month period yielded 28 clips for coding where the participants used an iPad each and 28 different apps (AAC, academic and games apps). A teacher was not always present, but when they were they either offered physical prompting to the pupils to show them how the app works, modelled the task or acted as a communicative partner. The pupils used the AAC apps to communicate with the adults during snack time, the academic apps to practice their literacy skills and the games apps during break time or as a reward. The authors suggest that further research is needed to check the effectiveness of the iPad in supporting individuals with autism. In particular, they recommend that teachers should receive training on how to use evidence-based strategies with the use of an iPad to increase their competence in evaluating the effectiveness of the apps and the device in supporting their learners.

In addition, Clarke and Svanaes (2014) suggest that teachers should receive initial and ongoing training on how to not only operate the device and its associated applications (e.g. how to download apps and project the iPad screen), but also on how to incorporate it as a pedagogical tool in teaching and learning (e.g. teaching activities and lesson plans with recommended apps).

Technology is part of our everyday life and children cannot be prevented from using it. Instead adults who work with children with autism should consider when, how and why the children should use iPads (Clark and Luckin 2013, Fletcher-Watson and Durkin 2015). It is recognised that there is a lack of guidance readily available on how to use iPads for joint attention specifically and therefore this was addressed by this study. The author acknowledges the limitation of this study that it was conducted in a specific school in UK with a small number of children in a class but results were not intended to be generalised.

The current study adds that training workshops on how to use iPads with children with autism for improving social communication skills is a promising area for further exploration. It is suggested that more research is needed to investigate the potential of iPad training workshops as a participatory research method to improve teacher's practice and children's social communication skills.

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DESIGN OF A SUPPORTING SYSTEM FOR EDUCATIONAL IMPROVEMENT WITH ACTIVE LEARNING APPROACHES

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Abstract

As is well-known the role of instructors has changed from conventional “teaching of academic expertise” to “offering new learning to students” in learner-centered education paradigm. Recently, with the spread of active learning practices like experience-based learning in higher education, facilitation or consultation skills, and project management skills have been recognized as necessary teaching techniques for any instructor. In such educational approach instructors are demanded to build up closer relationship between students than that in the conventional lecture style, because it intimately influences on both students' outcomes and educational effects in the approach. Unfortunately, most of instructors provide guidance or coaching to their students empirically without acquiring necessary skills described above. So, it is important to clarify the responsibilities of instructors and the essential knowledge and teaching skills for implementation of the experience-based learning approaches. We have conducted to study about supports for instructors practicing the experience-based educational approach, particularly focus on STEM education, in both educational and technological aspects. In the present paper, we show our study about frequently confused issues or cases of instructors in experience-based approach, and also show design concept and functions to be installed on developing portal site.

Keywords: Educational improvement, knowledge base, active learning, service learning.

1. Introduction

Recently, the word of “active learning practices” including case studies, group projects, peer teaching (e.g., Wieman 2017, Silberman 1996) becomes to be popular for training students to acquire independent-minded learning literacies like self-regulation, reflective thinking (e.g., Ertmer and Newby 1996, Ryan and Ryan 2013). As an active learning style, many of higher education institutions employ practice experience learning styles like discovery learning, field work, project-based learning (PBL), and service learning. As is well-known the role of instructors has been changed from conventional “teaching of academic expertise” to “offering new learning to students” with spread of the learner-centered education paradigm.

There are some differences in attention for implementation between traditional lecture style and practice experience style (e.g., Reigeluth, Beatty, Myers 2016, EMNAS 2018). In the latter instructors are demanded to build up closer relationship between students than that in the conventional style, because it intimately influences on both students' outcomes and educational effects in the approach. The instructors of the practice experience style, here and hereafter experience-based learning, are usually responsible for facilitation to share progress and results towards project goal, and provide guides or supports to students' activities (e.g., Andresen, Boud, Cohen, 2000, Prince, 2004).

With increasing interests of active learning practices, implementation of experience-based learning throughout institution are gradually increasing. In some practices, instructors share teaching techniques and know-how derived through their efforts, and are consulted about individual efforts with each other. Unfortunately, such remarkable practices are very few. In usual instructors hold own teaching method and know-how obtained through his/her practices by themselves, and would not share among faculty members. There are many Web sites publish educational resources including teaching method, and highly suggestive advices (e.g., UBC, SERC), but such publications may be inaccessible for ordinal faculties/instructors, particularly beginner of experience-based learning approaches, because they often cannot catch issues to be improved or, in some cases, cannot recognize their implementation has a problem demanded revision. So, it will be helpful for faculties/instructors engaged in implementation of

active learning, particularly beginners, to provide a portal site concentrated on course design and management for the experience-based learning.

We were involved in both course design and management of a PBL practice in a technical college for two years (Ishida et.al., 2017). From the two years practices, we found there are some issues that instructors frequently encounter during encouraging student leaning in the practice. Then on the basis of our observation and earlier studies for implementation of active learning, we have conducted to study about supports for instructors practicing the experience-based approach in both educational and technological aspects. In the present paper, we show our study about frequently confused issues or cases of instructors in experience-based approach, and also show design concept and functions to be installed on our developing portal site.

2. Perceptions from a PBL Practice in a technical college

Our PBL practice in a technical college (engineering) was a compulsory subject for second to fourth graders about 520 students belonged to 4 departments, and was offered them for two semesters. In the implementation we divided our students into 62 project teams consisting of 8-9 students with mixed grades, and all faculty members into each team as a coordinator. As the main purpose of this subject is we require the students to acquire generic abilities for a full-fledged member of society, like problem solving, collaborative working skills. The students started to make a theme of own project team (finding issues to solve), then planned to solve the issues. At the end of second semester they evaluated own project by themselves. The works of the instructors were 1) facilitating progress assigned project including logistics, 2) encouraging reflection activity for each student, 3) evaluation of project member's individual activity by hearing with a rubric.

In an effort to improve our practice, we conducted a questionnaire to all instructors at the end of the second semester of the first and the second trial. On the first trial, we asked them to reply in a free-form statement about a problem or a bother during this PBL practice period. The following three categorized responses were common comments:

1. About extent of the instructor's interposition to student activities

Example: * Nothing happened in the team, and the solidified air flowed

* I felt that the project theme selected by the students was too easy, but I could not correct it to appropriate way

* If the project has a difference between the plan and the implementation status, To what extent may I modify the project? When may I do that?

2. About project management

Example: * When I pointed out the necessity to revise a plan of the project, by consensus of the team they continue to take inappropriate way.

* Make sure students know how to work and achieve their goals in a given time.

3. About facilitation (How to proceed discussion. Create relationships among members.)

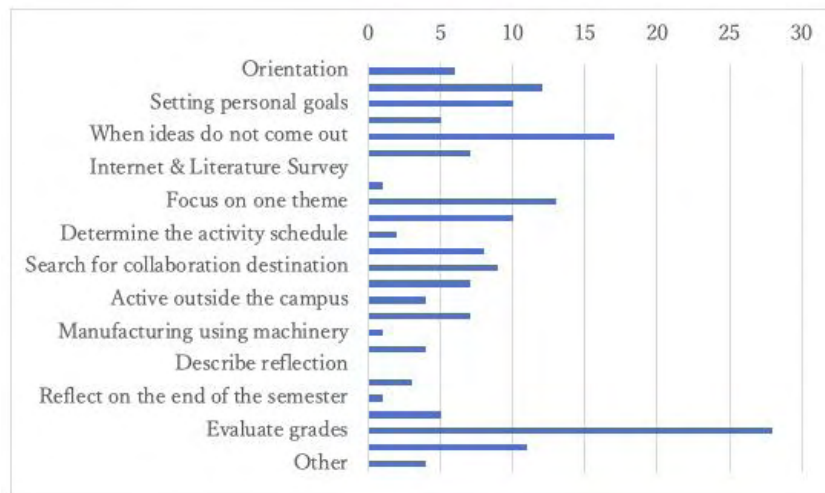
Example: * At the beginning of the project, all members were in silence. I bothered how to break down.

* The students actively exchanged own ideas, but they did not catch conversations

* Sometimes the remarks of the member did not come out.

* I feel it is difficult to dialogue with the students

Figure 1. The scenes when the instructors were bothered in judgment.



At the end of the second trial, we asked the instructors to choose up to five of 23 scenes whether they would provide suggests an advice (interpose to a students' activity) to the project team or not. Figure 1 illustrates the response of the questionnaire. The most frequent response was about grade evaluation. They also bothered in the case no student presented ideas/opinion, then it reflected on ambiguous project theme with unclear goals. Though the latter might depend on poor preparation of students, the presented results indicate that the troubles are essentially caused on instructors' insufficient knowledge and teaching skills for implementation of the experience-based learning. From the two questionnaires, we consider that it is important to clarify the responsibilities of instructor in the learning approach, and to provide an environment for any instructor in order to learn such knowledge and skills.

In addition to the questionnaires described above, we carried out the hearing research from several instructors, and also analysis of student course evaluation questionnaire. Then we found there are various issues depending on empirical value of coaching and/or learning experience in PBL approach. Many of beginners could not envisage students' activities in progress of the learning approach, so that they could not make preparation for facilitation (coaching) of his/her responsible project. The instructors with a certain experience were unable to decide to give a commitment to management of the project.

There are many factors for success of a project, such as quality of outcomes, accurate process management, fruitful cooperation with outside collaborators. The experienced instructors understand failure factors empirically, so they said, if they caught student's mistake, they could not decide whether they should point it out or not. It is interest for us most of instructors despite the empirical value assess student's learning progress by try and error method. We have incorporated the results of the survey in making concepts and design a portal site for instructor supporting, particularly focus on beginners.

3. Design of a supporting portal site

The reason why the instructors encounter the confusing scenes when they correspond to student's activities in experience-based learning approaches is that they have not pay much attention to such learning supports in the conventional lecture style. Even in the classroom lecture, we often employ discussion type activity, but we have little thinking what content we may facilitate discussion among students seriously. We often deal with an open-end issue without clear solution in experience-based learning approach. So, it becomes to be important to set specific and adequate targets for achievement including learning goals and aims employing the learning approach, while we pay attention to interests and motivation of the students carefully.

With the spread of active learning style in higher education, facilitation and project management have been recognized as necessary teaching skills for any instructor, though it takes a considerable amount of time for training to master these skills. As we described previous section, we observed that many of colleagues lost his/her specific tactics for coaching at same or corresponding situations in our practice because of insufficient knowledge and skills for learning supports in the experience-based learning. Therefore, we consider that development of a portal site collected various cases and know-how about implementation of the experience-based learning approaches has profound significance in help of any instructor, particularly with a little experiences and inexperienced instructors for the approaches. We show schematic diagram of developing portal site in Figure 2.

Figure 2. Schematic diagram of supporting portal site for instructors.



We expect that the site is accessed to obtain knowledge and techniques during they deal in the course in order for appropriately encouraging student’s leaning via the experience-based approaches. So we adopt the following concepts and functions in developing portal site:

1. The portal site divides the entrance by empirical values of the experience-based learning approaches; inexperienced, within 3 years experiences, over 3 years experiences.
2. It is consisted of four major categories to review own actions for student supports: facilitation for student’s activities, project management, selection of activity place / project theme, and learning evaluation. These categorize comes from analysis of the questionnaires’ responses.
3. The contents of the site are helpful techniques, know-how, good practices with ingenious attempts. Developing materials are composed principally of tactics taken in the situations we observed (see Fig.1), because most of them may frequently arise in any practice experience style learning.
4. Suppose a user cannot take the appropriate category from the four, the site equips him/her another path to offer suitable tactics or relevant contents.
5. The portal site has a functionality for posting ingenious attempts that a user they carry out in his/her practice. The database of the site automatically sorts out the posted data into the four categories with use of tags set by the poster.

4. Concluding remarks

We have described our ongoing study about development of a supporting system for educational improvement in active learning approaches. On the basis of perceptions obtained from implementation of a problem-based learning in a technical college and earlier studies for implementation of active learning, we have conducted to study about supports for instructors practicing the experience-based approach in both educational and technological aspects. In the present paper, we have entirely focused on to show our observational study for frequently confused issues or cases of instructors in experience-based approach, and design concept and functions to be installed on our developing portal site. We now continue to extract information (knowledge) and tactics (coaching skills) for encouraging student activities, and also learning design in practice of the experience-based learning that are basic data presenting via the portal site. This is an ongoing study so we will conduct to revise and brushing up our data, and also design appropriate user interface of the site, because our target users are beginner of experience-based learning so we envisage that they cannot find suitable data by themselves. We expect our system will be helpful for any instructor participating practices of active learning.

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MOOCS AS A KEY STRATEGY FOR UNIVERSITY ORIENTATION

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Abstract

In a global knowledge society, there is a growing need for a highly-qualified, and differently-qualified, workforce. Leading to heightened interest on the part of European and National Institutions in student demographics, and figures like total number of undergraduates, graduates, and STEM students. In Italy, the total number of people in the 25-34 age range who have a degree is 20% compared to the OECD average of 30%. And compared to graduate numbers in the rest of Europe, Italy is almost at the bottom of the league table. Italians score similarly on levels of digitalization. Student dropout figures in Italy also compare unfavorably with the rest of Europe. Against this background, European directives state the need for strategic intervention on the part of universities, in orientation and education. On a national level, the Ministry for University Education and Research (MIUR) is focusing on ways of responding to these challenges. And MOOCs and multimedia learning have been cited as a potential tool to help address them. This paper looks at how MOOCs, since January 2019, are being used as part of the new strategy for university orientation for school-leavers at Federica Weblearning, the Centre for Innovation and Research into online learning at the University of Naples Federico II. It explores how courses are structured to address the needs of this particular audience, how students are reached, student engagement encouraged and how success of the initiative is measured.

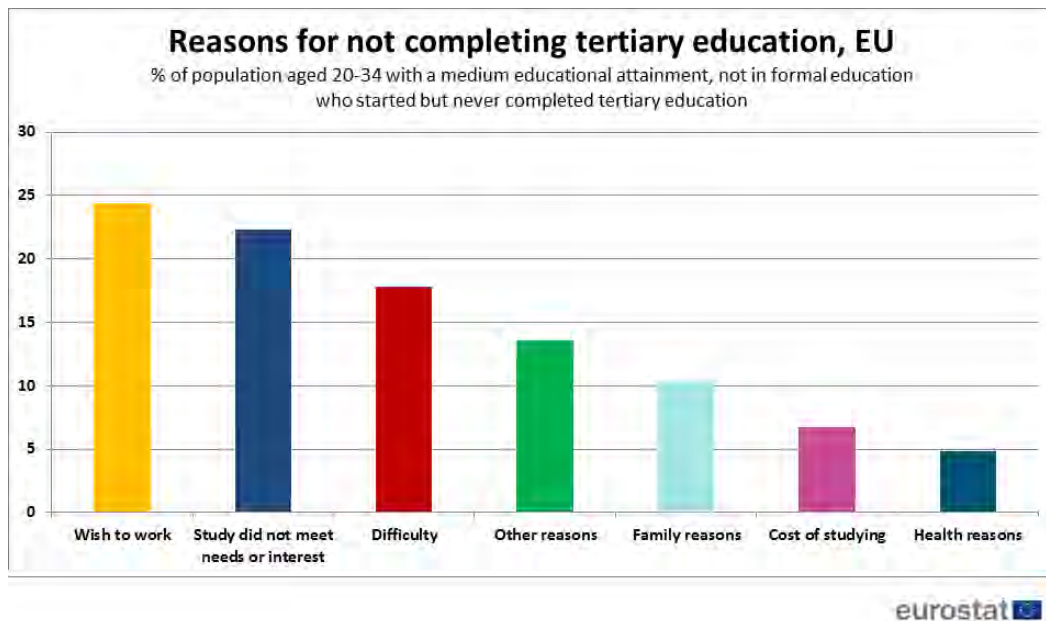
Keywords: *MOOC, multimedia learning, orientation.*

1. Introduction

Federica Weblearning is a University Centre for Experimentation and Innovation in open and multimedia learning at the University of Naples Federico II. Starting out with Open Courseware in 2007, Federica moved into the MOOC sector in 2015 and now has a portfolio of 150 MOOCs hosted on its own Federica.eu platform and on edX, the international provider headed by Harvard and MIT. The main driver behind MOOCs development was to enhance the University core business of preparing students for degrees by offering a more flexible, digital alternative/supplement to in-house teaching, which was more in line with 21st century student expectations. However, Federica also realized that its MOOC audience was much broader than this and so, in 2017, Federica reviewed its MOOC strategy in readiness for a new-look home-page that better addressed the changing audience. The results, presented in a previous paper (Kerr, R., Reda, V., 2017), defined the four pillars of the Federica Institutional MOOC strategy: Core Business; Lifelong Learning, Internationalization and, last but not least, Orientation, addressing the large numbers of high-school leavers who are facing important life and career decisions.

Although a university degree is still seen as the baseline qualification for most middle level jobs (Selingo, J., 2017), and, in an information society the need for a more highly-skilled workforce increases, a 2016 EU survey shows that while 30 million students successfully graduated from University, another 3 million dropped out. The reasons for abandoning university studies are wide-ranging but often relate to the degree program not responding to real needs (22%), and unexpected difficulty of the course work (18%).

Figure 1. EUROSTAT 2018.



The European Commission issued directives stating the need for strategic intervention on the part of universities, in orientation and education. However, the uptake has not been very widespread.

2. Online orientation initiatives

On a global level, over the last five years there have been various initiatives in the e-learning sector that aim to bridge the gap between school and higher education for secondary school students wishing to enter university. One notable example is Khan Academy a not-for-profit organization which offers learning tools primarily for school-age students, and teachers. It also provides services, such as mentoring for parents and teachers and other tools dedicated to helping students navigate college admissions, career choices, personal finance and entrepreneurship. On the other hand, leaders in the e-learning sector on higher education have designed programs that are specifically focused on student orientation. In particular, in the US, edX, the Harvard-MIT MOOC provider, is offering a project called “Get College Ready. Get Ahead. Get Learning” (<https://www.edx.org/high-school>), which consists of 50 courses with high relevance to high schoolers, including AP exam preparation, and introductory college freshman-year courses. At the same time, Futurelearn, leader of online education at a European level, since 2015 launched a project called Futurelearn Choices (<https://www.futurelearn.com/courses/collections/going-to-university>). It offers a collection of courses, specifically designed for students aged 16-19, with the purpose of giving an overview and a sample of different universities and university subjects that they may be interested in, in order to choose the right degree, university or career (Class Central, 2015).

France also seems to play a leading role in the field, with initiatives from the national institutional MOOC platform FUN (<https://www.fun-mooc.fr/>) and RenaSUP (Réseau national d'enseignement supérieur privé, <https://www.renasup.org/>).

FUN offers a BAC preparation course, MOOCs on key subjects not taught at school (medicine, law, psychology) and on STAPS (sciences et techniques des activités physiques et sportives), as well as a MOOC on how to successfully apply to top universities.

Renasup offers its Partner Catholic lycées an Orientation MOOC to help teachers and students understand Ministerial Reform (<http://www.mooc-renasup.org/index.php>)

The University of Torino in Italy offers 20 open access courses via its Start@UniTO project, in conjunction with the San Paolo Company. These are aimed at final year High school students with a view to better aiding student choice of course.

3. Scenario in Italy

A 2017 OECD report on Education Policy Outlook in Italy states that in Italy, the share of 25-34 year-olds with at least upper secondary education was 74.4% in 2015 (compared to the OECD average of 84.1%). Tertiary education attainment of 25-34 year-olds is the lowest among OECD countries; in 2015, 25.1% had attained tertiary education (compared to the OECD average of 41.8%). Dropout rates compare equally unfavorably. Government reforms in response to this include the three-year National Plan for Digital Education (Piano Nazionale Scuola Digitale, PNSD), which aims to improve digital competencies of both teachers and students, through a complex set of actions ranging from upgrading Internet connections in schools to setting up learning environments in which creativity and laboratory activities are possible. In co-operation with the European Strategy for Education and Training (ET2020), MIUR is implementing the National Operational Programme 2014-20. One objective of the programme is to reduce regional performance differences by decreasing the early school-leaving rate of 18-24 year-olds to below 16% by 2020 (from 17% in 2013). Italy achieved this target nationally in 2015, but many regions are still far from it, including Campania. MOOCs are seen as one of the possible strategies for achieving this target. Funding is provided by the European Regional Development Fund (27%) and the European Social Fund (73%). The Federica orientation initiative through MOOCs is seen as a possible contribution to improving these critical performances, as well as to providing digital learning contexts within the high school curriculum.

4. “Federica Orienta” initiative and its methodology

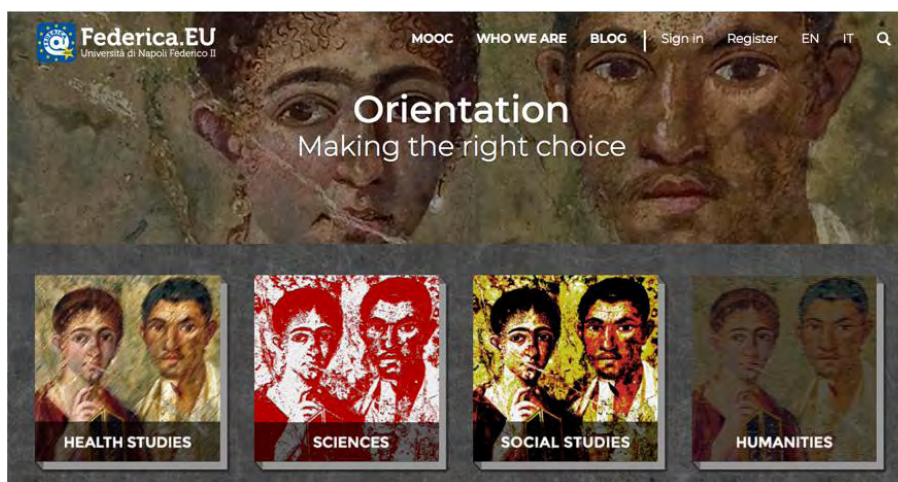
In January 2019 Federica Weblearning decided to launch an intensive MOOC based orientation initiative in conjunction with the Regional Education Council called “Federica Orienta” that is designed to enable students to have a better understanding of what study at university, and of specific disciplines, entails, and thus to help them make more reasoned degree choices in line with personal competences and aspirations.

The project is designed with two main components, online and offline (face-to-face). The online phase comprises specifically designed short MOOCs, called metaMOOCs, which are hosted on the main website of Federica.eu and are available to everyone. Additionally, the program is structured with face-to-face presentations and workshops at schools for teachers and students in the classroom, as explained in the subsequent paragraphs.

4.1. Online phase

The metaMOOCs are offered in the 4 scientific-disciplinary areas available at the university: health, sciences, social and humanities studies.

Figure 2. Federica.eu – Orientation Section.



The aim of the online content is to replicate the on-campus experience, introducing students to the subject matter, the teachers, the methodology and giving an idea of the level of difficulty. The emphasis is on subjects that tend to attract large numbers of applicants but which are not included in the High School curriculum, like engineering, law and medicine.

The metaMOOCs offer 4 alternative or complementary pathways. The first is a brief and lively overview of different disciplines via engaging video trailers. The second category invites students to follow one complete lesson of a subject of their choice, thus getting a feel for the teaching style, level of difficulty of input, as well as assessment format and content. The third MOOC category offers longer chunks of learning for students who want to prepare specific modules before actually enrolling at University and maybe get ahead. The fourth is an invitation to teachers, as multipliers, to engage students in orientation via a class project that involves the creation of a digital artefact to be shared on the Federica platform.

1. **Trailer** – the engaging trailers give an overview of subject content and what a course in this subject would involve
2. **First Lessons** - compilations of highlights from the first lessons of MOOCs in specific subjects
3. **Learn more** - in-depth exploration of a specific subject via a complete short MOOC.
4. **Tool kit** –Classes / Students are invited to create a multimedia report of their own orientation learning journey, which can be published and shared on the Federica platform

Classes are invited to participate in creating their own metaMOOC as a result of their exploration and learning experience on the Federica.eu platform. Or as a result of any other successful orientation activity they have been engaged in. Fundamentally, the MOOCs present with a high level of granularity so students can harvest chunks of learning from diverse MOOCs and connect them around a narrative of their own learning and orientation experience on Federica.eu, to form a recommended learning journey and/or reflection of their own making in the form of a video, mini-MOOC or BOOK, which they can then publish on the Federica.eu website and offer to other students.

4.2. Offline phase

To accompany and explain the potential of metaMOOCs for orientation, a series of workshops are being run by the Federica team with involved schools in the local Region. These workshops involve liaising with the Head Teacher, and are organized in conjunction with the Head of Orientation for classes of final year students. During the workshop the Federica team present the four different pathways while the students experiment navigation around the metaMOOCs on their mobile devices. The students are also presented with project guidelines that reinforce how to use the metaMOOCs and also propose various formats that can be used for the final compilation of their own metaMOOC, including video-story, mini MOOC or book.

Federica representatives maintain email contact with class teachers and offer support and ideas throughout their class's orientation journey, and they return to the school to verify students' progress on their multimedia products before they are finally published.

5. Results

As the project is still in its early stages, it is difficult to measure the concrete results and impact for teachers and students, but our overview since February 2019, seems to be positive.

In terms of the online phase, we registered more than 13,800 page views, and 600 students enrolled in the metaMOOCs.

15 secondary schools in the Campania Region who are heading for university entry in 2019 have been engaged in the offline phase, via workshops, presentations and meeting with final year students and their teachers. Many other appointments are in the pipeline for an early start with the 2020 intake for the offline phase.

Three video stories created by students are in production, narrating a positive learning/orientation experience in the context of literature and biology.

It is difficult to measure the success of the project, but participants are asked to complete a survey for the collection of qualitative data that can at least enable us to create positive feedback loops, adjusting the approach in accordance with student needs. Workshops are organized for the Autumn term with the teachers involved in the projects, to discuss the feedback emerging from the surveys and to define the road map for the subsequent year.

For now the majority of registered users are focusing on content in the field of humanities, engineering and agriculture, which will enable us in the future to map emerging trends/preferences on the part of the Italian Liceo audience.

6. Conclusions and discussion

As school-leavers have to make difficult decisions about whether to study at university or not, and which subject would best prepare them for personal fulfilment as well as the job market, it seems likely that they will be negatively influenced, at least in Italy, by rising costs of tertiary education, high unemployment rates even amongst graduates, and high university dropout rates. Online orientation initiatives, like the Federica meta-moocs, seek to provide a valid introduction to the on-campus experience, to better inform potential students of subject content, teaching methodology and levels of difficulty. They also introduce students to an online campus, a valid alternative study context for 21st century students.

The metaMOOCs portfolio will be extended to include preparation courses for university entrance exams in faculties where competition for places is so high. Future developments will also increase levels of student interaction to foster the digital competencies and soft skills that are in demand in the 21st century workplace.

The Federica platform also offers four online Bachelors courses in Computer and Mechanical Engineering, Tourism Management and Business Administration, and this orientation initiative via metaMOOCs prepares students well for an eventual decision to prepare their degree online while working too.

Another future aim of the project is to increase teacher involvement through training workshops in MOOC production and delivery.

Acknowledgements

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MAKING A DIFFERENCE: THE TALE OF RECYCLING EFFORTS OF AN INDIVIDUAL STAFF MEMBER AT AN HBCU

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Abstract

In the area of sustainability individual efforts matter and can make a difference in the commitment of institutions of higher education for sustainable actions and practices by moving the needle closer to the goal of going green. Research supports the notion that one person can make a difference.

Institutions of higher education have the potential to function as change agents for sustainability (Stephens, Hernandez, Roman, Graham & Scholz, 2013). According the University Leaders for a Sustainable Future sustainability implies that the critical activities of institutions of higher education are ecologically sound, socially just, and economically viable. These institutions can function as sustainable communities, embodying responsible consumption of food and energy.

In 2010 Clark Atlanta University, an HBCU took an important step toward reversing global warming when the university's president signed the American College and University President's Climate Commitment (ACUPCC) thus joining over 600 institutions in 50 states in the United States to commit to attaining carbon neutrality. Goals were defined and outlined in the institution's Strategic Plan Initiative that set the university on a path for 20% reduction of energy consumption across the campus in five years and a doubling the campus recycling efforts by 2015 thus ensuring that sustainability issues remained an integral to the CAU experience.

This presentation explores the case of a staff initiated recycling effort at an HBCU (Historically Black College and University). It analyzes an in-depth interview with the staff member whose efforts moved from interest and concern about recycling, to membership of the university's Sustainability Council and ultimately influencing the recycling behavior of others in his unit including other staff, faculty and students. The presentation serves as an example of how one person can make a difference in sustainability initiatives, and offers insight for how recycling as a practice can be initiated and sustained at an institution of higher education in their quest to go green.

Keywords: *Recycling, case study, sustainability, HCBU.*

1. Introduction

In the area of sustainability individual efforts matter and can make a difference in the commitment of institutions of higher education for sustainable actions and practices by moving the needle closer to the goal of going green. Research supports the notion that one person can make a difference.

Institutions of higher education have the potential to function as change agents for sustainability (Stephens, Hernandez, Roman, Graham & Scholz, 2013). According the University Leaders for a Sustainable Future sustainability implies that the critical activities of institutions of higher education are ecologically sound, socially just, and economically viable. These institutions can function as sustainable communities, embodying responsible consumption of food and energy.

In 2010 Clark Atlanta University, an HBCU (Historically Black Colleges and Universities) took an important step toward reversing global warming when the university's president signed the American College and University President's Climate Commitment (ACUPCC) thus joining over 600 institutions in 50 states in the United States to commit to attaining carbon neutrality. Goals were defined and outlined in the institution's Strategic Plan Initiative that set the university on a path for 20% reduction of energy consumption across the campus in five years and a doubling the campus recycling efforts by 2015 thus ensuring that sustainability issues remained an integral to the CAU experience.

Sustainability implies that the critical activities of a higher education institution are (at a minimum) ecologically sound, socially just, and economically viable, and that they will continue to be so for future generations. A truly sustainable college or university would emphasize these concepts in its

curriculum and research, preparing students to contribute as working citizens to an environmentally sound and socially just society. The institution would function as a sustainable community, embodying responsible consumption of food and energy, treating its diverse members with respect, and supporting these values in the surrounding community.

As the nation's oldest historically black research institution, Clark Atlanta University (CAU) provides leadership in Historically Black Colleges and Universities (HBCU's) sustainability and helps to foster emerging geoscience networks. CAU is on the cutting edge advancing diversity, equity and inclusion. At CAU there are three pillars of sustainability: Social (People), Environmental (Planet) and Economic (Profits)

In 2011 a Sustainability Council was established whose membership included representatives from staff, faculty, and the student body. The mission of the council was to develop and implement a campus-wide sustainability program. The council's responsibilities included supporting the president in the implementation of the ACUPCC initiatives, being a repository of information of all university matters related to sustainability and distributing all university messages regarding sustainability as well as coordinating all university programs related to sustainability. The resultant Sustainability Plan was both comprehensive and ambitious and focused on providing leadership, research, education, community support, policies and procedures to ensure that future generations would have the resources to meet their needs. A Sustainability Coordinator was hired in 2017 to help guide sustainability efforts sharing responsibility for engaging the CAU Sustainability Council and advising the student Living Green Club.

In its 2018 Annual Sustainability Report the CAU Campus Sustainability Plan continued to be a dynamic document intended to provide a roadmap for advancing sustainability over the next five years (2018 – 23). The Plan identified leadership, organization and resources as the key ingredients for moving CAU sustainability forward. The Sustainability Plan invited feedback and creative suggestions from CAU Trustees, administration, faculty and students was considered a living document to guide sustainability efforts of the university from 2018-2023.

2. From the one to the many: the story of one individual's recycling efforts

Although some forms of informal recycling took place on the CAU campus, the CAU Sustainability Plan identified additional strategies for reducing and diverting 75% of the University's waste stream from landfills.

Behavioral change is one of our most important sustainability goals. Most people have already made up their minds that one person cannot make any difference in regard to recycling waste. That thinking might apply in other fields. In recycling, an individual can make a big difference when that individual effort contributes to a larger task of recycling.

3. The question: how does one person's effort change the behavior of others?

This study asks the question - How does one person's commitment to recycling move the needle closer for an institution of higher education to go green?

4. The method – an in-depth interview

In-depth interviewing is a qualitative research technique that involves conducting intensive individual interviews with one or a small number of respondents to explore their perspectives on a particular idea, program, or situation. The respondents can be asked about their experiences and expectations related to a program or situation, the thoughts they have concerning the program operation, processes and outcomes, and about any changes they perceive in themselves as a result of their involvement in the program.

A one-on-one in-depth interview was conducted with a staff person employed in a broadcast service unit of the university whose personal interest in recycling lead to membership of the university's Sustainability Council and ultimately influencing the recycling behavior of others in his unit including other staff, faculty and students.

The objective of the interview was to gain insight about how the subject's individual efforts moved from a personal interest in and commitment to recycling to involvement in the university's sustainability efforts and making a difference in the recycling program.

4.1. The Subject

A one-on-one In-Depth interview was conducted with a staff person employed in the broadcast service unit of the university. This person, an African-American male in his 50's, had been with the university for more than seven years starting out as a part-time staff member before becoming full-time in the last two years. Prior to working at the university, the subject worked at two large corporations located in the city of Atlanta.

4.2. Questions

Structured open-ended questions were used to encourage the interviewee to share his understanding, beliefs, experience and point-of-view about recycling. Asking questions that were based on the interviewee's responses and linked to the research objectives used inductive probing. The ultimate goal was to capture what the interviewee's experience meant.

4.3. The Interview Questions included the following:

- What has been your experience with recycling at CAU?
- How did you become involved in sustainability at CAU?
- What were your expectations related to the recycling program at CAU?
- What are your thoughts concerning your involvement with the CAU Sustainability Council? (The program operations, processes and outcomes)
- What was most rewarding about your involvement in sustainability efforts at CAU?

5. The Results

5.1. Seeing an opportunity and making a difference

The subject described how prior to joining CAU he worked at two large companies in Atlanta that had recycling programs. When he came to CAU, he worked part-time in the broadcast service unit. Because he worked on a Gospel radio show for 2 hours a day (5 – 7 am) he did not have a great deal of interaction with others. Later when his hours expanded, working from 10 am – 2 pm, he noticed how “used” paper was just tossed away in the trash. Making his own “Recycle” labels the subject re-purposed cardboard boxes and mail bins for recycling the used paper. He would take home the boxes/bins filled with paper after his shift and put the materials in his home recycling bin provided by his local government.

After a while he thought, “if they had a recycling program” staff would engage in recycling. He asked his colleagues who he needed to talk “to get recycling bins” and was told to “talk to someone facilities.” He went over to the facilities department and asked for recycling receptacles. In less than a week facilities brought two bins, which he placed near the copy machine and outside the office in the hallway. This was 5 years ago.

When asked how the unit's recycling program was going, he said housekeeping checks and empties the bins on a daily basis. “I trust the process and hope ... “ the material placed in the recycle bins including other recyclables such as cans and bottles are disposed of properly.

5.2. When others notice your good works

Seven years ago the subject received an email inviting him to join the CAU Sustainability Council because of his recycling efforts. The council tackled “low hanging fruit” initiatives such as the turning off of office lights when one left the office. During his tenure on the Sustainability Council, the university established a goal to LEED Silver certify all new construction and renovations of existing building. LEED certification provides independent, third-party verification that a building is designed and built using strategies aimed at achieving high performance in the key areas of human and environmental health; sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

5.3. The younger generation

The interviewee believes that the younger generation (our students) is more committed to the ideals of “Climate Change and Saving the Planet.” He believes that the Sustainability Council's plans and activities that focus on creating an “impact on the entering Freshmen classes” and developing “sustainability leaders and mentors” has been effective including activities such as participation in the Recycle Mania Case Study Competition that engage students sustainability efforts of the university.

6. Conclusion

This study examined how one person can make a difference in sustainability initiatives and answered “yes” to the question can one person make a difference in the arena of sustainability by using their personal passion for recycling to change the recycling behaviors of other thus optimizing that passion in their place of employment. The paper offers insight for how recycling as a practice can be initiated and sustained at an institution of higher education in their quest to go green. It is important to remember that the three pillars of sustainability are Social (People), Environmental (Planet) and Economic (Profits). A critical component of any sustainability plan is promoting awareness among the entire University community.

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POSTERS

VOCATIONAL TEACHERS' MOTIVES FOR IMPROVEMENT THEIR QUALIFICATION

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Abstract

Vocational education and training is widely valued by policy-makers in many countries. Vocational teachers are working in difficult conditions today. Changes continually take place in educational policy and in vocational school's physical and social environment. The teachers who want to be effective in such an environment should not only master their profession, but also seek new knowledge and strive for continuous improvement. Continuous professional development of teachers is essential when addressing the gaps in training that arise through time and change. Usually teachers improve their teaching skills on a voluntary basis, based on their own need to expand their professional development.

This article concerns the continuing professional development of vocational teachers. Data were collected from vocational teachers through quantitative study. 27 vocational schools in Lithuania were involved in the study. Results showed that the needs of teachers' professional development remain unchanged for many years. Such needs are dominated by didactic-pedagogical topics, although in the current situation, vocational education requires the development of communication and information technology competences. The motives for development are caused by technological advancement in the labor market and inner need for improvement.

Keywords: Vocational teachers, qualification, professional development.

1. Introduction

Today's challenges and relevant vocational training problems suppose exclusive requirements for the educational system and vocational teachers. Vocational teachers' work is based on two main competences: teaching competence and competence related to a specific work-life vocational practice (Andersson & Köpsén, 2015). There are emphasized vocational teachers' personal qualities, motivation, an innovative approach to their activities and desire to keep improving in particular, taking good vocational training experience and creating special modern educational technologies for the subjects taught (Daukilas, Mičiulienė, Kovalčikienė & Kasperiūnienė, 2016). Vocational teachers have to be able to think broadly in various aspects and, evaluate and demonstrate practical experience, which relates to the subject matter of the object. Their professional development is a lifelong learning process, which is caused by both external (technological advancement in the labor market, teacher change in schools) and internal (inner need for improvement) factors.

The research questions for this study were:

How do the vocational teachers evaluate the impact of qualification improvement activities? What kind of activities are most preferred by vocational pedagogues? Do their attitudes depend on gender, age, school policy, etc? What are the essential motivations for the qualification improvement of the vocational teachers?

Nonparametric statistical hypothesis verification methods have been used to evaluate the statistical significance of the differences between the groups. Hypotheses are checked by χ^2 , Kruskal Wallis or Mann-Whitney U statistics. The data were processed with the statistical program SPSS.

2. Results

The study of the content of vocational teachers' activities was carried out on April - May 2016. Using probabilistic cluster sampling of the 10 regions (counties), 27 vocational schools have been randomly selected. The questionnaires, which are designed to identify professional development ways,

the peculiarities of the educational process, used the nominal and order (Likert) scales. In this research we focused on vocational teachers' motives for improvement their qualification.

A total of 339 teachers from vocational schools the survey, with some surveys incomplete. The sample included mostly women (72,1 %). There were 19,6 % of teachers of general subjects, 72 % of teachers of vocational subjects, 8,4 % of teachers of both general and vocational subjects. 40.7 % of the respondents were from cities (more than 50 thousand inhabitants), and others respondents were from district centers and countryside. Most respondents (38,3 %) were in the 50 - 59-year range. 21,4 % of respondents were in the 40 – 49 year age group, 17,5 % of respondents were in the 30 – 39 age group and the same percentage of respondents were older than 60 year. Only 5,3 % of respondents were in the 18-29 years age group.

The teachers were asked about the professional development they had participated in during the 12 months prior to the survey and to evaluate the impact of activities in 4 points scale (1 – no impact, 4 – large impact).

The majority of teachers participated in professional development activities (Table). The percentage of those not having participated in any professional development activity was estimated at 8,8%. The respondents attended at professional development activities 7,4 days on average (median – 6, maximum – 28). The most of teachers attended at courses/seminars, participated in the activity of methodical groups and observation visits to other schools, had informal dialogue with colleagues to improve the teaching.

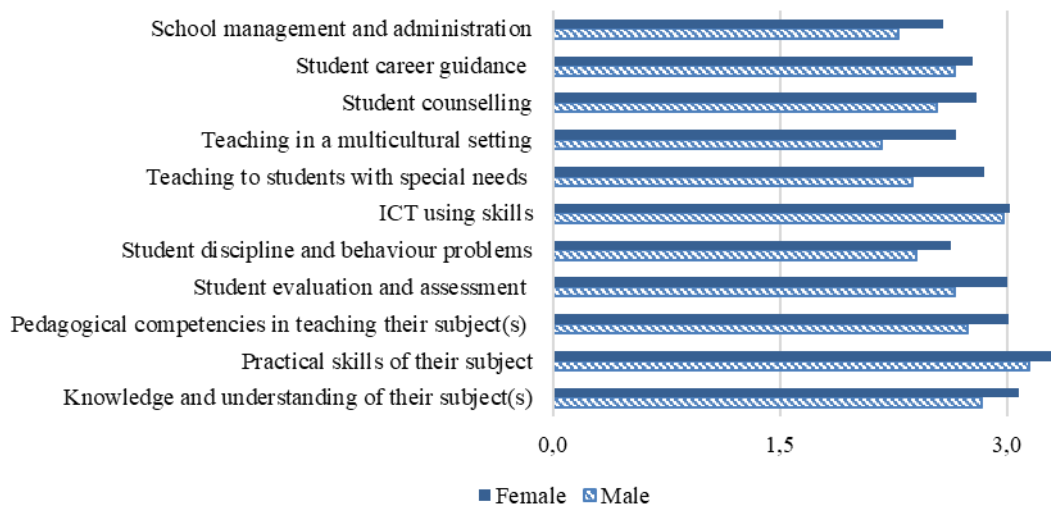
Table 1. Participation of teachers in activities and its impact on their professional development.

Type of professional development	Teachers indicating they participated in activity in previous 12 months, %	Impact		
		Mode	Mean	Std. Deviation
Courses/seminars (education-related topics)	90,86	3	3,01	,624
Informal dialogue with colleagues to improve the teaching	87,02	3	3,17	,758
Courses/seminars (subject related/technological topics)	84,37	3	3,18	,701
Participation in the activity of methodical group	79,35	3	2,97	,777
Observation visits to other schools	76,99	3	3,20	,741
Reading professional literature	73,75	4	3,38	,723
Observation of colleagues' work	71,68	3	2,92	,829
Project activities	59,29	4	3,24	,874
Individual or collaborative research on a topic of interest	49,26	3	2,63	,922
Internship	33,04	4	3,18	1,100
Participation in a network of schools	27,43	3	2,69	1,094
Mentoring and/or peer observation and coaching, as part of a formal school arrangement	21,24	3	2,59	1,159
Participation in pedagogical ideas fair	17,11	3	2,49	1,098
Qualification programme (master studies)	10,91	1	2,39	1,293
Workshops/camp	4,42	1	1,75	1,090

The majority of teachers reported that the *Reading professional literature* had the largest impact. Surveys responses indicated, that *Project activities*, *Observation visits to other schools*, *Courses/seminars* (subject related/technological topics), *Internship*, and *Informal dialogue* with colleagues had medium or large impact. Comparing by gender, there were statistically significant differences in assessment of following activities: *Project activities*, *Observation of colleagues' work*, and *Informal dialogue with colleagues* (*Female* ranked more positive than *Male*). Comparing by place of residence, there was statistically significant difference in assessment of *Workshops/camp*. Kruskal-Wallis test showed that teachers of vocational subjects ranked more positive such activities as *Courses/seminars* (subject related/technological topics) ($p = 0,012$), *Internship* ($p = 0,026$), and teachers of general subjects ranked more positive *Informal dialogue with colleagues to improve the teaching* ($p = 0,039$). There were not statistically significant differences by age.

The respondents indicated, that the most important need is the improving the knowledge and practical (technological) skills of their subject, and practicing of ICT skills. There were found statistically significant differences by age in ranking of *Student evaluation and assessment* ($p = 0,001$), *Teaching in a multicultural or multilingual setting* ($p = 0,004$), and *School management and administration* ($p = 0,000$), *Instructional practices* ($p = 0,015$); by subjects taught by teachers – *Teaching to students with special needs* ($p = 0,010$). There were no statistical statistically differences comparing by place of residence. Comparing qualification improvement needs by gender (Figure), there were found not statistically significant differences in assessment of *Student discipline and behavior problems* ($p = 0,115$), *ICT using skills* ($p = 0,430$), *Student career guidance* ($p = 0,280$) and *School management and administration* ($p = 0,063$).

Figure 1. Qualification improvement needs (average rank).



The results show that the participants highlighted personal desire for the acquisition of new knowledge and technical skills as the strongest motive for improvement of their qualification. They pointed out that “*We need to learn all our life in our professional life*”.

3. Conclusions

Vocational teachers’ training is inert, more based on traditional experiences and local needs. Highly relevant group and individual qualification upgrading strategies are: more traditional methods of qualification upgrading methods are used, such as courses and seminars on pedagogical and technological topics, consultation with colleagues. However, individual ways are appreciated, such as reading professional literature. The topics and needs of teachers’ professional development are unchanged for many years: didactic-pedagogical topics, although teachers miss technological-business training; teachers give priority to didactic-business training. The geographical location and size of the school affects the qualifications of teachers. In schools in small rural areas, priority is given to general, often informal learning in methodological groups, non-governmental organizations, social activities and programs. Teachers of district schools are more likely upgrading their qualification in project activities.

The research of motives for the development of vocational teachers reveals that qualification improvement is a continual process in this profession which is caused by both external (technological advancement in the labor market) and internal (inner need for improvement) factors.

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THE EMPLOYABILITY OF UNDERGRADUATES IN TAIWAN: FROM THE VIEW POINT OF ENTERPRISES AND THEMSELVES

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Abstract

97.70% of companies in Taiwan are SMEs. Most of these SMEs have an experience of recruitment on new employees just graduated from universities. Unfortunately, most companies often feel that there were exists a gap between school's supply and company's need for competencies. Therefore, the purpose of this study is to gain an insight into companies' views on the employability of undergraduates and to examine the employability they had by themselves. This study randomly selected 152 employers and 117 employees from 735 SMEs companies in 2018. According to the statistical analysis and discussion, the conclusions and recommendations drawn are as follows: 1. In view of companies' views on employability, employees' "general knowledge" is given greater importance, but graduates focus on "professional skills"; 2. Among the 45 employability items, companies attach the greatest importance to "working under pressure", but graduates focus on "team work"; 3. Top managers attach greater importance to "general knowledge" compared to middle managers; 4. Compared to other countries, the top ten employability items given importance are practically the same, but Taiwan gives special emphasis to learning ability.

Keywords: *Internship, employability, small and medium-size enterprises (SMEs), undergraduate, cooperative education.*

1. Introduction

Education provides the different kinds of workforce for economy development. In order to strengthen the employability of undergraduates, the Department of Technological and Vocational Education, MOE proposed the "Outline of Technical and Vocational Education Policy" in March 2017. The outline states that students should strengthen their abilities in practice through systematic internship systems in order for companies to hire graduates best resembling the site of practice (Ministry of Education, 2017). Many studies and graduates have confirmed that the existing school education is not in line with companies' needs and students' career development and there exists a gap between company sites in which students have employed and the company' applications. There also exists a big gap between the abilities that students learn in school and the abilities needed in the actual company workplace. Therefore, the purpose of this study is to gain an insight into employability of graduates from the perspective of enterprises and to find the gap between enterprises and undergraduates. The research conclusions shall serve as a reference for schools when making curriculum adjustments or cultivation of abilities.

2. The definition and dimensions of employability

The academia has had divided views on the definition of employability. According to the Business Dictionary (2018), employability could be defined as "A group of essential abilities that involve the development of a knowledge base, expertise level and mindset that is increasingly necessary for success in the modern workplace." It is not easy for us to measure employability, unfortunately, Misra and Mishra (2011) thought employability is not just dependent upon the labor market forces, but also on other factors like willingness, capacity, mobility training (skills enhancement) and functional flexibility (working changing shifts, working beyond job description). For instance, technical universities are

recognized as the prime engineering who will teach future engineering practitioners and present students with the knowledge on how to become “employable” that is how to develop a range of employability skills which include not only hard skills i.e. discipline specific skills, technical and IT skills but perhaps most importantly soft skills i.e. communication and interpersonal skills, ethics, critical thinking, leadership, entrepreneurship, life-long learning, problem-solving, social responsibility, adaptability, flexibility and others (Chang, et al., 2018). Brennan et al. (2001) conducted a survey on university graduates from 12 countries (now employees). With the assistance of universities, 45,000 new graduates who were already working were surveyed. The questionnaire consists of three dimensions and 37 employability abilities. For the demand in local companies, this study was revised the initial 37-item questionnaire. In this study, a 5-expert panel discussion meeting was held, and 8 questions were added to make the employability questionnaire become 45-item questionnaire.

3. Methodology

3.1. Participants

There were 735 companies in the list of institutions with Top-2000-Company in the Area of Electrical Engineering and Computer Sciences (EECS) of Industry of Manufactures (National Development Council, 2018) were downloaded from the Database of Common Wealth Magazine in Taiwan in 2018. Through purposive sampling, the samples were selected, and the questionnaire was mailed to these institutions. Questionnaires were recovered from 117 companies, accounting for the effective recovery rate of 15.9%.

3.2. Procedure

The questionnaire consists of two sections. The first section is about demographic information contains 5 items. The second section consists of 45 items concerning the “Employability”. All scales comprised 5-point Likert-type items. The average time for completing each questionnaire is 6-7 minutes.

3.3. Measurement

The Employability Scale implemented in this study was initial developed by Brennan, J., Johnston, B., Little, B., Shah, T., & Woodley, A. (2001). The Employability Scale consists of 3 dimensions: 1. Specific/ professional basic knowledge (SBK), 2. General knowledge/ abilities (GKA), and 3. Behavior/ character / personality (BCP). Internal consistency of total scale is measured with Cronbach’s alpha ($\alpha = .974$), and sub-scale in SBK is .940, in GKA is .937, and in BCP is .961.

4. Results and discussion

4.1. Difference between self and enterprise evaluation on employability

As shown in Table 1, the self-evaluation employability by graduates is higher than enterprise-evaluation. Furthermore, there is a great difference between them on behavior/character/personality (BCP).

4.2. Ranking on the employability

In Table 1, both graduates and enterprises are thought that the employability is insufficient on the specific basic knowledge. The ranking of the respective employability items. The means of the 45 employability items show that “Economic reasoning” has the lowest mean (average=2.72), followed by “Foreign language proficiency (2.78)”, and “Understanding complex social systems (2.86).” From the bottom three employability items, it can be found that all of the items fall under SBK, indicating that Taiwanese companies thought their employee with lower specific basic knowledge.

Table 1. Difference between self-evaluation and enterprise- evaluation.

Item	Self-evaluation			Enterprise-evaluation			t-test
	M	SD	Rank	M	SD	Rank	
Specific/pro. basic knowledge (SBK)	3.34	1.009		3.22	1.022		-3.424*
1. Broad general knowledge	3.59	1.001	18	3.17	0.968	21	-3.464*
2. Cross-disciplinary thinking/knowledge	3.49	0.988	14	3.01	0.952	13	-4.037*
3. Field-specific theoretical knowledge	3.46	0.886	13	3.05	1.012	14	-3.521*
4. Field-specific technical knowledge [#]	3.50	0.847	15	3.09	1.054	17	-3.439*
5. Field-specific knowledge of methods	3.41	1.043	11	2.97	1.085	10	-3.326
6. Foreign language proficiency	3.01	1.071	1	2.78	1.018	2	-1.814
7. Computer skills	3.62	1.016	19	3.55	0.941	44	-.579
8. Understanding complex social systems	3.07	1.120	3	2.86	1.017	3	-1.580
9. Planning, coordinating and organizing	3.38	0.989	8	3.05	1.032	14	-2.648*

10. Applying rules and regulations	3.20	0.949	5	3.05	0.951	14	-1.288
11. Economic reasoning	3.04	1.094	2	2.72	1.140	1	-2.315*
12. Documenting ideas and information	3.38	0.945	8	2.93	1.021	7	-3.704*
13. Practical skills in EECS [#]	3.38	0.990	8	2.99	1.042	12	-3.172*
14. Terminology in EECS [#]	3.36	1.062	7	2.97	1.038	10	-3.038*
15. Emergency response [#]	3.30	1.147	6	2.95	1.060	9	-2.604*
General knowledge & attitude (GKA)	3.68	0.933		3.25	1.038		-4.436*
16. Problem-solving ability	3.69	0.960	23	3.11	1.081	18	-4.634*
17. Analytical competencies	3.44	0.986	12	2.88	1.073	4	-4.350*
18. Numerical abilities	3.19	1.050	4	2.89	1.007	5	-2.377*
19. Learning abilities	3.87	0.856	38	3.63	0.975	45	-2.168*
20. Reflective thinking on one's own work	3.69	0.885	23	3.26	1.002	30	-3.662*
21. Creativity	3.56	0.986	17	3.36	0.945	37	-1.763
22. Working under pressure	3.72	0.999	27	3.20	1.088	24	-3.980*
23. Accuracy, attention to detail	3.78	0.832	33	3.22	1.085	25	-4.637*
24. Time management	3.77	0.913	31	3.19	1.108	23	-4.575*
25. Negotiating	3.65	0.913	20	3.14	1.061	20	-4.160*
26. Physical and mental fitness for work	3.68	0.953	22	3.53	1.003	43	-1.304
27. Manual skills	3.77	0.904	31	3.36	0.973	37	-3.568*
28. Working independently	3.86	0.937	36	3.32	1.101	32	-4.257*
29. Ability to work in a team	3.97	0.895	41	3.50	1.042	42	-3.932*
Behavior/character/personality (BCP)	3.83	0.894		3.24	1.043		-5.769*
30. Initiative	3.81	0.860	34	3.25	1.105	28	-4.541*
31. Adaptability	3.91	0.857	39	3.41	1.026	39	-4.253*
32. Decisiveness, persistence	3.72	0.927	27	3.32	1.013	32	-3.349*
33. Power of concentration	3.85	0.883	35	3.33	1.066	35	-4.315*
34. Getting personally involved	4.02	0.861	42	3.46	0.996	41	-4.816*
35. Loyalty, integrity	4.07	0.858	44	3.43	1.071	40	-5.237*
36. Critical thinking	3.70	0.874	26	3.24	0.963	26	-4.020*
37. Oral communication skills	3.74	0.948	29	3.26	1.013	30	-4.018*
38. Written communication skills	3.66	0.921	21	3.18	1.057	22	-3.852*
39. Tolerance of different view points	3.94	0.884	40	3.25	1.075	28	-5.632*
40. Leadership	3.52	0.934	16	2.93	1.062	7	-4.788*
41. Taking responsibilities, decisions	3.69	0.942	23	2.91	1.082	6	-6.232*
42. Tolerance for frustration [#]	3.86	0.899	36	3.11	1.052	18	-6.180*
43. Creative thinking skills [#]	3.74	0.902	29	3.34	1.003	36	-3.455*
44. Entrepreneurship [#]	4.03	0.825	43	3.32	1.046	32	-5.980*
45. Empathy [#]	4.08	0.939	45	3.24	1.061	26	-6.711*
Whole scale	3.63	0.674		3.17	0.838		-4.803*

5. Conclusion and recommendation

The self-evaluation employability by graduates is higher than enterprise-evaluation. Teachers and students in university could refer the means lower items of employee ability by enterprise evaluation in Table 1 to enforce the skills with remodel curriculum or teaching design.

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MOTIVATIONS AND JOB REPRESENTATIONS OF PROSPECTIVE PHYSICAL EDUCATION TEACHERS STARTING THEIR VOCATIONAL TRAINING

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Abstract

The teaching career-choice can be mainly explained by various intrinsic motivations (Berger & D'Ascoli, 2011) but also by a high sense of personal efficiency (Watt & Richardson, 2007). In the case of physical education teaching, the choice is often made by students who previously had a personal affinity for a sport, for which they imagine professional developments (Carlier et al., 2003). Men' choice seems, however, to be more focused on the sports skills to be achieved (Roux-Perez, 2004).

This paper summarizes the results of an exploratory research based on a questionnaire. Our main objective was to analyze the motivations, the personal efficiency and the job representations held by physical education students at the beginning of their vocational training. In order to answer our research questions, 254 subjects (174 men and 80 women), studying in two institutions of higher education, were surveyed and a descriptive cross-sectional analysis was then conducted.

Our results allow us to conclude that, broadly speaking and regardless of gender, physical education students are mainly motivated by intrinsic factors. Through their future profession, they search for a personal achievement and an improvement of their knowledge. They generally have a high sense of personal efficiency although women sometimes feel less “able” than men to teach physical education at the beginning of their training. Finally, the students agree on the qualities needed to the physical education teacher and they often hold their job representations close to that of an “educator” and “animator”.

Keywords: *Physical Education, vocational training, motivation, representations, personal efficiency.*

1. Introduction

The teaching career-choice can be mainly explained by personal factors (types of motivation, beliefs in one's abilities, prior personal appeal for a sport ...) and by preconceptions of the job that may vary from one individual to another (Bandura, 2003; Carlier et al., 2003 ; Roux-Perez, 2004 ; Berger & D'Ascoli, 2011). When a choice of educational orientation has to be made, individuals calculate the costs, benefits and risks associated with it (Franquet, Friant & Demeuse, 2010). But the way the orientation is selected (free choice or under the influence of relatives for example) may later have positive or negative consequences on motivation (Brasselet & Guerrien, 2010).

The concept of motivation is used in the sector of education and training to explain people's attitudes and performance (Toffoli, 2003). The model of self-determination (Deci & Ryan, 2000) describes the motivational dynamics that explain an individual engages or not in an activity. It defines different types of motivation that are differentiated according to the degree of self-determination of people, that is to say the degree to which they feel free or forced to perform an activity. Three main motivations can be highlighted: the amotivation, the extrinsic motivation and the intrinsic motivation.

Amotivation means a total lack of motivation for the activity. Extrinsic motivation occurs when the individual performs the activity without an optimal personal interest. It refers to behavior that is driven by external rewards or by the wish of avoiding unpleasant consequences. This type of motivation is characterized by four forms of regulation: external, introjected, identified and integrated. The last two types (identified and integrated) are often studied in the literature without any real distinction. Finally, the intrinsic motivation means that an activity is voluntarily carried out only for the pleasure, the satisfaction and the interest that it provides. It is the highest degree of self-determination, characterized by several types of intrinsic motivation: knowledge, achievement, and stimulation (Blais et al., 1993; Deci & Ryan, 2000).

Beliefs about one's own abilities also play an important role when choosing a teaching career (Watt & Richardson, 2007). Self-efficacy is indeed a core-concept for motivation, search of well-being and personal accomplishment (Bandura, 2003). In the same way, self-representation of the daily experience has an effect on the motivation because it provides objective and subjective information about the chosen profession (Postic, Le Calve, Joly & Beninel, 1990).

2. Methodological approach and sample

The paper presents the results of an exploratory research conducted among 254 students attending training courses in two French-speaking Belgian higher education institutions. The sample is made up of 174 men (68.50%) and 80 women (31.50%), enrolled in the different levels of the 3-year training. The proportion of women who choose physical education is significantly lower than that of men, although this difference is much lower at the end of training (women represent 29.84% of students at the beginning of the cursus against 42.55% at the end).

By using a global questionnaire, we wanted to analyze their motivations (according to the Scale of Motivations in Education - EMS, Vallerand et al., 1989), their feeling of personal efficiency (Bandura, 2003) and their job representations (as suggested by Carlier et al., 2003). Each item in the questionnaire was associated with a Likert scale ranging from level 0 (strongly disagree / not at all important) to level 10 (strongly agree / very important). A global score is obtained by summing the different so-obtained values. The statistical treatments used to analyze the collected data then allowed us to evaluate similarities and differences between the students.

3. Main results

The results show that our students are essentially motivated by intrinsic motivational factors. Through their profession, they essentially seek for a form of personal achievement ($m = 8.06$), stimulation ($m = 7.98$) and knowledge ($m = 7.72$). They indeed enjoy transmitting their sports skills, deepening their knowledge in sport and exceling in the different disciplines of training.

In contrast, they attribute a moderate importance to extrinsic motivations with external or introjected regulation (respectively, $m = 5.55$ and $m = 5.25$) even though their diploma will effectively allow them to have a relatively well paid job. Similarly, showing that they are able to succeed in their studies remains a non-central motivation.

Table 1. Motivations of our subjects (mean and standard deviation in the whole sample).

Motivations	Whole sample	
	Mean (m)	Standard deviation (σ)
Intrinsic motivation toward accomplishment	8.06	1.20
Intrinsic motivation toward stimulation	7.98	1.15
Intrinsic motivation toward knowledge	7.72	1.26
Extrinsic motivation with external regulation	5.55	1.79
Extrinsic motivation with introjected regulation	5.25	1.80
Extrinsic motivation with identified regulation	3.59	2.16
Amotivation	.94	1.53

Our analyzes highlight that all students have good confidence in their own abilities. They feel able to succeed in their studies ($m = 7.78$) and to become a good physical education teacher ($m = 8.19$). They also believe in their own sporting skills ($m = 7.59$). Let's add that they believe more and more in their abilities to later exercise their profession as they progress in their training.

Table 2. Feeling of perceived self-efficacy of our subjects (mean and standard deviation in the whole sample).

Perceived self-efficacy	Whole sample	
	Mean (m)	Standard deviation (σ)
Feeling able to become a good physical education teacher	8.19	1.48
Feeling able to succeed in their studies	7.78	1.69
Believe in their own sporting skills	7.59	1.38

Finally, students think that a physical education teacher must also be a good "educator" ($m = 8.10$) and an "animator" ($m = 7.27$) who have to convey positive values, ensure the social balance of the students while releasing stress in an entertaining way. On the other hand, students less link the physical education teacher with coaching ($m = 5.53$). They will fewer expect their pupils to outdo themselves and achieve accurate performance.

Table 3. Job representations (mean and standard-deviation of the whole sample).

Job representations	Whole sample	
	Mean (m)	Standard deviation (σ)
Educator	8.10	1.16
Animator	7.27	1.35
Coach	5.53	1.87

4. Conclusion

Our results allow us to conclude that, broadly speaking and regardless of gender, physical education students are mainly motivated by intrinsic factors. Through their future profession, they search for a personal achievement, a stimulation and an improvement of their knowledge. They generally have a high sense of personal efficiency although women sometimes feel less “able” than men to teach physical education at the beginning of their training. Except for this fact, the results show that the motivations of our prospective teachers of physical education little differ while progressing in the vocational training. Finally, the students agree on the qualities needed to the physical education teacher and they often hold their job representations close to that of an “educator” and “animator”.

In conclusion, students share quite similar and globally “harmonized” motivations, feelings of self-efficacy and job pre-conceptions. Two explanatory hypotheses can be found to explain this observation: either a “typical profile” is necessary when choosing this type of cursus or a light “smoothing” effect occurs during the training. These hypotheses should be more qualitatively analyzed in future longitudinal research.

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THE DEVELOPMENT OF STATISTICAL LITERACY ASSESSMENT TOOL FOR SENIOR STUDENTS IN ELEMENTARY SCHOOLS

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Abstract

The most critical capabilities of the twenty-first century are: learning and innovation ability, information, media and technology literacy, work and life skills. Key competencies in information literacy included data interpretation and the prediction of possibility, which has a critical impact for the decision of problem solving. However, analysis, interpretation of data, prediction and judgment are statistical literacy. To cultivate the ability of data analysis, interpretation, and the prediction and judgment of event probably occurring is the prior knowledge of statistical literacy in elementary school. Therefore, this study used data and chance as item content to compile a set of crossing grade assessment with reliability and validity. The assessment and its parallel norm tests suit to evaluate the students' statistical literacy development in the fifth and sixth grade.

The research results are as follows: 1. This study applied the Rasch model to explore the validity of the "Statistical literacy assessment tool". The results found that most of the items were goodness of fit.

2. This study, by concurrent estimating the difficulty of all the items and the ability of the students, showed that the ability of the students of different grades was significantly different, and the higher the grade, the higher the ability of the students.

3. This research is the parallel design of the test items. It can be used as a longitudinal study assessment tool to explore the statistical literacy of students in the fifth and sixth grades, and can reduce the threat of validity for repeating the test.

Keywords: *Statistical literacy, assessment tool, elementary school.*

1. Introduction

a. The Partnership for 21st Century Skills (P21) believes that the key capabilities most needed in the 21st century are: the ability to learn and innovate, information literacy, media and technology literacy, work and life skills (Liu, 2012).

b. No matter what occupation, correctly understanding and presenting of chart information, there are already existing every corner of life and workplace.

c. There are only a few articles and project reports on the development of students' statistical literacy concepts, indicators and tests in Taiwan.

d. The survey results of PISA, TIMSS and TASA found that the statistical literacy scores of Taiwan's primary and secondary schools is relatively weak compared to the whole (Lin, Ren, Li, Lin, Chang, Cao, Yang, 2014; PISA in Taiwan, 2014).

2. Objectives

Therefore, the research is to compile a set of test and parallel test for assessing students' statistical literacy-data and chance ability and understanding the development of students' data and chance ability in the fifth and sixth grades. It is also an important tool for assessing curriculum development, teacher instruction, and students' data and chance ability. The followings are the research's objectives:

a. Administering the items of the test and all the parallel tests in order to establish a norm test and confirm the reliability and validity.

b. Administering the criterion-related test - mathematical achievement test and analyzing the validity of the criterion.

c. Analysis of the overall status of the sample students' data and chance ability.

d. Analysis of data and chance ability, and other sub-projects - the relationship between mathematical vocabulary, mathematical writing and computing ability in order to understand the important factors related to the ability of data and chance.

3. Methods

3.1. The test development process

a. Establishing statistical literacy connotation

- b. Establishing a statistical literacy assessment framework
 - c. Setting the item type and length
 - d. Designing and revising procedures
 - e. Test compiling and data collection
- 3.2 Rasch model analyzing "statistical literacy test"
- 3.3 The research objects

For the fifth and sixth grade students, the sample statistics are as follows:

Table 1. Pre-test statistics description for the number of people in each grade.

grade	five	six	total
number	514	523	1037

Table 2. Formal test sampling description table.

grade	five		six	
	number	proportion	number	proportion
north 1	20	0.04	137	0.27
north 2	105	0.22	85	0.16
center	209	0.44	80	0.16
south	121	0.25	178	0.34
east+distance	23	0.05	36	0.07
合計	478	1.00	516	1.00

3.2. Data analysis

3.2.1. Rasch model. Since the test includes binary and multivariate scoring items, the Rasch partial credit model (Master, 1982) is adopted.

3.2.2. Validity analysis. The validity certificate is established from the two aspects of the test content and the internal structure.

3.2.3. Reliability analysis. This study used subject separation reliability and EAP reliability.

4. Results

4.1. Fifth and sixth grade assessment framework

Table 3.

content	Concept understanding	Procedure executing	Solving and reasoning	total
Data collation and presentation	3	2	0	5(23.8%)
Data reading and interpretation	2	4	4	10(47.6%)
possibility	3	1	2	6(28.6%)
total	8(38.1%)	7(33.3%)	6(28.6%)	21(100%)

4.2. Validity evaluation results

4.2.1. Construct validity. Rasch model goodness of fit item goodness of fit except for the 3 questions in Volume 2, the MNSQ of all the other items fell between 1 ± 0.3 .

Table 4.

Volume	Ave. b	Area b	MNSQ	# outlier of MNSQ
1	-0.22	-2.04~1.00	0.74~1.17	0
2	-0.35	-1.98~1.30	0.65~1.33	3
3	-0.10	-2.00~1.20	0.79~1.21	0

Estimated difficulty of each test in each year

Using the good anchor items' parameters which were set up in the previous pre-test, the answers of all the students in the two grades are concurrently estimated, so that the student's ability and the test difficulty can be estimated under the same scale. The average difficulty of the test questions is -0.22 , which means that for the whole student, the test items are median and tend to easy.

Vertical scale and item calibration

The researcher used one-way ANOVA to compare differences in data and chance abilities between students in the two grades. The analysis showed significantly different between two years, sixth grade ($M = .51$, $SD = .79$) significantly higher than the fifth grade ($M = .23$, $SD = .70$).

Expert validity

The expert validity adopted in this research, in the assessment framework part, is through expert consultation meeting. There are 5 experts and scholars, including 2 mathematics education, 1 special education, 1 mathematics cognition and learning problem diagnosis, 1 psychometrician to confirm and build the assessment framework. The validity of the test items is confirmed after discussion and revision based on 6 elementary teachers with more than five years of teaching experience, and 1 psychometrician doctor.

4.3. Reliability analysis result

Table 5. Subject separation and EAP reliability table.

grade #	items	Subject separation	EAP reliability
5	103	0.98	0.71
6	103	0.98	0.75

4.4. Simultaneously measure the validity of the data and possibility ability, and analyze the criterion-related validity

Table 6.

		5 grade	6 grade
Math vocabulary	Pearson correlation	.57**	.69**
	Number	201	200
Math words	Pearson correlation	.60**	.72**
	Number	193	217
Math calculation	Pearson correlation	.49**	.56**
	Number	184	189
Statistical literacy	Pearson correlation	1	1
	Number	478	509
Math achievement	Pearson correlation	.71**	.68**
	Number	185	205

** . $p < .01$

5. Discussion

Although the overall reliability and validity are good for the norm test tool. There are still some findings:

Although the parallel tests have been pre-tested and analyzed to select good items for assembling items, and take the spiral test during the test. However, the post-test analysis still finds that it will be affected by the samples, resulting in seemingly parallel items whose parameters are still different. In addition, the average difficulty of the whole test is still different. Because of the budget constraints, the samples to be administered are still limited. If a larger samples and tests can be carried out, the results of parallel tests may be better.

The reliability analysis of fifth grade is .71, which may be related to the development of the students, and because the teacher is entrusted to help the test. There is only a description of the paper; there is no training and explanation for the supervision, so the reliability is slightly lower.

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UNIVERSITY OF THE THIRD AGE - UNIVERSITY STUDIES DON'T HAVE TO BE ONLY FOR THE YOUNG

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Abstract

The presented study focuses its attention on one of the important forms of lifelong learning, represented by the University of the Third Age, whose primary mission is to open up university resources to acquire knowledge, and skills for people at a post-productive age. The aim of the offered programs is to provide senior citizens with the opportunity to competently and at the university level to get systematically acquainted with the latest knowledge in science, history, politics, culture etc., i.e. to present a specific program of lifelong learning that would be interest-based. Students can thus broaden and enrich their knowledge with new skills, impressions, and experiences. The experience gained shows that the motivation to study at this later age is not only the joy of learning, but also the desire to maintain some mental freshness with a reflection in the increase of self-confidence based on their own active and creative approach to life, because older age may not be just an empty and lonely, but a full-fledged life stage. The objective of the study is not only to present the specifics of the University of the Third Age in Czech higher education, but also to present the approach of its students (University of the Third Age at Tomas Bata University in Zlin) to the offer of study programs, the structure of the studies, motivational aspects, etc., on the basis of a quantitative research in continuity with the resulting qualitative research values study, and at the same time to show one of the possibilities to make the presented form of education more effective.

Keywords: *University education, lifelong learning, university of the third age, older age.*

1. Introduction

An outstanding feature of today's society is the aging of the population, not only in the Czech Republic. It is not so long ago that old age was perceived negatively, and people in senior age were encouraged to be thought of as incompetent and useless members of the society, even considered to be a burden. However, the current view has been changing. It shows that old age does not have to just represent emptiness and loneliness, but it can be a full life stage, becoming a natural and integral part of the life cycle. One of the primary tasks of the society is to ensure dignified living conditions at the senior age (Haškovcová, 2010) in direct continuity with the active integration of seniors in all areas of social reality.

2. Design

The constant, increasing population growth in the 65+ age group is clearly evident throughout Europe. For the period 2000-2017, Italy (18.1%, 22.3%), Greece (17.3%, 21.5%), Germany (16.2%, 21.2%), Portugal (16.0%, 21.1%) and Finland (14.8%, 20.9%) occupied the forefront positions, where the Czech Republic ranked the sixteenth (Eurostat and CZSO, 2018). However, as the data of the Czech Statistical Office (CSO) show, there is a significant increase here as well. In 2000, the total number of population (in thousands) was 10,267 (4,997 men, 5,270 females), the population 65+ of which 1,423/13.9% (the index of old age 65 +/0-14 in% = 85.5) 10,610 (5,220 men, 5,390 women), the population 65+ of which 2,040/19.2% (122,1). In the last ten years, the number of people aged 65+ has increased by about half a million. This indicator is also documented by indicators of increasing number of retirement pension recipients (RP) in the Czech Republic in 2006-2017 (men and women): 2006/622,154×797,865; 2017/848,008×952,225. Despite the fact that we can see the predominant number of women, the highest possible level (11,000-11,999 CZK) in 2006 was only 11,282/1.4% of women, and 65,833/10.6% of men (2007: 23,225/2.7%×121,862/19.2%; 2008: 64,565/7.8%×255,968/39.0%), as in 2017, when the highest possible amount (18,000 and more CZK) reached 7,363/0.8% of women compared to 28,406 / 3.3% of men (CSO, 2018). The problem is that an increasing proportion of senior citizens in the population becomes also the major cost item of the state budget, whether we are speaking of retirement pensions or the social and health care system.

Thus, the solution to this situation becomes an increasingly important necessity not only for the society but also for the aging population entering the next stage of the postproductive age (Mühlpachr, 2005), because it can contribute, with its active approach, to a more effective transfer of experience and by generation conditioned cultural patterns, and last but not least the economic benefit (Drobný, Šerák, 2016). And especially in the development of seniors' activities, the firm place is represented by lifelong learning (LLL), primarily institutions linked to a formal school system, the so-called university of the Third Age (U3A) under the effective state aid. And although the results of some of the earlier studies have shown that senior citizens no longer have formal education, but on the contrary they identify with the active participation in informal learning (Rabušicová and Rabušic, 2008), and in their decision to 'educate' themselves they have played an important role (Šerák, 2009; Haškovcová, 2010; Veteška, 2016), on the contrary, it is increasingly important for the pensioners to focus on the desire to deepen, expand or acquire new knowledge with the preference of organized learning in continuity with the activities of educational institutions.

Universities of the Third Age have followed different models but two ideal types predominate: the French model (1973), based on close association with a traditional university; and the British model (1981), operating more in the spirit of mutual aid and self-help (Dannefer, Phillipson, 2010). The U3A system in the Czech Republic (1989) is built on the French model. At present the U3A is already at 40 universities and faculties across the Czech Republic. Since 1993, they have been associated in the Association of Third Age Universities (AU3V), a member of AIUTA (International Association of the Universities of the Third Age), EFOS (European Federation of Older Students), and the European information network for the U3As (Šerák, 2013).

3. Methods

A primary research was conducted at Tomas Bata University (TBU) in Zlín, which is a full member and at the same time the seat of the AU3A. the U3A at TBU offers one-year lecture cycles (the 1st year of study - "Basic U3A course") with the possibility of choosing subjects from the accredited study fields/lectures for the given academic year. The study subjects are two-semester and four-semester courses. Teaching takes place once every 14 days, mainly in the form of two-hour lectures (seminars or workshops). In the academic year 2017/18, within the framework of accredited U3A study programs (lectures: natural and technical sciences; social sciences; teachings and services; law, legal and public administration; psychology; culture and arts, art work; photography; linguistic courses; informatics and physical activities) the total of 1,521 U3A students participated (Annual Report 2017, 2018).

A quantitative research survey took place in December 2018 as a part of the 4th year of the Cultural History (CH) study program in the form of a physical questionnaire containing 33 questions (21 closed/4 polyatomic, 7 semi-open and 5 open), supplemented by a subsequent discussion. Out of the total of 58 attenders, 46/79% (4 men and 42 women) participated in the survey, out of which only 1/2% did not reach the age of 60 years (without RP), 21/46% (61-70 years of age) and 24/52 % (71-80 years of age). Secondary education completed with a Maturita exam had been reached by 29/63% of respondents (formerly having been employed particularly in administration), and higher education by 17/37% of respondents (predominantly working in technical and pedagogical direction).

4. Discussion

As stated, it is above all a motivation in continuity with teaching, which play the primary role in the educational process and will be at the center of attention as well as within the contribution. The strongest motivation to enter the U3A were for the respondents their personal interests (35/76%), as well as the desire for knowledge (35/76%), the desire to keep up (12/26%), and to be more involved in the society 11/24%), which directly corresponds to the current requirements (see 2) and where the attention of the U3A should be addressed. Although motivation remains also to be the need to fill up free time (11/24%), friends (6/13%) and family (1/2%), it is not only "a" time filler but the preference for a full-fledged educational process leading to the transfer of information on a professional basis. And as the responses showed, 40/87% of the respondents mentioned motivation in the form of lecturers (access, expertise). For the overwhelming majority (29/64%) of the respondents, the admittance into the U3A was no longer a major change in life, and the current demandingness of the study was classified mainly as less demanding (31/67%), the number decreased for moderate difficulty (12/26%), and only three (7%) respondents regarded the study to be difficult in continuity with stress. Nevertheless, the satisfaction with the education was 100%, while the preferences were for the presentation of teachings in the form of a lecture (36/78%), the form of a discussion (21/46%), and the third place was given to an individual lecture (18/39%). There was also a great interest in the possibility of frequent excursions and educational field trips (35/76%) corresponding to the lectured

matter, in the organization of which they actively take their part. And it is also an organization of exhibitions presenting their own artwork or the works of their colleagues, etc. The respondents unequivocally proved their interest in continuing in studying (eg the CH program out of a student initiative has been running smoothly for 4 years), but if it was necessary to consider interrupting or dropping out of the study, for 40/87% the only reason would be their health conditions, for the 4/11 % a loss of interest, and the only (2%) answer mentioned the financial situation. They also contribute to the popularization of the U3A in public, and for the overwhelming majority, the source of information on the U3A coming from their neighborhoods and friends (30/67%), family (9/20%), the Internet was mentioned the least (5/11%), although only respondent said they did not use the computer at all. Even the conclusions of the discussion confirmed that the U3A studies primarily bring "the respondents to expanding knowledge, personality development, self-education, knowledge of new horizons beyond their former occupations, etc."

Thus, we can consider the active attitude of the elderly students not only within the study activities conditioned by the pursuit of education, but also outside the 'study duties' to be a beneficial contribution. We should talk about the 'commitment' to further support these activities, enable senior learners to formulate their needs and requirements, create the conditions for their active participation in the design and implementation of programs and projects, and encourage the development of their creative potential. And the emphasis should also be placed on the development of intergenerational cooperation between young university students and senior citizens in order to share their experience.

5. Conclusion

Although a cause-effect relationship between intellectual challenge in later life and an individual's ability to continue to function effectively may remain difficult to establish, the empowering nature of education provides a convincing rationale for increasing the range of opportunities for older people (Svindell, Thompson, 1995). We still find that the attention paid to the education of the elderly is only marginal in the educational process, and its importance remains very often underestimated. If we want the life to be successful in today's "knowledgeable society", it becomes necessary to strengthen the active approach and, in particular, the motivation for lifelong learning. That is, the need to raise interest in the permanent expansion of the educational and skill base, even at the post-productive age. In order for a change to take place, and for people to accept learning and education as a normal part of their lives (even at the late age), it is necessary to think about how to motivate them to develop, explore educational opportunities and remove the barriers that prevent their participation in education. The segment of education of the elderly certainly deserves its increased attention.

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READING COMPETENCY AND METACOGNITIVE KNOWLEDGE IN PRIMARY SCHOOL CHILDREN: AN EXPLORATIVE SURVEY

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Abstract

Reading comprehension is a process of interaction between the characteristics of the text, the reader and the reading context. In a reader, numerous cognitive processes interactively contribute to comprehension. It is recognized as an important skill, is the basis of the more general study skills, on which depends largely, the educational and academic future of each student. Since learning from longer texts causes great difficulties for many students summarizing is one of the key strategies for good reading comprehension. Summarizing is one of the reading strategies that enables students to more deeply understand the text and it is an indicator of understanding at the same time. Based on these considerations, the ability to synthesise was evaluated in a group of pupils, aged 8 to 9 years, with typical development. Furthermore, the comprehension skills of the text were measured, with reference to the ability of semantic and lexical inference, to vocabulary skills and to metacognitive skills, in order to identify the relations between summarizing and students' general reading competency and metacognitive knowledge about reading.

Keywords: Text comprehension, primary school, summarizing, metacognitive knowledge.

1. Introduction

The current society, ever more globalized and characterized by a continuous production of information and the sharing of knowledge, it requires changes not only in the socio-productive sector but also and above all in the educational-training sector. It is clear how people are continually called to update their cultural profile and to acquire, as required by the European Framework of Reference for 2007 of the European Union (EC, 2009), communicative and methodological skills, useful to make appropriated the processes of learning to the needs of today's complex and liquid society (Bauman, 2011). The European Council (EU 2000, 2020, 2030) also stressed the central role of education for the development of member Countries and the strategic importance of the progressive and continuous improvement of intellectual capital.

It requires, therefore, to put in place a lifelong learning, as a strategy for the development of knowledge, personal development and social integration of individuals. It is possible if people develop skills in reading and understanding texts as processes aimed at grasping the meaning of the text and the construction of knowledge. The literature demonstrates how the comprehension competence of the text is part of the basic skills, crucial for the development of other skills (Oakhill & Yuill, 19963; van den Broek & Espin, 2012), and how to summarize, then synthesise, a text is a meaningful strategy for a good understanding of the text (Pečjak & Pirc, 2018). Furthermore, low reading and comprehension skills have negative consequences for each student's academic future (Cain & Oakhill, 2006).

The competence of reading, understanding and synthesis (summarize), therefore, must take shape from the first years of schooling as it is not only one of the conditions for dealing with everyday life, but it is also essential to succeed in the training, study and future professional life. Internationally, the OECD-PISA, since the first edition (1999), has paid particular attention to the assessment of this competence. Reading literacy is defined, in the Program, as the "ability to understand and use written texts, reflect on them and engage in their reading in order to achieve goals, to develop their own knowledge and potential and to be an active part of society". It is clear from this definition that the cognitive dimensions of the reading processes and the metacognitive ones, typical of the "levels of awareness and intentionality of one's strategies of thought" are added "that relating to the commitment invested by the subject in the action of reading" (Grange et al. 2009, p. 149). It is essential to evaluate whether the students possess this competence, as learning from long texts causes great difficulty for many students. Summarizing is a reading strategy that allows students to understand the text more deeply and, at the same time, is an indicator of understanding.

2. Design

To achieve the objectives of the survey, a battery of tests was administered to evaluate the ability to understand text and vocabulary in pupils aged 8 to 9 attending the fourth grade of primary school.

The 5 classes involved in the survey were identified in two schools, located in two different geographical areas of Calabria, southern Italy region.

3. Objectives

The study intends to evaluate the ability to synthesize, by administering to a sample of pupils a summary test (Menichetti, 2018). Furthermore, in order to identify the relationships between the summary and the reading competence and metacognitive knowledge of the students, the comprehension skills of the text were measured, with reference to the capacity of semantic inference, vocabulary skills and metacognitive skills.

4. Methods

4.1. Participants

The sample of our research consists of 104 children attending the fourth grade of primary school, aged between 8 and 9 years, 56 females and 48 males. Students with a specific learning disability and with a cognitive disability certification were excluded from the sample, according to the Italian law 104/92.

4.2. Material

The tools used are the following:

Verbal Meaning Test (PMA Battery, Thurstone & Thurstone, 1965). The test was modified specifically for this research, including items of greater difficulty. The test consists of 30 items and allows to obtain a measure of the child's vocabulary. The child is asked to identify the word with the same meaning as the target word, among four alternative answers.

Inference test. In order to evaluate the inference skills, the story "Gimmy", of the Battery to deepen the difficulties in comprehension of the text was given (Tressoldi & Zamperlin, 2007). The child is asked to read and answer 10 multiple-choice questions, which require to obtain inferential information from the reading of the piece.

Metacognitive questionnaire. For the metacognitive component, the questionnaire developed by the SApIE group (Society for Learning and Education informed by Evidence) was used. The questionnaire allows to investigate the awareness about the aims of the task, the knowledge of strategies to improve understanding, control during comprehension and sensitivity to the text.

Summarizing Test. To evaluate this competence the Summarizing Test version ST-A was administered (Menichetti, 2018). It is a tool that aims to assess the child's ability to recognize a good synthesis of a narrative text. The test consists of four texts, for each piece the child must read the text alone, in silence, and then answer a series of multiple-choice questions, in which the pupil must select from the proposals formulated, those that appear the most appropriate: each question presents six answer alternatives, all with a degree of acceptability, and asks the child to mark the three which, more than others, are suitable to represent in a synthetic way the piece read.

4.3. Procedure

The tests were given collectively in the individual classes, during school hours. The tests were provided one at a time and preceded by a moment of detailed explanation of the instructions. The total time taken to complete the work in each class was approximately 60 minutes.

5. Results

Table 1 shows the descriptive statistics (average, standard deviation) of the research sample.

Table 1. Average and SD of the scores obtained from the sample.

	Vocabulary test	Total answers "Gimmy"	Metacognitive score	Total score. Summarizing Test
Average	22,65	4,12	10,22	21,61
SD	3,80	1,73	3,74	4,97

To examine the relationship between the synthesis abilities and the variables listed above, given the asymmetric distribution of some indicators, non-parametric correlations were calculated (ρ (rho) of Spearman). Significant correlations ($p < 0.01$) emerged between the synthesis abilities and the variables taken into consideration with scores between .50 to .20.

6. Discussion and conclusions

The results obtained confirm the data present in the literature which underline the importance of lexical abilities and the comprehension of the text in the success of the study (De Beni et al., 2003; Tressoldi & Zamperlin, 2007; Mirandola et al., 2018). The study revealed significant correlations between the various variables involved (ρ (rho) of Spearman between .50 to .20; $p < 0.01$).

In particular, as far as linguistic aspects are concerned, several studies have shown that bad readers have poor performance in language comprehension tasks (e.g. receptive vocabulary, inferences, listening comprehension) (Catts et al., 2006; Carretti et al., 2011).

The collected data underline the importance of starting, already from kindergarten, activities that promote understanding, given the important role of this competence in the success of the study. The survey topic presented will be further explored, with an expansion of the sample, in order to find confirmation of the data already in our possession through a representative sample of the national reality and overcome the limit linked to the population investigated through the exploratory survey, which currently involves only one region of Italy.

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DOES IT ADD UP? PROFESSIONAL DEVELOPMENT FOR ELEMENTARY MATH TEACHERS

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Abstract

A two-year, quasi-experimental design research study evaluated the impact of professional development on teachers' knowledge/beliefs and behaviors related to mathematics instruction in elementary settings. 44 teachers (22 in control group and 22 in treatment group) completed the *Teacher Knowledge Assessment System* (TKAS), an online system for administering the Learning Mathematics for Teaching (LMT) assessment that measures teachers' basic mathematical knowledge and teachers' pedagogical content knowledge in mathematics (Hill, Schilling, & Ball, 2004; Phelps, 2011). Teachers in the treatment condition showed significantly greater improvement in their knowledge of mathematics than did those in the control group. The treatment group also showed significantly more growth on LMT/TKAS test than did the control group. Findings from the second-year evaluation of changes in teachers' knowledge and beliefs about elementary mathematics instruction show that the professional development did improve teacher mathematical knowledge and beliefs relevant to improving mathematics instruction.

Keywords: *Professional development, teachers, mathematics instruction, elementary education.*

1. Introduction

Teaching excellence in elementary school mathematics is urgently needed (D'Ambrosio, Boone, & Harkness, 2004). Children who acquire strong mathematics skills in elementary school are likely to be able to excel in higher-order math concepts at later points in education (Telese, 2012). This study investigated the impact on elementary teachers' knowledge and beliefs about mathematics education professional development opportunity. The impact of professional development on teachers has been established in prior research (Farmer, Gerretson, & Lassak (2003). Teachers participated in a professional development program known as Math Strong.

2. Design and objectives

A two-year, quasi-experimental design evaluated the impact of professional development on teachers' knowledge/beliefs and behaviors related to mathematics instruction in elementary settings. Specifically, the study examined the following questions:

1. Is professional development training for elementary teachers using the Math Strong Program significantly related to teachers' mathematical knowledge and skills about two subscales (Number, Concepts and Operations, TKAS-NCOP and Patterns, Functions and Algebra, TKAS-PFAS) of the Teacher Knowledge Assessment System (TKAS)?

2. Is professional development training for elementary teachers using the Math Strong Program significantly related to teachers' beliefs about improving mathematics instruction as measured on the Teacher Knowledge Assessment System (TKAS)?

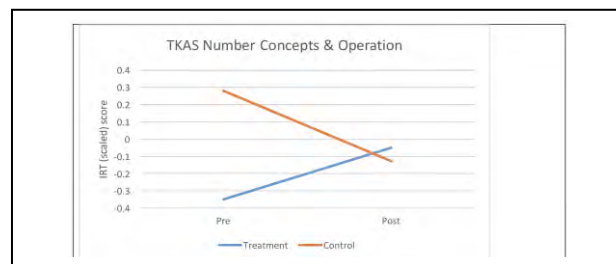
3. Methods

Forty-four teachers were assigned to either a control (n=22) or treatment (n=22) group. Teachers in the treatment group completed the Teacher Knowledge Assessment System (TKAS) online tool. TKAS measures teachers' basic mathematical knowledge and teachers' pedagogical content knowledge in mathematics (Hill, Schilling, & Ball, 2004; Phelps, 2011). The scales of the tool consist of Number, Concepts and Operations subscale (TKAS-NCOP) and Patterns, Functions, and Algebra (TKAS-PFAS).

4. Discussion

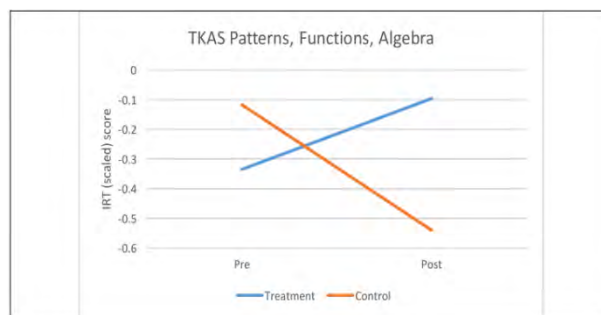
Number, Concepts and Operations Subscale - A 2 (Condition: Treatment, Control) x 2 (Time: Pretest, Post-test) ANOVA of the TKAS-NCOP scores, with time as a repeated measure did not find significant main effects of either Time ($F(1,42)=.658$, ns., $\eta^2=.005$), or Condition ($F(1,42)=1.31$, ns., $\eta^2=.030$), but there was a significant Condition x TIME interaction ($F(1,42)=8.81$, $p<.01$, $\eta^2=.173$). The chart below shows that treatment group teachers had lower scores than the control group at the pretest; at posttest, the treatment group scores were slightly higher than the control group.

Table 1. Change in TKAS-NCOP scores in treatment and control groups pre- and post- professional development training.



Patterns, Functions, and Algebra. A 2 (Condition: Treatment, Control) x 2 (Time: Pretest, Post-test) ANOVA of the TKAS-PFA scores, with time as a repeated measure did not find significant main effects of either Time ($F(1,41)=.422$, ns., $\eta^2=.010$), or Condition ($F(1,42)=.278$, ns., $\eta^2=.0070$), but there was a significant Condition x TIME interaction ($F(1,42)=5.445$, $p<.05$, $\eta^2=.117$). Like with the number, concepts and operations subscale, the treatment group teachers had lower scores than the control group at the pretest; at post-test the treatment group scores were slightly higher than the control group.

Table 2. Change in TKAS-PFA scores in treatment and control groups pre- and post-professional development training.



5. Conclusion

Results of this portion of the study demonstrate that teacher's content/pedagogical content knowledge in mathematics increased from pre-test to posttest among the teachers who were in the treatment group. The findings of this study support the conclusions made by Walker (2007) about rethinking professional development for elementary mathematics teachers.

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STRATEGIES USED BY PHYSICAL EDUCATION TEACHERS TO ENHANCE PROFESSIONAL WELL-BEING

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Abstract

Disengagement from the teaching profession is a contemporary scourge among Canadian teachers. Quebec province is experimenting the same problematic situation. Diverse impacts are noticeable, associated to public costs, professional wearout, exhaustion and burnout. This research invites to an ideological and scientific shift in order to shed light on teachers' professional well-being. Positive psychology is used as theoretical framework to address the phenomenon, and better understand "What strategies do teachers use to create, maintain or restore a state of well-being?". To this end, the research objective is to draw a portrait of the different strategies used by teachers in order to enhance well-being. As a first stage of the project, the research protocol is aimed at teachers in physical education and health, since they are now recognized as leaders, models and promoters in healthy lifestyles in schools and communities. At the methodological level, we have undertaken five focus groups with 37 teachers, representing seven different regions of Quebec. The results will allow us to propose two avenues of strategies used by PE teachers in relation with Self and with Others. It is in this unprecedented perspective that we aspire to value the profession and the teachers, to favor the pursuit of professional careers and the motivation of teachers, and consequently to promote the educational success of pupils.

Keywords: *Strategies, professional well-being, teacher, positive psychology.*

1. Introduction and objectives

Psychological health is divided in two poles: psychological well-being, as the affirmation of a healthy mental state, and psychological distress, as being the affirmation of a mental health problem (Stamate, Brunet & Savoie, 2015). In teaching, psychological distress has been studied and broadcasted, facilitating knowledge advancement and a better understanding of distress and ill-being phenomenon. Disengagement from the teaching profession is one of the contemporary scourges among Canadian teachers (Kamanzi, Barroso Da Costa & Ndinga, 2017), and Quebec province is experimenting the same problematic situation (Karsenti, Correa Molina & al., 2015). Diverse impacts are noticeable, associated to public costs (MEES, 2018), professional wearout (Lantheaume & Hérou, 2008), exhaustion and burnout (Houffort & Sauvé, 2010).

However, an ideological shift has been established over the last ten years to complement this knowledge. Indeed, the search for positive feelings is increasingly tackled and valued in teaching, with concepts emerging such as pleasure (Brassell, 2015), passion (Brunelle & Brunelle, 2012), leadership in teaching (Wilmore, 2007), or flow (Csikszentmihalyi, 2008). Thus, in order to better understand the optimal functioning at work (Seligman, 2011), the integrative concept of professional well-being becomes an approach used in teaching to comprehend how a person is able to attain achievement according to his full potential (Goyette, 2014, 2016, Stoloff, Boulanger & al., 2018). The result of professional well-being is a sense of accomplishment and positive emotions, which tend to limit distress and disengagement at work (Seligman, 2011).

Even at an early stage, new scientific advancements have demonstrated the value of this approach (Theorêt & Leroux, 2014). However, it is noted that even when the research approach addresses a positive aspect (well-being, job satisfaction, self-determination, etc.), the majority of research results present a lack of well-being at work, lack of satisfaction at work, problems limiting the satisfaction of basic needs, etc., denoting a rooted scientific culture addressing problems where few real transformations are observed.

To initiate a change, the research question of this article relates to specific teacher's practices enhancing well-being: How do some teachers live a state of professional well-being and cope with the difficulties of the profession? To this end, the research objective is to draw a portrait of the different strategies used by teachers in order to enhance well-being. As a first stage of the project, the research protocol is aimed at physical education (PE) teachers, since they are known to be leaders, models and promoters of healthy lifestyles in schools and communities, especially in Quebec (MEQ, 2001).

2. Conceptual framework

Based on solid theoretical grounds, positive psychology theory enables a better understanding of the source of well-being and the means to achieve it (Seligman, 2011). It is a bold epistemological position that offers a constructive angle for proposing educational and flexible means of action that teachers can implement and adapt.

To this day, there seems to be no consensus on a definition of well-being, since it is a multidimensional concept, mainly studied in positive psychology, which contributes to an individual's positive construction about his life (Della Fave, 2011). Here, "The topic is a construct – well-being – which in turn has several measurable elements, each a real thing, each contributing to well-being, *but none defining well-being*" (Seligman, 2011, p.15). To this end, Seligman's (2011) PERMA model presents five elements that characterize well-being: Positive emotions, Engagement also described as flow, positive Relations, Meaning, and Accomplishment. Far from monism, these five elements comprise what people will "feel" in a state of well-being.

3. Method

Five focus groups with 37 teachers were undertaken, representing seven different regions of Quebec (Abitibi-Témiscamingue, Capitale-Nationale, Estrie, Lanaudière, Laurentides, Laval, and Outaouais), favouring the diversity of "contextual" responses. Interviews focused on indicators of well-being and strategies used to create, maintain or restore a state of well-being. The content analysis was conducted according to themes (Paillé & Mucchielli, 2008) using *NVivo10* software. In order to limit theoretical influence, the induction was insured by analysts new to the concept, unaware of any well-being definitions, frameworks, or models. This approach privileged theme emergence related directly to content. Intercoder reliability was 92% of the initial coding (Deslauriers, 1991); inconsistencies were then recoded until an intercoder agreement was reached.

4. Findings

Results present five main strategies that emerge from the analysis made of these teachers' speeches, and the means to make these strategies effective. Two avenues of strategies were used by PE teachers in relation with Self (Strategies 1 to 3 and 5) and in relation with Others (Strategy 4).

The first strategy is to put things into perspective, and is initiated by taking a step back from a difficult situation to see the overall picture and understand the different issues. Then, to ensure an adequate portrait, rationalizing makes the analysis of the situation as objective as possible by limiting emotional reactions. In turn, this enables oneself to relativize, accept or just let go of any stress caused, change the reachable, and from there, be flexible and open to different perspectives.

The second strategy is optimism, and is done by putting oneself in a positive mental disposition, keeping in mind that all experiences can be sources of learning or new understanding. From there, consider the resolving sequel from a solution perspective rather than a problem solving one. This strategy is nourished by a constructive Being, working with motivating and realistic goals or projects, or stimulating and successful content.

The third strategy is proactivity and comes in two stages. The first stage is to act in anticipation by preventive organization of one's environment. It is about predicting, planning, and organizing the elements on which one has control; to master one's premises and contents. The second step is related to those around us. Here, it is a question of being involved in the school's dynamics, on a small to large scale, by engaging and participating in activities and projects that are initiated or offered. Conversely, it's also about renouncing to activities that don't feed us anymore.

The fourth strategy is networking, and is related to the potential and strength of the group of people involved in the network. For this, three levels emerge. The first level is primarily the creation of positive relations, which requires getting to know others and then, accepting and appreciating the differences. It is easier to get along with those who resemble us. Creating a positive relationship with those who are different can require a more structured and conscientious approach rather than an instinctive one. Quality relationships are then built on people's strengths rather than their irritable sides. The second level is, once the positive relation is established, to communicate with those who are willing to listen, and ask for help when needed. The third level of this strategy is to accept or initiate collaboration and share, to create professional stimulation and avoid possible isolation.

The fifth strategy is to take responsibility, therefore, to be convinced that we have control over situations, because we make our choices. We can decide to stay, to leave, to change, to keep, to adjust, or to question all the professional elements that affect us. Taking responsibility for our choices and taking control over situations is giving oneself the opportunity to experience flow. To do this, all necessary ingredients are put in place, to our liking, to be able to abandon oneself in the moment, and be absorbed in the moment.

5. Conclusion

All five strategies described by PE teachers to enhance professional well-being seem to emerge from self and the impact on others. This is to say that one must have the strength and the tools to take control over situations, in a positive and rational manner. Having said that, more research is necessary to enrich knowledge addressing strategies used by others (school board members, mentors, leaders, etc.) to cultivate a positive school climate and well-being in others. It is in this unprecedented perspective that we aspire to value the profession and the teachers, to favor the pursuit of professional careers and the motivation of teachers, and consequently to promote the educational success of pupils.

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DIVING INTO MINORITY STRESS THEORY WITHIN THE LGBTQ+ COMMUNITY

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Abstract

The LGBTQ+ (Lesbian, Gay, Bisexual, Transgender, Queer) community is an evolving population with a variety of identities that need to be understood by the heteronormative society. The first step for understanding this community is for educators to grasp current terminology and concepts. Moreover, the heteronormative society has impacted individuals in the LGBTQ+ society due to socially constructed ideals of identity. Specifically, the intersection of race, gender, and religion in the LGBTQ+ community relating to sexual violence and the like. The purpose of this presentation is to convey the need for sex education that includes the LGBTQ+ community, sexual orientation, gender identities, and gender expression. A second purpose is to investigate the impact on individuals of the LGBTQ+ populations based on the Minority Stress Theory. Minority Stress Theory breaks down the amount of stress a person experiences due their minority status using the minority stress model. As well as, present a call for action for educators at all levels. It is important to deliver and to have professional development centered around Safe Zone Trainings, which is a training the educates on the identities within LGBTQ+ communities and how as a society we can be better allies. Lastly, synthesize information about the LGBTQ+ individual's experiences, future directions and research that needs to be completed.

Keywords: *Heteronormative, minority stress theory, safe zone, LGBTQ+, sex education.*

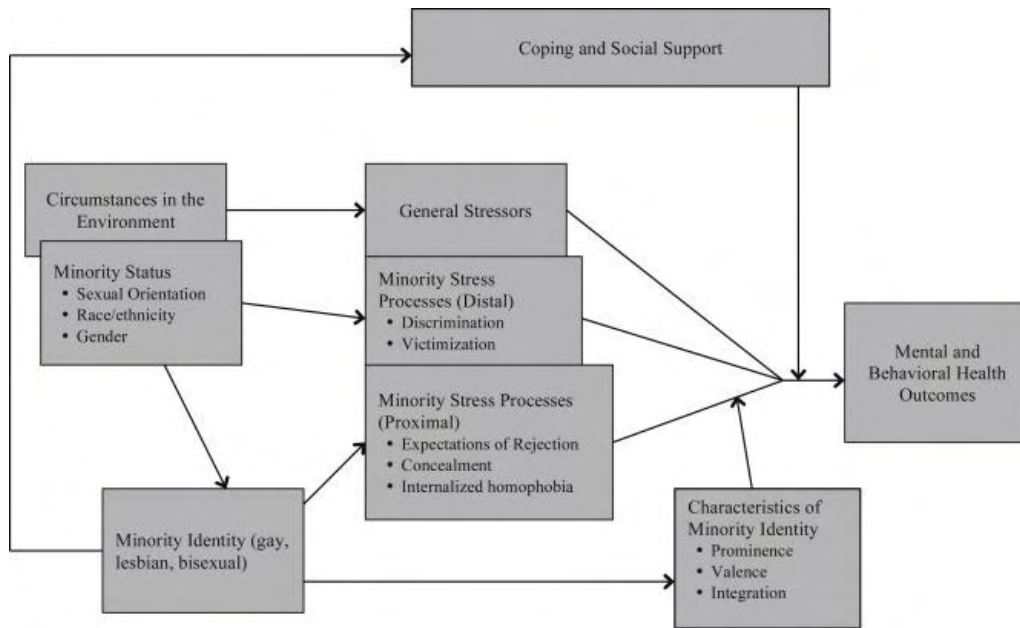
1. Introduction and current problem

Heteronormativity is an ideology that promotes gender conventionality, heterosexuality, and family traditionalism as the correct way for people to be (Oswald, Blume, & Marks, 2018). It is a framework that surrounds the practices of heterosexuality and because heterosexuality is "more natural" than other forms of sexuality it should be standard sexual practice (Oswald et. al., 2018). It perpetrates heterosexual privilege which are advantages that come with heterosexuality in this society and culture (i.e. acceptance from family, safety, and acceptance in their chosen career field). As well as, heterosexism, which is the belief that all people are heterosexual, the assumption and/ or belief that heterosexual relationships and behavior are superior to other forms of relationships. The term queering processes relates to acts and ideas that defy heteronormativity by challenging gender, sexuality and/or family binaries (Oswald et. al., 2018). Gender identity refers to how a person perceives themselves and what they call themselves; this may or may not agree with the societal gender roles outlined for their sex which are typically male and female. Gender roles are the societal and cultural expectations of people based upon their biological sex usually masculine/feminine. Butler (1990) argues that gender is socially constructed, and gender expression is a social performance. The binary divide (male and female) is also socially created. Acceptable and valued behaviors and roles are defined and reinforced through culture and media. Queer theory assumes this binary divide is not fixed and "to queer" is to challenge social constructs. The goal of this literature review is to analyze how heteronormativity impacts sexual minority populations through the lenses of minority stress theory, sexual violence, and intersectionality; and propose a resolution for change in academia settings.

2. Minority stress theory

Minority Stress Theory breaks down the amount of stress a person experiences due their minority status using the minority stress model. Minority stress considers the additional stress individuals from stigmatized social categories experience as a result of their minority position (Meyer, 2013). The minority stress model (See Figure 1) describes stress processes, such as the experience of prejudice events, expectations of rejection, hiding and concealing, internalized homophobia, and coping and social support (Meyer, 2013). Stressors are heightened when multiple intersectional identities are included.

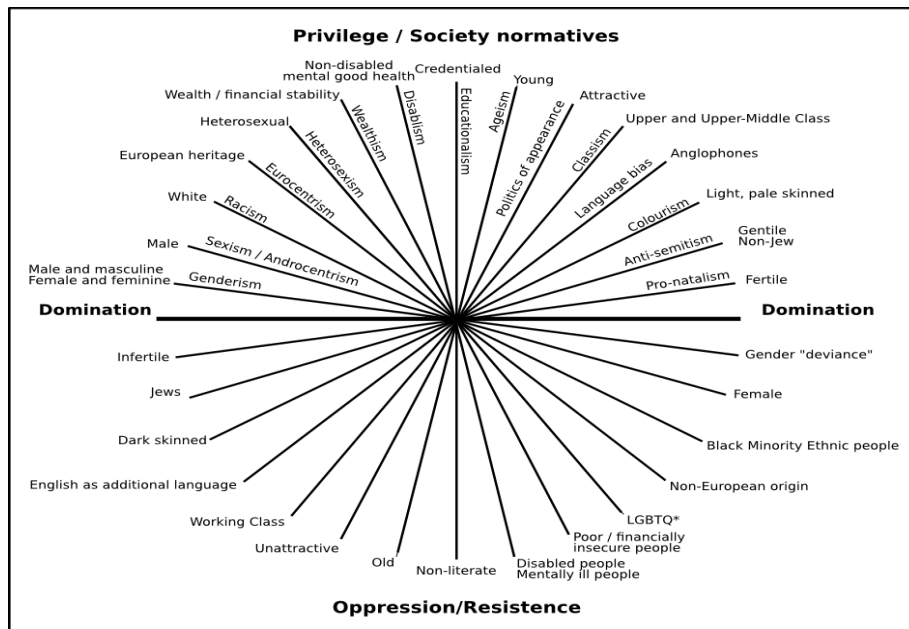
Figure 1. Minority Stress Model.



2.1. Intersectionality and sexual violence

Intersectionality refers to the categorical and hierarchical classifications such as race, class, gender, sexuality, and nationality (Cole, 2019). Intersectionality is not just about oppressions, it is also about privilege and how individuals’ positions in society affect which side of social classifiers they have (See Figure 2). For example, a white gay man would have the minority stressors from being gay as white is the dominant or privileged identity. However, for a black gay woman the minority stress is more intense because not only is the sexual minority in play but it also factors in racism, and sexism on top of any identities that are already held.

Figure 2. Intersectionality Matrix.



Little is known about intimate partner violence (IPV), sexual violence (SV), and stalking among the LGBTQ+ in the United States (Center for Disease Control and Prevention, 2010). “LGBTQ+ individuals are often targeted for sexual violence based on their sexual orientation and gender identities. In this way, sexual violence is used as a form of power, oppression, and control,” according to Macalester University. According to The National Intimate Partner and Sexual Violence Survey (2010) approximately 1 in 5 bisexual women (22%) and nearly 1 in 10 heterosexual women (9%) have been raped by an intimate partner in their lifetime. According to RAINN, “21% of TGQN (transgender,

genderqueer, nonconforming) college students have been sexually assaulted, compared to 18% of non-TGQN females, and 4% of non-TGQN males” rates that are substantially higher than those who identify as heterosexual.

3. Limitations and future research

In the current literature review, a major limitation is the limited amount of research done in the LGBTQ+ community. The scope of the paper is also limited to the geographic location of the United States. The timeline of research used is fairly recent besides some older fundamental models and books. However, research and studies are still being done since research has not begun primarily until the past two decades. Further research in this community may have go outside of the scopes of the typical way of conducting research to get accurate and substantial data collections. As research is also engaging in dialogues to talk to folks in a community and not just those in the ivory tower of academia.

4. Conclusion and resolution

According to Kulick, Wernick, Woodford & Renn (2016), “Oppressive systems can have deleterious effects on health and wellbeing of marginalized communities.” Barriers to reporting within the LGBTQ+ community range from “access to sexual health education, crisis support services, and health care... to the way the heteronormativity, substance abuse, internalized homophobia, rape culture, and misogyny affect our communities” (LGBT Individuals and Sexual Violence, 2019). According to Kulick et. al., (2016) reports stated that “engaging in efforts specifically focusing on heterosexism can also have a direct impact on individual wellbeing thorough the development of confidence and self-efficacy among LGBTQ students.” Moving forward, in regards to educational settings having competent, inclusive, and intersectional sex education compared to rarely having sex education could decrease some minority stress that those in the LGBTQ+ population face (Parenthood, 2019). Intersectional work aims to be more inclusive to all people and respect every part of an individual’s identity. Employees can take an active role by asking colleagues and students their preferred pronouns. As departments, having professional development around the training “*Safe Zone*” which is a welcoming, supportive and safe environment for (LGBT) students could create safe and affirming environments wherever they go (Human Rights Campaign, 2019). Studies show that in schools with inclusive curriculum students were more likely to feel more connected, comfortable speaking about their identity, and have accurate information regarding LGBT folks. Minority stress, intersectionality, and sexual violence will always be a part of communities, however, finding ways to include LGBTQ+ curriculum into education and challenging social constructs can lessen the minority stress that LGBTQ+ folks encounter.

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THE PERCEPTION OF SCHOOL STAFF AND PARENTS IN REGARD TO THE “ENFANT NATURE” APPROACH IN A QUEBEC PRESCHOOL

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Abstract

Despite the recognized benefits of outdoor free play on children's physical and psychological well-being, there is a marked decrease of the time spent in these activities. Many factors could explain this, notably early schooling, increased time spent in indoor sedentary activities and the rise of adults' supervision and concerns related to children's safety (Strife & Downey, 2009). The *Enfant Nature* (EN) approach aims to counteract the “nature deficit disorder” (Louv, 2005) with an experiential outdoor education program. It also aims to foster overall children's development while promoting a healthy and active lifestyle. Over the course of a year, semi-structured interviews were conducted to explore the perceptions of school staff (n=2) and parents (n=8) of 4-year-olds in a preschool class engaged in EN approach. The experimental variables were perceptions related to the EN approach, the potential risk elements and the effects on the overall child's development. Our findings suggest that overall the participants demonstrated a high level of enthusiasm for EN and discovered a new stimulating way to learn and teach. They quickly concluded that the level of risk in a natural environment was similar to the school. They also reported that EN had been beneficial for children's cognitive, physical and social-emotional development, particularly for their self-confidence, general knowledge, problem solving, socialization, physical activity level and improvements of motor skills. The positive perceptions of EN and the recognition of its relevance for outdoor free play in learning allows us to be optimistic about the sustainability of this approach.

Keywords: *Early childhood, outdoor learning, perception, school staff, parents.*

1. Introduction and context

According to the *Institut de la statistique du Québec* (2013), 85.4% of children have attended daycare before attending kindergarten. Knowing that these children spend about seven and a half hours each day at daycare, it represents nearly 65% of their daytime. Because of this societal reality, the physical and psychological well-being of preschoolers have become a shared responsibility between families and schools. Despite the fact that all children follow the same major developmental stages in terms of physical, motor, cognitive/linguistic, social and emotional components, the pace can vary from one individual to another. Generally, children entering kindergarten have all the skills and abilities required to fully enjoy all the proposed educational activities. However, many children experience difficulties adjusting to the school's environment. In 2018, the Quebec Survey of Child Development in Kindergarten concluded that one out of four kindergarteners was considered vulnerable in at least one of the five domains of child development (Simard, Lavoie & Audet, 2018). This knowledge is key since a vulnerable child is more likely to experience learning difficulties during his educational pathway. A child's level of development in kindergarten therefore seems to be associated with social adjustment and subsequent educational success (Cantin, Bouchard, & Bigras, 2012). Thus, these issues raised some questions regarding the offer and effectiveness of services supporting child development dedicated to children and families.

Despite the recognized benefits of outdoor free play on children's development, there is a marked decrease in time spent in these activities. Many social factors could explain this, notably early schooling, increased time spent in indoor sedentary activities and the rise of adults' concerns related to children's safety (Strife & Downey, 2009). The *Enfant Nature* (EN) approach aims to foster overall children's development while promoting a healthy and active lifestyle. This approach also aims to counteract the “nature deficit disorder” identified by Louv (2005) with an experiential outdoor education program, which is an innovative approach that is complementary to the educational program in Quebec.

2. Objectives and relevance of the study

The objective of this study was to explore the evolution of the school staff and parents' perceptions about the EN approach. Using the current international literature, perceptions were evaluated according to the following variables: 1) the implementation of the EN approach, 2) the potential risk elements (physical and socio-emotional) and 3) the effects of the approach on the overall child's development. This kind of knowledge is essential for the success of an innovative project particularly in a school context. It will notably help to adjust the pedagogical content to ensure its quality and identify the elements to be maintained and/or improved. It will also provide useful information to ensure sustainability of the approach in Quebec.

3. Method

A descriptive qualitative study was used to achieve the research's objective. Over the course of a year, semi-structured interviews were conducted to explore the perceptions of school staff (n=2) and parents (n=8) regarding the EN approach in a preschool class of 4-year-old children. Individual interviews were conducted with school staff as well as a focus group with parents.

To obtain an overall view of the perceptions over a school year, two interviews for each group were organized, one at the beginning of the school year and another one at the end of the year. For both groups, parents and school staff, the interview templates were organized in accordance to the three main variables identified in the literature. However, the structure of some questions differed between parents and school staff. Indeed, some questions for the parents were oriented towards their observations at home, while some questions for the school staff were oriented towards their role in nature and observations in class. The individual interviews lasted approximately 45 minutes and were structured using 17 questions; the focus groups lasted approximately 55 minutes and were structured using 14 questions.

The analysis strategy was based on the Boutin (2007) steps. The content was audio recorded, transcribed and analyzed using NVivo 11 software, which facilitates the categorization and classification by units of meaning. It also analyzes the similarities and differences noticed in the comments made by the participants.

4. Findings and discussion

According to the first variable, the level of openness and enthusiasm towards the EN approach was maintained over the school year for both groups of participants. Many factors contributed to the implementation success such as the planning level, the EN pedagogical material and the equipment provided to the children. One of the aspects that surprised the school staff was that the natural environment favoured improvements in positive behaviours, particularly in terms of linguistic skills, attitudes and initiative taking. In fact, Cameron-Faulkner, Melville, and Gattis (2018) recently demonstrated that natural environments influenced human communication. The two groups raised the same main challenge, namely to let children explore and experiment by themselves and suppress their need to overprotect them. The parents and school staff's openness towards the implementation of an alternative approach within the traditional program positively influenced their attitude.

Echoing to the second main variable, the discovery of the different types of activities involving risk-taking was always perceived in a positive way. Seasonal variations were seen as an asset in terms of exploration and learning opportunities rather than a barrier to outdoor activities. In addition, it appears that some factors alleviated participants' fears about potential risk such as environmental management, clarity of instructions and beneficial effects on children. It is important to note that the foundations of outdoor learning include risk-taking, not only for the pleasure of taking risks, but also for the benefits it can bring to children, particularly regarding developmental stages. According to Savery et al. (2016), the benefits outweigh the probability of any negative experience.

In relation to the effects, both groups of participants recognized that the EN approach promoted all spheres of child development. They also observed an increase in the duration and intensity of physical activity by children on a daily basis. The school staff pointed out that the outdoor activities that increased the level of physical activity had been beneficial for the classroom workshops, including activities of drawing, grabbing and cutting. Fjørtoft (2001) highlighted the relation between free play in the natural environment and the effects on children's motor skill. Regarding the small number of studies evaluating in a quantitative manner, the effects of natural environment on the development of gross and fine motor skills, further research is needed. The educational material, including stories and songs, have enabled children to acquire a wide range of knowledge about fauna and flora. Moreover, it allowed them to enrich their vocabulary and linguistic skills. The school staff explained that the outdoor activities had allowed

the children to improve their problem-solving skills through various quests and challenges. Besides, Burdette and Whitaker (2005) argue that problem-solving opportunities, in a play context, promote the development of executive functions, which are important not only for subsequent educational success, but also for the achievement of everyday tasks. Both groups of participants indicated that EN had contributed to the development of several emotional skills and strengthened social ties, which was also reported by Strife and Downey (2009). Indeed, children were more resourceful, self-confident and autonomous in their actions.

5. Conclusion

Beyond this study, this innovative approach is part of a much broader focus considering that a child's level of development in kindergarten seems to be associated with social adjustment and subsequent educational success (Cantin et al., 2012). Since in Quebec one out of four children in kindergarten is vulnerable in at least one area of development, it is more than relevant to consider ways to optimize child development. The EN approach aims to promote global development, healthy lifestyles and educational success through active outdoor free play. It also encourages risk-taking by creating opportunities for children to push their physical, cognitive and social limits (Little & Wyver, 2008). Although on a small scale, the results of this study demonstrated the potential benefits that this type of approach can have on the children's development. In addition, the participants' positive perceptions towards EN and the recognition of its relevance for active outdoor free play in learning allow us to be optimistic about the sustainability of this approach in Quebec.

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DEVELOPMENT OF LEARNING ACTIVITY STATUS RECORDING SYSTEM USING THE INTERNET OF THINGS

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Abstract

In countries with birth rates that are declining significantly such as Japan, integration and abolition of schools have recently been attempted over a wide area to maintain a standard school scale from an educational point of view. Therefore, it has become difficult to carry out educational activities across different schools with the full cooperation of teachers. The task of educating must be performed without disparity, regardless of area, by complementing teachers' educational knowledge and skills. One solution is to realize an advanced education support method by promoting distance education. The aim of this study is to develop a system to record learning activity status to support classes from a distance using the Internet and the Internet of Things (IoT). The educational support system consists of a video conference system, online storage service, 'learning activity status recording system (LRS)', and teaching materials with IoT. This paper introduces LRS and describes how to transmit state transition information from a wheel mobile robot as a teaching material with IoT to LRS. From the results of surveys on the developed educational support system for high school teachers, the usefulness of the system was clarified.

Keywords: *Distance education, learning activity, robot, IoT.*

1. Introduction

In countries with birth rates that are declining significantly such as Japan, integration and abolition of schools have recently been attempted over a wide area to maintain a standard school scale from an educational point of view. However, there are small schools that cannot be administratively integrated, but such schools are required to have the same high-quality education as large schools. In terms of future education in Japan, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) has set a goal to realize high-quality education for all students through the use of advanced technology. The realization of advanced education through the promotion of distance education is listed as one of its goals. One example of distance education that has been reported is the lecture. Most cases of the application of distance education to classes, including experiments and practical training, have not been reported.

The aim of this study was to develop a system to record learning activity status to support classes from a distance using the Internet and the Internet of Things (IoT). Japanese junior high school students learn Japanese, mathematics, science, society, foreign languages, music, art, health and physical education, technology, and home economics. In the domain of technology, improvement of education on programming is required as part of the recent educational policy. In past research, we proposed a support method from a remote location of classes targeted learning contents 'measurement and control by program' stipulated in the course of study the junior high school and developed the system (Iwayama & Ito, 2017). The educational support system consists of a video conference system (VCS), online storage service, 'learning activity status recording system (LRS)', and teaching materials with IoT. This paper introduces LRS and describes how to transmit state transition information from a wheel mobile robot as a teaching material with IoT to LRS.

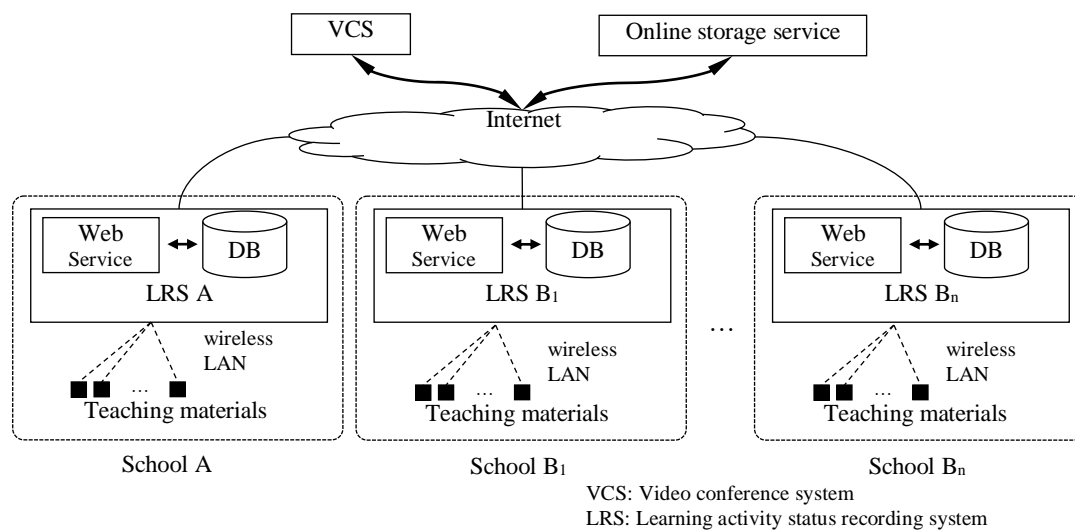
2. Distance educational support system

In many schools, it is often difficult to conduct lessons on the same content at the same time. Therefore, this system has functions that can support education asynchronously. The educational support system employed in distance schools uses an online storage service, so that data can be stored and moved between servers set up in schools via the Internet (Figure 1). LRS is installed in each school, and the faculty is configured to transmit and receive the data through the online storage service, as necessary. The

teacher of school A is the leader. Other teachers of schools B_i , $i=1\sim n$ work in cooperation with the leader. The leader is assumed to have higher skills than the other teachers. The leader performs lectures for all students using VCS, as usual. Teachers in each school B_i are involved in virtual team teaching and simultaneously conduct classes for the corresponding students. The students can ask questions of the teacher in the school to which they belong. If the teacher of school B_i cannot respond to a specific question, the leader teacher of school A answers the students, instead.

Each learning material is configured for IoT. The teaching material is a wheel mobile robot, with a wireless LAN module and sensors to measure the rotation of the wheel inside. The state transition information of the teaching material is sent to LRS via a wireless LAN in the classroom, where the lesson is conducted by IoT. State transition information of teaching materials aggregated during practical training is converted into coordinate data in the server by the developed conversion software. The converted coordinate data are stored in a database with permission to be able to refer by the web service program. The saved data can be transmitted to teachers in each school through online storage. Therefore, since all teachers can grasp the state transition of each teaching material, teachers of school A and teachers of B_i school can cooperate with one another. As a result, the teachers in school B_i can teach their students while assisting from the teacher in school A.

Figure 1. Distance educational support system.



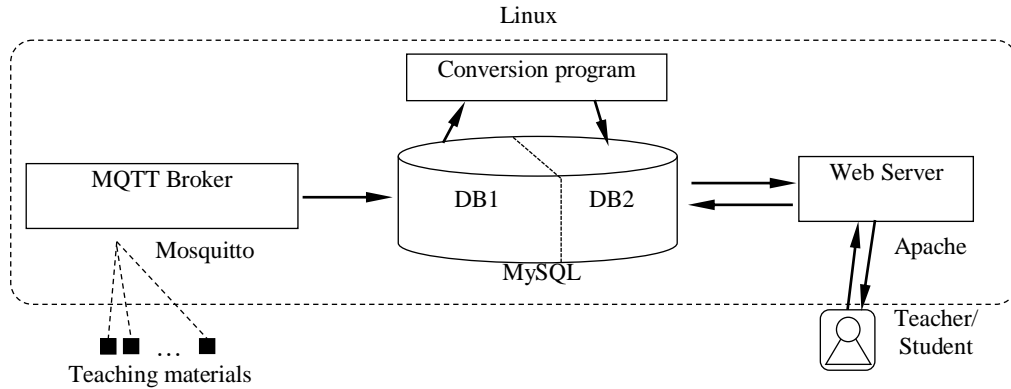
3. Learning activity status recording system

The learning activity status recording system saves the activity situation and displays the trajectory based on the analysis, in the distance educational support system. An outline of the configuration is shown in Figure 2. The OS of this system is Linux, and the database uses MySQL. The state transition information transmitted from the teaching material with IoT consists of identification code, time, and rotation counts for both side wheels. Message Queue Telemetry Transport (MQTT) protocol is adopted because it is programming language-independent and lightweight for network traffic (Hwang, Park, & Shon, 2016). MQTT is a messaging protocol based on the TCP / IP stack. It is open-source and free of charge. Libraries for MQTT use are provided for various programming languages. The MQTT message communication method involves transmission from a Publisher (the calling side) and reception by a Subscriber (the receiving side) via a server called the MQTT Broker. Mosquitto, an MQTT Broker provided as open-source software, is employed. A library for Python, a dynamic programming language used in various applications, is adapted to store data sent from the Publisher to the Subscriber in the database.

The software embedded in the teaching material is in the process of development. Transmission experiments are performed using Linux (Raspberry Pi), instead of the teaching material. A script written by Python sends the state transition information to the database using MQTT at specific intervals. The data are sent to the database in DB1 illustrated in Figure 2. They are converted to two-dimensional coordinates by the developed program. Odometry is algorithm for estimating the position of a robot by computing the displacement vector based on rotation speed and angle of the right and left side wheels in a wheel-moving robot. The developed program is described using odometry. The transformed coordinate values are stored in DB2 illustrated in Figure 2. Web contents for visually providing the information

necessary for educational support are constructed using Hypertext Preprocessor (PHP), which is an open-source general script language. It is configured to be delivered from the web server after forming a vector image with JavaScript to improve design ability. The teachers and students can access the database via web contents and confirm the trajectory connecting points of coordinate values with lines.

Figure 2. Constitution of LRS.



4. Awareness survey of the system

Twenty-five teachers in charge of technology education were interviewed following an explanatory overview of the distance educational support system. The content of the survey confirms the usefulness of the system from an educational point of view (Table 1). Positive opinions were found in all items as a result of the survey.

Table 1. Evaluation of educational support system (n=25).

Question	Positive response (%)	Average	S. D.
Do you think that the educational support system from the remote place of the class including the practical training which received explanation this time is useful?	92.0	3.24	0.71
Do you think that classes can be developed while listening to the opinions of experts on a system for educational support from remote areas?	88.0	3.32	0.68
Do you think teachers can perceive learners' thinking and ingenuity, even in remote schools, by using an educational support system in remote areas?	92.0	3.20	0.69
Do you think that it is worthwhile, not only in the technical field but also for any subject?	88.0	3.28	0.67

5. Conclusions

The state of teaching materials with IoT can be visualized by the developed conversion software. It was shown that students and teachers in remote locations could view the learning process of the other students and the learning outcome, which is the trajectory of the robot, using a web browser. The results of interviews with teachers of technical education implied its usefulness. In the future, we will conduct an examination that actually receives the state transition information from the robot and compare the mobile situation and trajectory of the web contents.

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FORMATIVE ASSESSMENT OF GLOBAL EDUCATION -JAPANESE HIGH SCHOOL STUDENTS' CONCEPTIONS OF A GLOBAL LEADER-

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Abstract

The purpose of this poster presentation is to investigate the characteristics of Japanese high school students' conceptions of a "global leader". In an increasingly globalized world, it is critical to strengthen the development of capabilities for cultivating human resources for global operation activities. For this purpose, in 2014, a new global education project called Super Global High School (SGH) was initiated by the Japan's Ministry of Education, aiming at cultivating global leaders at the secondary education level. In order to allow students to perform globally in the future, students are to learn high levels of education, communication skills and imagination as well as about concerns such as various social problems. These certified schools are expected to design a curriculum with a profile of their ideal leader in addition to setting specific research topics during the designated period (five years, concluding in March 2019). In order to investigate students' conceptions and awareness caused by SGH learning experiences, a focus group discussion (FGD), one of the qualitative techniques for data collection, was conducted. FGD also functioned as formative assessment, since the students were able to obtain reflection and feedback on their own learning, promoting meta-cognition skills. In the poster, I will make a presentation on the students' images of a global leaders.

Keywords: Japanese high school students, super global high school (SGH), global leaders, global education, formative assessment.

1. Objectives

The purpose of this study is to investigate the characteristics of Japanese high school students' conceptions of a "global leader". I will explore what a global leader should be like, with an analysis of the images of ideal global leaders that Japanese high school students think after experiencing various global learning activities. Also, I will discuss how formative assessment strategies will work in their learning.

In order to allow students to perform globally in the future, students are to learn high levels of education, communication skills and imagination as well as about concerns such as various social problems. These certified schools are expected to design a curriculum with a profile of their ideal leader in addition to setting specific research topics during the designated period (five years, concluding in March 2019).

According to MEXT, there are six main efforts to be made by SGHs; 1) Definition of Ideal Global Leader Profiles, 2) Research and Development Themes, 3) Global Business and Social Issues, 4) Theme-based Research, 5) Collaboration with Universities, 6) Collaboration with International Organization and Companies. This study focused on 4) Theme-based Research (Exploratory Studies and Overseas Fieldwork), specifically, "Overseas Fieldwork", which is set as a core activity in our SGH program.

Practices at Miyagi-Pref. Sendai Nika High school, which is designated as an SGH and is putting a lot of resources into global education, will be analyzed as an example case in this research. By investigating students' awareness developed by SGH learning experiences and finding out the characteristics of their conceptions of a "global leader", some implications will be provided for designing a better global education program.

2. Research

2.1. Introduction of the SGH curriculum

Sendai Nika's SGH's research theme is: An Inquiry into Global Water Problems in the Field of the Kitakami and Mekong Rivers. Water problems are one of the critical global issues taken up by UNESCO. In addition, they are one of the key targets in the Sustainable Development Goals (SDGs), which have recently had more focus placed on them by Japanese education.

The curriculum is designed with a core set of approaches to solve water problems in the world. They learn about water problems locally, and then they are able to expand their interest to broader areas of Asia through research tasks. In order to learn about domestic and international water problems, there are plenty of active, participatory and experiential learning opportunities for students, such as Local Fieldwork, Overseas Field Trip/Cultural Understanding, International Exchange Program, Overseas Fieldwork/Community Involvement, and International Academic Conference. Among them, "the Mekong fieldwork" is the most stimulating activity in the SGH program of this school. Students learn about water issues in the Mekong Basin, conducting research and community involvement activities which they have planned in advance. Sendai Nika H.S. set ideal global leader qualities and abilities as the expected outcomes of the SGH program.

2.2. Method

In order to explore students' conceptions and awareness gained by SGH learning experiences, a focus group discussion (FGD), one of the qualitative techniques for data collection, was conducted. It was analyzed with particular attention towards formative assessment.

Formative assessment is the frequent assessment of students' understanding and progress in order to identify learning needs and difficulties, give feedback, and tailor teaching strategies (CERI, 2005). OECD revealed that it is one of the most effective strategies for promoting high performance in schools. In fact, OECD reports that several countries promote formative assessment as a fundamental approach to education reform. Also in Japan, the idea of formative assessment has been incorporated into the new Courses of Study.

Table 1. Profile of Focus Groups (FGs)

Discussion theme: <i>What is a Global Leader Like?</i>	
FGD Activity procedure: 1) List abilities/capabilities/skills of "global leader", individually 2) Give and exchange opinions over discussion 3) Categorize the abilities or skills they think are important 4) Think about the reason and share ideas or experiences 5) Categorize subheading 6) Intensify discussion	
FG1	FG2
Date: September 10 th , Monday, 2018 (Time: 12:20~13:00)	Date: December 4 th , Thursday, 2018 (Time: 14:45~16:15)
Participants: All of the 2 nd grade High School students who took part in the Mekong field work held in Summer 2018 (there are 8 in total)	Participants: All of the 3 rd grade High School students who take Project Study and experienced presentations at academic conferences (there are 14 in total)

As shown in Table 1, there are two FGs being questioned. As for FG2, as a part of formative assessment strategies, student's feedback on the self-assessment worksheet was analyzed as evidence.

3. Discussion

The most frequently appearing key word in the discussion among FG1 is "*the other person's situation*". This exactly signifies the ability that our school expected the students to acquire through the SGH program. In other words, "*the other person's situation*" is the right point to connect with "The power of empathy", which is one of the five qualities and abilities that we want students to learn as global leaders. They think that to sympathize with another person's position or feeling is the most important trait of a global leader. Awareness of this view point developed in daily classes and was enforced through the fieldwork; this is because the two teachers in charge of this fieldwork and the SGH Project Study did not directly mention the five expected traits to the students.

Of course, there are more profiles of "global leader", but they are categorized into several groups subtitled by the students as; "*Respect*" "*Cross-cultural understanding*" "*Viewpoints*" "*Actions*" "*Consideration for others, Cooperation/Harmony*", and "*Leadership/leader-spirit*". They used their experiences from fieldwork to formulate ideal global leaders, by conceptualizing their global awareness.

We have confirmation that the overseas fieldwork contributed to developing qualities and abilities which we want students to learn as global leaders. On the other hand, it is unclear whether or not

the students obtained the other four abilities. Based on FGD, however, the same holds for the overseas fieldwork more or less contributing to developing these skills.

A similar tendency can be seen in FGD2, but it is noticeable that the discussion was much deeper and the students listed a lot more key words describing ideal global leaders. This is because they are one year senior with more learning experiences including making presentations at domestic or international academic conferences. An example of this is that in addition to various profiles which appeared in the discussion conducted by FG1, FGD2 assembled more skills and abilities as global leaders into the “Facilitation” and “Discussion skills” categories.

According to self-assessment sheets submitted by FG2, learning that occurred from joining academic conferences falls mainly into these four categories; 1) learning regarding communication and presentation techniques (effective presentation, explanation skills and ways to convey something in a way that's easy to understand) ; 2) learning regarding viewpoints (understanding the importance of having multiple viewpoints, viewing a matter objectively, considering things from different angles and to verifying the effects from new perspectives) ; 3) learning regarding thinking skills (to think deeply and logically); 4) learning regarding research & study (motivation to research at university, some mindsets as a researcher). Apart from those, stimulation, broadened horizons, self-esteem, flexible approach etc. were introduced.

With regard to teaching and learning methodology, I found that FGD functioned as their formative assessment and aroused their reflection. Though the discussion, they were able to understand what they had learned by reflecting on their learning. Also, they were able to think or rethink about things from different viewpoints, which expanded their views. To promote learning, it is indispensable that a learner identifies what he or she has done well and focuses on what he or she can do to improve (Black & Wiliam, 1998). Students should be engaged in a reflective and critical review of the work they have done to enable them to plan their revision effectively. Formative assessment including reflection and feedback by group discussion and self-assessment sheet is an effective way to deepen their understanding.

Several weeks after the academic conference, one student in FG2 wrote on the self-assessment sheet: *“Looking back to those days when I was devoted to doing my best for my research presentation, I feel grateful for this opportunity that I need to reflect my learning. Now I realize that as days passing by, my passion which was burning at that time is being disappearing day by day. From now on, I will try not to forget my next goal.”* This can identify the cardinal importance of formative assessment, showing proof of how self-assessment as reflection is important to having a learner acknowledge their hidden desires for self-realization. In this sense, formative assessment is a significant tool to promote meta-cognition skills and to boost student learning, empowering learners.

4. Conclusions

Through the discussion above, it is clear that SGH's programs had a great impact on the students, and helped them raise their consciousness of global awareness and international-mindedness. Overseas fieldwork especially enhanced knowledge and awareness obtained in classes (Project Study) at school and even made a momentous contribution to increasing global citizenship which is thought to be necessary to establish a more peaceful and sustainable world. Their conceptions of a “global leader” have been formulated by a mixture of their rich experiences.

Furthermore, they were able to understand what they had learned by reflecting on their learning and finding what they can do at present and what they need for the next step. It is essential to provide learners with opportunities to have self-assessment feedback in the learning process, and engagement in feedback and reflection works as a significant formative assessment to develop their skills as well. By implementing both self and group assessment, their chances of deepening learning will be increased.

Owing to the abundant activities and experiential learning of the SGH program, their global awareness has surely been fostered and it seems they have appropriate, relevant and profound conceptions of global leaders. However, it is uncertain whether they will really become true global leaders and it is still unknown that what kind of role they will actually play in the future. It is important to keep watching over their development long term.

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PREPARATORY STUDY OF ‘LOVE FOR ONE’S HOME’ EDUCATION THROUGH LEARNING TRADITIONAL COLOR NAMES: KNOWLEDGE OF THE TRADITIONAL COLOR ENHANCES ITS ATTRACTIVENESS

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Abstract

As a preparatory step of our research project for ‘love for one’s home’ education through learning traditional colors, an experiment was conducted to examine the effect of attaining knowledge of a color on its attractiveness. A hundred and twenty-two university students answered the degree of affinity of six Japanese traditional colors twice with an interval of one hour, first without any information and second with the color name and a short text explaining its origin and the cultural background. Results showed the degree of affinity rose from the first to the second evaluation for most colors, supporting our hypothesis that people would appreciate the value of traditional colors when their knowledge about these colors was deepened. The appropriateness of the traditional colors as learning materials for ‘love for one’s home’ education, a part of moral education that is recently emphasized by Japanese government, was discussed. In addition, the present findings indicated the importance of the additional information that should be given to learners along with the traditional colors in order to maximize educational efficiency.

Keywords: *Knowledge of traditional colors, ‘love for one’s home’ education, traditional color names.*

1. Introduction

We have started a new research project for ‘love for one’s home’ education, that is recently promoted by Japanese government, through learning Japanese traditional color names. Each of these color names has a unique cultural background and long history. Unfortunately, however, they have not been taught in primary or higher educations for several decades, and young people have little knowledge about them. We thought the traditional color names would be excellent learning materials for Japanese young people to notice the attractiveness of their own community. In our preliminary survey, we found that those who have more knowledge about these color names tend to have a positive attitude toward learning more about them (Takahashi & Aotani, 2018a, 2018b). So the key question is ‘how to make them take the first step of learning.’ To find a clue to solve this question, we conducted a simple experimental study.

2. Methods

2.1. Participants

A hundred and twenty-two Japanese university students, 71 males and 51 females, participated in the research. Their mean age was 18.6 years old ($SD=.85$).

2.2. Materials

Six Japanese traditional colors were used as evaluation targets (Table 1). These color names have been used in Japan for more than a thousand years, except for *Wakaba-iro* that has been used from the Meiji-period (1868 - 1912).

Table 1. Japanese traditional color names with Munsell notation in parenthesis used in this study shown on approximate background colors.

Imayou-iro	(5R 4.5/8.5)	Fuji-iro	(10PB 6.5/6.5)	Kamonoha-iro	(5BG 4/4)
Wakaba-iro	(7GY 7.5/4.5)	Kara-kurenai	(1.5R 5.5/13)	Kon-iro	(6PB 2.5/4)

2.3. Procedure

Participants answered the degree of affinity for each color, shown as a printed color chip (4cm × 4cm), on an 11-point scale (from 0: 'do not like at all' to 10: 'like the most'). They did this twice with an interval of one hour. First they evaluated the colors without any additional information given (by seeing only color chips), and second with each color name and short text explaining its origin and the cultural background such as "*Imayou-iro*: *Imayou* means 'modern' or 'now popular' in the Heian-period (794 - 1192). Most popular dying color at that time was red created by *Beni-zome* (red-dying). This color name appears in *Genji-monogatari* and *Utsuho-monogatari*, famous classic tales, suggesting its widespread use." In addition, after finishing the second evaluation, participants answered whether or not he/she had known each color name before the experiment.

3. Results

Figure 1 shows the mean affinity score for each color in the first and the second evaluation. Repeated-measure *t*-test revealed that the second score was significantly higher than the first score in *Wakaba-iro* ($t=4.010$, $df=121$, $p<.001$), *Kara-kurenai* ($t=2.158$, $df=121$, $p<.05$), and *Kon-iro* ($t=4.936$, $df=121$, $p<.001$). Table 2 shows the results separately for participants who had prior knowledge about the name of each color (YES group) and those who did not (NO group). Comparing the variation from the first to the second evaluation between groups, participants who did not know *Wakaba-iro* (43.4% of all) increased its affinity score to a greater degree than those who knew it (56.6%) ($t=2.702$, $df=120$, $p<.01$)

Figure 1. Mean affinity score of each color in the first (left column) and the second (right column) evaluation.

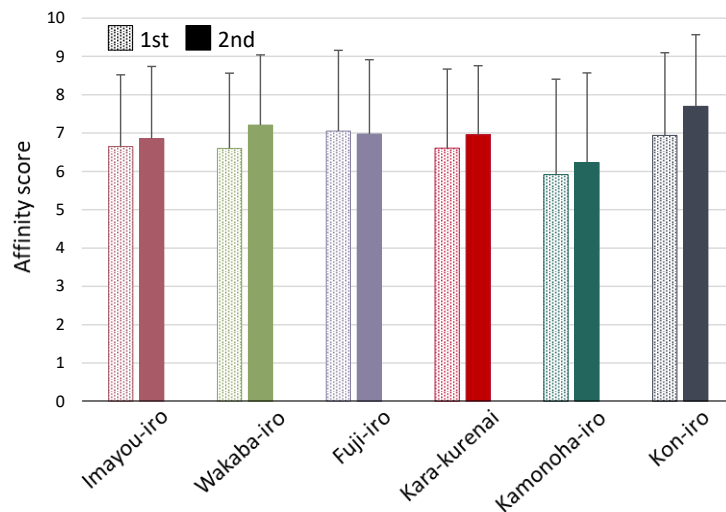


Table 2. Results of participants with or without prior knowledge of each color name.

	Knowledge	Participants (%)	First evaluation	Second evaluation	Variation (1→2)	Group difference
Imayou-iro	YES	4.9	5.33	5.83	-0.50	ns
	NO	95.1	6.72	6.91	-0.19	
Wakaba-iro	YES	56.6	6.78	7.04	-0.26	$p<.01$
	NO	43.4	6.36	7.43	-1.07	
Fuji-iro	YES	62.3	7.37	7.20	-0.17	ns
	NO	37.7	6.50	6.63	-0.13	
Kara-kurenai	YES	44.3	6.26	6.91	-0.65	ns
	NO	55.7	6.90	7.00	-0.10	
Kamonoha-iro	YES	5.7	7.57	6.71	-0.86	ns
	NO	94.3	5.82	6.20	-0.38	
Kon-iro	YES	94.3	6.99	7.70	-0.71	ns
	NO	5.7	6.14	7.71	-1.57	

4. Discussion

The affinity score of Japanese traditional colors increased from the first to the second evaluation, with only one exception for *Fuji-iro*. Though the simple repetition effect might be involved here, in our view such positive change in subjective evaluation is mainly caused by the additional information of the colors. Being inspired by the ‘antique’ color name and its historical and cultural background, participants may have noticed a new attractiveness of the traditional colors, each of which has an unclear tone that is generally not preferred. The results supported our hypothesis that people would appreciate the value of traditional colors when their knowledge about these colors was deepened.

Participants’ prior knowledge of the examined colors varied widely by colors, from *Imayou-iro* that was known by only 4.9% of participants to *Kon-iro* that was known by 94.3% of them. However, the relationship between the prior knowledge of the color and the amount of increase of its affinity score by the additional information was not clear. This result is slightly contradictory to the above discussion, because our hypothesis expects people not having prior knowledge of the traditional color would be influenced more by the ‘new’ information of its historical and cultural background. Only the result of *Wakaba-iro* supported this reasoning. *Wakaba-iro*, as mentioned earlier, is the only color that does not have a very long history among the colors examined. So it may suggest that young people are more sensitive to the attractiveness of rather modern traditional colors. This is a problem for further consideration in the future.

In the educational context, the present results have positive implications for achieving the aims of ‘love for one’s home’ education. Japanese traditional colors and their names are said to be the fruit of Japanese nature and culture that has matured over a long time. This is why we believe them to be the ideal learning materials for ‘love for one’s home’ education. By learning these colors, young people would know their local history, notice the value of their own culture, and also enhance a sensitivity towards nature. In order to achieve the aim of moral education stated in the National Curriculum Standards in Japan, that is ‘cultivating morality as a foundation for developing Japanese citizens with a proactive attitude who would ... respect traditions and culture, love one’s country and hometown which have fostered such traditions and culture,’ we think Japanese traditional colors are perfect learning materials. The present results showed one possible way to maximize learning efficiency of such moral education, that is to provide learners with appropriate information explaining the historical and cultural background of the traditional colors.

Based on the present findings, the next step of our project should be a verification of the effect of learning in a more realistic situation. We must examine how and how much participants’ understanding of, and attitude to, their home would change by learning Japanese traditional colors in a relatively long span, more concretely for some months. After an accumulation of data of such an experimental study, we hope to create a kind of booklet showing the attractiveness of traditional colors as a convenient learning tool that can be widely used in schools, in those of the lower grade in particular.

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TESI PROJECT – NEEDS ANALYSIS AND NEW SOFTWARE FOR PEOPLE WITH COMMUNICATION DEFICIENCIES

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Abstract

TESI project focuses on social integration of peoples with verbal communication disorders that are at risk of social isolation. Taking into account the diversity of the verbal disorders' spectrum (including autism, dyslexia and intellectual disabilities), the project aims to develop a basic training software system for all care and professionals working with people with verbal disabilities, independently of their area of knowledge. The present work focuses first on the social needs of children and young people from the target groups. Second, based on the needs analysis, we designed a TESI Workflow Model, using a friendly structure with instructions and images data base which can be adapted to each user. The mobile application was installed on mobile devices (phones and tablets) and the tests in triads of users-parents-educators are in progress.

Keywords: *Social inclusion, research project, communication disorder, new software.*

1. Introduction

TESI project is an ERASMUS+ KA3 project which aim to develop a mobile application for peoples with verbal communication disorders, based on the results of an ERASMUS+ former project (Iacobescu, 2018a and 2018b).

Three target groups consisting in students with verbal impairments, their teachers and parents were studied in order to identify the general and the specific needs for improving their communication in the daily life (Cerban and Iacobescu, 2018). The results of our study will be used to design an application for mobile devices which uses images and successions of images to express basic sentences and actions.

Because of the diversity of the children with speaking impairments (different severity levels of autism, different levels of intellectual abilities, different personalities, the presence or the absence of further impairments – such as sensorial problems, epilepsy etc.) it is less likely that they would respond in the same way and make similar progresses undergoing a single type of intervention. Thus, several types of intervention will probably be needed to answer all the needs a child could have.

The case studies focused on selected children of the target group, data on their parents, families and life their background for the following partner institutions in the project: Special gymnasia School, „Sf. Mina”, Craiova, Romania, Josip Matos Primary school (Osnovna škola Josipa Matoša), Croatia, Association for Education and Development of Disabled People, Greece, and Special School for Students with Hearing Impairments “Stoyan Belinov” – Plovdiv, Bulgaria.

The lot of the subjects is diverse, of different ages, different cognitive and psychosocial development stages, and total lack of verbal language, sound speech or a few basic words speech.

The core method of the study consisted of observation, pursuing fine and gross motor development, space orientation, answer to commands and use of all analyzers. Behavioral record was done as much as possible on time for each subject, and the teachers who worked with them for a long period of times were assessed.

2. Results

For all students from the target groups there were identified the areas of communications to be improve: hygiene, nourishment, dressing, playing with other children, health, shopping, moving around familiar environment, public transportation, communication with neighbors, communication with unfamiliar people, expressing personal needs and wants, social interactions.

Taking into consideration the student status and needs, TESI Tool will be design as an assistive communication tool for people with reading, writing and verbal communication difficulties. It will enable users to communicate using visual cues (images) and to learn and perform daily activities by following visual instructions. A database of images will be collected together by teachers and parents in order to fit the specific needs of each student, after the general needs were taken into consideration in the application design

We can divide the students' needs in two main classes:

1. Needs which require direct communication of users (people with verbal difficulties) with carers/tutors using mobile technology: nourishment, playing with other children, moving around familiar environment, public transportation, communication with neighbors, communication with unfamiliar people, expressing personal needs and wants, social interactions, etc

2. Needs which can be solved by direct use of the mobile technology: hygiene, dressing, orientation in space, etc.

Some areas, as health, can be considered in both categories.

For the first category of needs, it is necessary to develop a software which allows both parts (users and tutors) to have a dialogue using the image library from the tablets. The image library is individually designed for each user, by the carers (teachers, parents, etc.) and can be shared in the community of the project target groups.

We call this category of TESI tool: Expressions, with two approaches: Users' expressions and Carers expressions'. For the users' expression tool, we must take into consideration the above mentioned status of students. The images should be relevant for each user and easy to be accessed. Some parts of the software is better to be adaptive, as the tutor considers (images access, dimensions, position on the screen, etc)

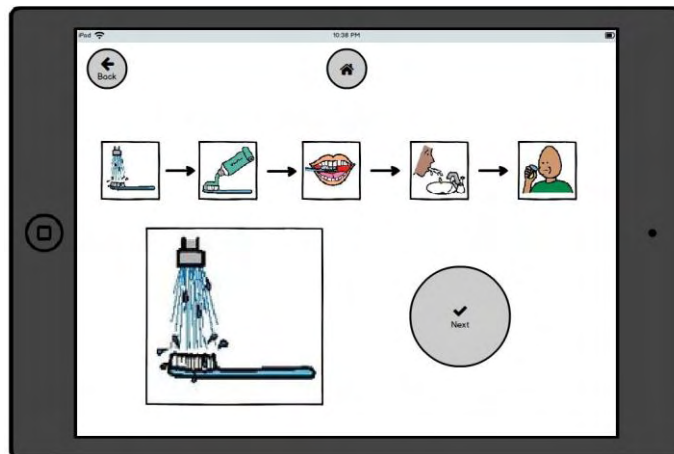
Example of need (User expression): "I want (to eat) a banana.", "I want to go home", "I want to play with my doll", etc.

Image relevance: for some users a schematic image is more relevant than a real one: Walking ("Let's go for a walk!") (Figure 1).

Figure 1. Images relevant for "walking" action.



Figure 2. Expression sequence (Iacobescu and Pavlov, 2019).



The second category of TESI tools will consist in sequences of images which will show users “how to do” daily routines: how to dress, how to wash, etc. In addition with the relevance of images composing the instruction, the carer will decide about the succession of images (on pushing/scrolling, automatic)

Examples: How to brush the teeth, How to dress a shirt, etc. (Figure 2).

3. Conclusions

TESI tool (the adaptive personalized software) will help people with verbal disabilities to: express themselves easier, increase the communication parents - children and teachers – children, improve their skills and enhance their status. Skills which will be improved: dressing skills, personal hygiene skills, socializing and peer relation, relation with teachers, obeying school rules, Expressing emotions, Skills in using mobile technology, Increase their knowledge and imagination, feel more self-confident, feel more independent, feel safer.

Then, this m-tool will contribute to a more effective social inclusion of the target group students, and can be extended for those people with communications deficiencies. In addition, the TESI tool will help their teachers in their educational process and their parents in very day life routine.

Acknowledgements

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INCLUSIVE EDUCATION OF SEN CHILDREN IN NURSERY: ANXIETY AND SELF-EFFICACY OF CHILDCARE PROFESSIONALS

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Abstract

The will to recognize and to take into account the needs and the skills of Special Education Need children in order to give them perspectives of an inclusive education cursus is already possible in nurseries. Inclusive education of such babies can be enriching for everyone; but it can also become a source of stress and anxiety for the nursery professionals. It challenges all their working procedures, the usual standards and reference marks but also the perceptions and conceptions they acquired over time about children care. So they have to adjust the way they work with children and accept to be more flexible. (Bazier & Mercier, 2009; Béclin & De Pauw, 2014; Camus & Rogier, 2012; Garcia, 2014; Hendrix, 2013). This research focuses on workers of two public nurseries who welcome Special Education Need babies in the French speaking part of Belgium. We met eleven nursery nurses, a director and the parents of two SEN children. We used semi directive interviews with each of them. We also used three additional tools with the nursery nurses: the Spielberger's State-Trait Anxiety Inventory (STAI-Y) (1990 trad), the Follenfant and Meyer's working self-efficacy scale (2003) and the drawing of a nursery typical day. Our results show that the type of disability influences the workers conceptions and practice. Investing inclusive education is not so easy for the workers. Various factors influence their feelings and could be approached through specific actions in order to reduce their anxiety (anticipation of the child's reception conditions, better communication between parents and workers, specific training programs, professional support and assistance). Choosing inclusive education must always be carefully and properly thought and care must be taken to constantly improve the working procedures.

Keywords: SEN children, municipal nursery, professional childcare, anxiety, work self-efficacy.

1. Introduction

The evolution of the concept of disability encourages the development of innovative inclusion projects and a better consideration of the specific needs of individuals. This is particularly true in nurseries that welcome Special Education Need children (SEN). These babies face health issues and/or sensory, motor and/or cognitive disabilities (Garcia, 2014; Vandebroek et al., 2010). It is therefore essential to encourage their stimulation and to promote their socialization, but the challenges of inclusive education are numerous and concern all stakeholders. For all the nursery professionals, these new situations are often a source of uncertainty and anxiety that can lead to a decrease in self-confidence and to a feeling of helplessness. (Bazier & Mercier, 2009; Béclin & De Pauw, 2014; Camus & Rogier, 2012; Georgette-De Bruyne & Vandevorde, 2014; Hendrix, 2013).

In the French speaking part of Belgium, several legal texts specify the conditions under which the approval of the early childhood facilities is issued. The inspection of nurseries and the granting of approvals are carried out by the "Office de la Naissance et de l'Enfance" (ONE), a public institution under the supervision of the French Speaking Community Government. According to the law, a nursery is an "early childhood facility designed to accommodate children aged zero to 36 months with a staff of qualified professionals". It also specifies that the childcare facility must be attentive to the specific needs of each child and must promote respect for their differences in order to facilitate their integration. The early childhood facilities are therefore part of a global political effort to include children with disabilities in ordinary environments. It is also expected that the ONE provides specific support to the staff involved in these situations and liaise with specialized external services (AGCF, 2003).

2. Methods and instrumentation

The aim of our research was to study how the actors of early childhood facilities understand and analyzed their personal and/or professional reality when they have to welcome SEN children. The research

is part of an exploratory approach, whose subject has been little developed in the scientific literature. We focused on workers of two public nurseries who welcome SEN babies. These daycare facilities are organized by the Public Social Action Center of the City of Mons and are included in the legal framework presented above. Since 2013, they have been particularly concerned with ensuring a quality inclusive welcome for babies with specific needs. Our research questions were: what are the preconceptions of the social stakeholders about SEN babies and inclusion? What are the consequences on their everyday practices? What are the favorable factors than can improve the anticipation of an inclusive welcome project? In order to answer these questions, we met 11 nursery nurses, a director and the parents of two SEN children. We used semi directive interviews with each of them. We also used three additional tools with the nursery nurses: the Spielberger's State-Trait Anxiety Inventory (STAI-Y) (1990 trad), the Follenfant and Meyer's working self-efficacy scale (2003) and the drawing of a nursery typical day.

3. Main results

3.1. The semi directive interviews

The purpose of the semi-structured interviews was to bring out the meaning given by the actors to the inclusive childcare experience. The sessions were organized on the basis of an interview guide focused on various themes (Berthier, 2012). Our cross-sectional analysis highlights that our childcare professionals have a preconception about the inclusive approach that is essentially based on the need to adapt their professional practices and their professional environment, to better meet the needs of children because they consider integration into the peer group as an essential factor of inclusion. On the other hand, only few professionals highlight the importance of equality of treatment between children and collaboration with parents. These preconceptions vary essentially according to the nature and the severity of the child's disability because, according to them, it influences the necessary environmental adaptation. Our results highlight an important difference between the experiences lived by the professionals of the two studied structures. In the first one, all of the nursery stakeholders and the director describe their experience in a positive way and talk about a climate of trust with the parents. In the second, the testimonies are more negative: all express the exhaustion engendered by the simultaneous reception of three SEN babies; many express a feeling of loneliness and frustration and relate anxiety-provoking situations. All the parents we met described, for their part, a mostly positive experience and a good relationship with the team. They felt supported and think that the professionals had real interest for their child. They appreciate the efforts they made to ensure the quality of the stay. Overall, the involvement of the staff during the setup of the project favors a positive and serene experience. Only some nursery stakeholders said that they were not really associated with the decision and that they were forced to accept to work with the SEN babies.

3.2. The Spielberger's State-Trait Anxiety Inventory (STAI-Y, 1990)

Spielberger's Inventory of State-Trait Anxiety Form Y (1983), translated by Bruchon-Schweitzer and Paulhan (1990), was used to evaluate the possible state of anxiety of the nursery caregivers facing an inclusive care project, compared to their usual anxiety. All of our subjects obtained fairly equivalent scores, which underline, for each of the two dimensions, a level of anxiety that is "low" or even "very low" (see Table 1). In addition, we can also note that our subjects show less specific anxiety in their professional situation (State Anxiety) than in their usual life (Trait Anxiety).

Table 1. Results at the Spielberger's State-Trait Anxiety Inventory.

	Minimum	Maximum	Mean (std dev)	Interpretation
Trait Anxiety	27	40	32.75 (5.45)	Very low
State Anxiety	23	34	27.75 (3.96)	Very low

3.3. The Follenfant and Meyer's working self-efficacy scale (2003)

The Follenfant and Meyer's Working Self-Efficiency Scale (2003) allows an assessment of a person's belief in his ability to act, to perform a mission in a professional context. Our results show that, overall, the assessment that nursery nurses make of their self-efficacy at work is fairly average (32.11, see Table 2).

Table 2. Results at the Follenfant and Meyer's working self-efficacy scale.

	Minimum	Maximum	Mean (std dev)
Nursery A	33	36	34.20 (1.17)
Nursery B	25	26	29.50 (4.39)
All nurses	/	/	32.11 (3.84)

The results of the subjects of the nursery B (29.50) are lower than those obtained in the nursery A (34.20). This could be explained by a weaker belief in their ability to cope with a professional situation that differs from their normal working environment. The variability of their individual results is also stronger (4.39 vs 1.17). These values reflect the differences found in the cross-sectional analysis of interviews and drawings.

3.4. The drawing of a nursery typical day

The drawings of "a typical day at the nursery" gave us data about subjective representation that the professionals had about welcoming a SEN baby. In nursery A, three of them represented a playful moment. Another illustrated a morning welcome scene with all the babies. It is interesting to note that only one drawn the parents and the team. The majority of the caregivers drew a group of children: in half of the cases, the SEN baby is integrated into the group and no distinguishing sign makes it possible to perceive his/her disability; in the other half, the professionals represented themselves apart, or without the other children, therefore underlying a special relationship with the SEN baby. In the nursery B, only one professional drew the three SEN babies simultaneously; others only one or two. A child is almost always absent from the productions (he presents behavior challenges difficult to manage for the team). All the illustrations give an image of a comfortable and playful place of welcome.

4. Conclusions

The inclusive welcome of a SEN baby within early childhood facilities is not easy to organize. Our results however show a real motivation of the professionals but also the importance of identifying the factors that could undercut their engagement. Before welcoming the child, it is necessary to organize meetings with the parents and to plan a period of familiarization with the project. The training of the team will also allow the actors to enter serenely in the process. These elements increase the self-confidence of the professionals and secure the parents. Improving the professionals' skills, through support of specialized services, is also important because an inclusive approach can always be a source of questioning, stress or even anxiety. Choosing inclusive education must always be carefully and properly thought and prepared. The process must be supported by external specialists. It must also contain continuous training sessions in order to constantly improve the working procedures quality and to reduce the workers' anxiety.

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COGNITIVE SCIENCES FOR ACADEMIC SUCCESS OF MIDDLE SCHOOL STUDENTS

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Abstract

Territorial vulnerabilities subdue children at risk of difficulties at school in the Normandy region. We examined benefits of a personalized accompaniment based on the cognitive sciences on academic success of middle school students. We recruited middle school 6th graders students in Normandy. The experimental college included 52 students who benefited from pedagogical program based on cognitive sciences, was compared to the control college included 48 students who received classic pedagogical program of methodology. All students were interviewed before and after one year of teaching. We used the *Children Memory Scale* (Cohen, 2001) to assess students' attention and national tests to assess academic performance in reading comprehension and numeracy. Students were assigned a global score for each test. We conducted repeated-measures analysis of variance for each global score. We observed significant interaction between Group (experimental vs. control) and Test (Pre- vs. Post-test) on attention and on numeracy global score considering age as covariable in analysis. The results showed that the pedagogical program based on cognitive sciences significantly improves students' attention and enhances performances improvement of 6th graders in numeracy after one year of implementation compared to a classic pedagogical program. Our proposed pedagogical program seems to be one of the possible levers to promote the success of all middle school students while promoting a scientific approach to evaluating educational practices.

Keywords: *Cognitive science, academic success, learning, neuroeducation.*

1. Introduction

In France, there is more and more students who do not have basic skills in reading comprehension, numeracy or science (Commission européenne, 2017). Social and territorial vulnerabilities subdue children at risk of difficulties or failure at school, particularly in Normandy (Boudesseul et al., 2016 ; Direction de la recherche, des études, de l'évaluation et des statistiques, 2018). The French reform of the Middle School is in line of the context of poor academic performance and one of its objectives is "to enable all students to learn to learn" through personalized accompaniment. One of challenges of this reform is to provide tools for teachers that will enable students to achieve this objective. Cognitive sciences could take up this challenge. This field of research focuses on the fundamental processes that underlie successful school learning (Goswami, 2006) and can help to modulate educational strategies and redesign educational programs to optimize learning for the success of all students (Howard-Jones et al., 2016). One of the proposals is to include teachings based on brain functioning in school curricula (Dommert, et al., 2013 ; Gaskins & Pressley, 2007 ; Rossi, et al., 2017). Few studies have shown the benefits of this type of curricula on intelligence theories or student academic performance (Blackwell, Trzesniewski, & Dweck, 2007; Dommert et al., 2013; Lanoë, Rossi, Froment, & Lubin, 2015). However, these curricula are short-term and, to our knowledge, there are no longer-term curricula available. Our study aims to evaluate the benefits of a long-term curricula based on cognitive science extended over two years for Middle School 6th graders students in France. The underlying hypothesis is that a better understanding of its cognitive and neurocognitive functioning in a school learning context can enable all students to make the most of their potential. We presented results after one year of instruction.

2. Method

One hundred Middle School 6th graders students from Normandy participated to the study. The experimental Middle School included 52 students ($m = 11;4$ years; $sd = 3$ months; 23 girls) who benefited from curricula based on cognitive sciences, was compared to the control Middle School included 48 students ($m = 11;3$ years; $sd = 6$ months; 19 girls) who received classic curricula based on learning methodology. These curricula take place within personalized accompaniment, which are part of the official programs of the Ministry of National Education. Students were matched in terms of age, sex and socioeconomic level. Every student and his/her parents gave their written consent to participate to the study. All students were native speakers of French, and none of them reported cognitive impairments or developmental problems.

In the experimental Middle School, students received instruction based on cognitive science. This instruction focused on anatomy and brain plasticity, attention, memory, executive functions, work methods that promote learning, and healthy living. The content of the curricula was built by the teachers who were trained in cognitive sciences beforehand by researchers. Then, the content of the curricula was validated by the researchers' team of Laboratory of Psychology of Caen Normandy. In the control Middle School, students received a classic instruction of methodology. The content focuses on helping students organize themselves and know when and how to learn. All student received curricula at the rate of one 45-minutes weekly session for two years (2017-2019). All students were interviewed before (Pre-test) and after one year of instruction (Post-test) to assess the benefits of the pedagogical program based on cognitive science. We used the Attention/Concentration index (between 50 and 150) of the *Children Memory Scale* (Cohen, 2001) to assess students' attention. We used national tests to assess academic performance in reading comprehension and numeracy created by the Academic Centre of Research Development of Innovation Experimentation from Caen. The reading comprehension test assessed information selection, implicit deduction, and identification of a chronology. The numeracy test assessed number comprehension, calculation, and arithmetic word problem solving.

3. Results

We conducted general linear model with the Group as the between factor (experimental vs. control), the Test as within factor (Pre-test vs. Post-test) and Age as covariable. We observed significant interaction between Group and Test on Attention/Concentration index ($F_{(1;97)} = 16.05$; $p < .0001$; $\eta_p^2 = .14$) (Figure 1). The results showed that the attention/concentration index in the experimental group was significantly higher in the Post-test than in the Pre-test ($m_{Pre-test} = 88.94$; $m_{Post-test} = 97.67$), whereas it seems that it was unchanged for students in the control group ($m_{Pre-test} = 93.79$; $m_{Post-test} = 92.56$). We did not observe any significant effect on reading comprehension global score. We observed significant interaction between Group and Test on numeracy global score ($F_{(1;97)} = 8.46$; $p < .005$; $\eta_p^2 = .08$) (Figure 2). The results showed that performances of students in both groups significantly improved, but improvement is more important for students in the experimental group ($m_{Pre-test} = 7.43/20$; $m_{Post-test} = 10.26/20$) than for students in the control group ($m_{Pre-test} = 9.15/20$; $m_{Post-test} = 10.65/20$), performances of two groups were different in pre-test.

Figure 1. Attention/Concentration index according to the Group and the Test.

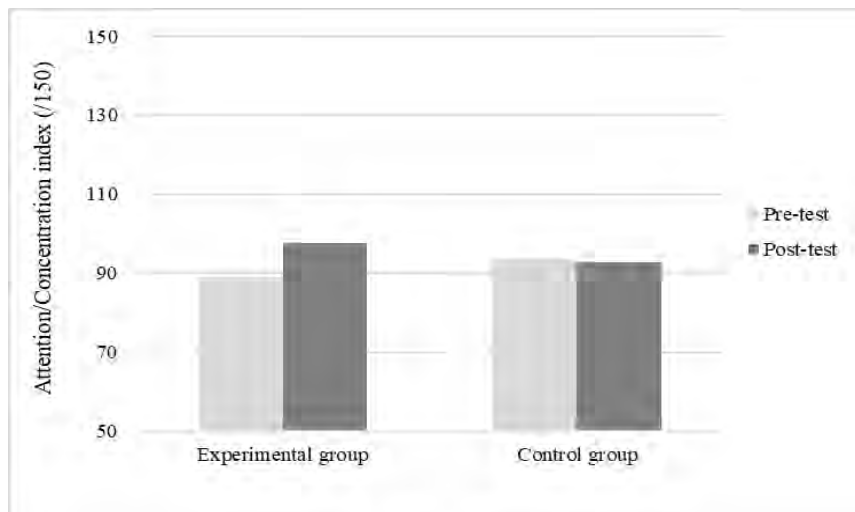
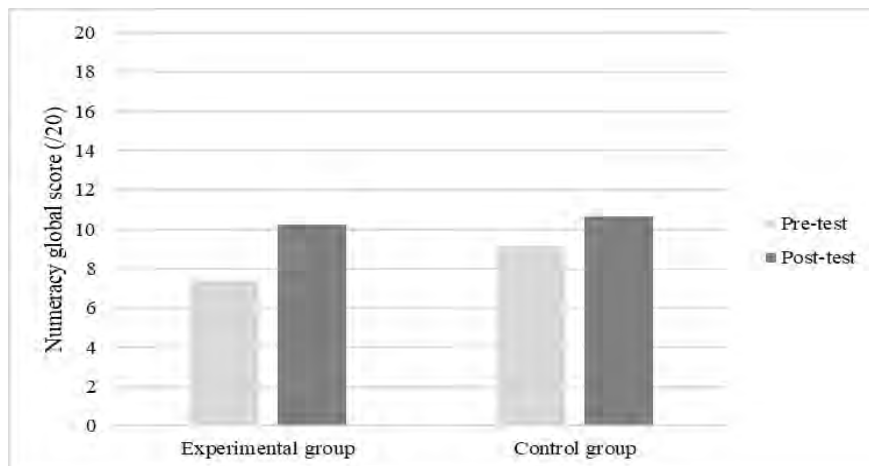


Figure 2. Numeracy global score according to the Group and the Test.



4. Conclusion

The results showed that the curricula based on cognitive sciences significantly enhances performances improvement of 6th graders in numeracy after one year of implementation compared to a classic curricula. It seems that students appropriated knowledge taught, assimilated their active role in their learnings and may be applied its in school learning, here evaluated in reading comprehension and numeracy. Nevertheless, it remains necessary for the curricula to take place over two consecutive years to consolidate these initial benefits and observe other effects affecting other areas of cognitive functioning and learnings. Our proposed curricula seems to be one of the possible levers to promote the success of all Middle School students while promoting a rigorous and scientific approach to evaluating educational practices.

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THE IMPACT OF THE ERASMUS+ PROGRAM ON THE INTERNATIONALIZATION OF CROATIAN VITICULTURE AND ENOLOGY ON THE EXAMPLE OF THE POLYTECHNIC IN POŽEGA

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Abstract

The Polytechnic in Požega was founded in 1998. with the one of primary aim for improving winegrowing, enology and fruit production in Slavonia (Croatia). Taking into account the history and the relatively young independence of the Croatia, one of the goals of the establishment of the Polytechnic in Požega is to create an international recognition of Croatia's viticulture and enology. Nine years ago the Polytechnic received the first ERASMUS charter, which is also the first international institution project. The paper presents the importance of ERASMUS + mobility program on education and development of students social skills, teacher training and international recognition in the example of cooperation between the Polytechnic in Požega and the equivalent French wine schools. The study includes data collected from the system of ERASMUS+ program at the Polytechnic in Požega a survey of current students on professional study Viticulture – enology – pomology, students and teachers who participated in the exchange with French schools. After data processing, the positive impact of participation in the mobility program is reflected in several aspects. Better communication in a foreign language, two-way transfer of new and traditional technologies in wine and grape production between Croatian and France, more intensive participation in international wine events and professional associations, as well as dispersion of the international association of the Polytechnic in Požega with the mediation of French partner institutions. The presented data show indisputable international recognition Polytechnic in Požega in areas of viticulture and enology and therefore Croatia itself.

Keywords: *ERASMUS+, viticulture and enology, Croatia.*

1. Introduction

On Croatian territory are evidence of viticulture since the time of the Etruscans and Greeks which spread viticulture westward (Mirošević I Karoglan Kontić 2008). Although it has a very long tradition of grape growing and winemaking, it is necessary to take into account the fact that independent Croatia was internationally recognized at 1991. Allegations in certain wine-growing and winemaking atlases Croatia mentioned just in a group of Balkan countries (Domine, A. 2004). It is not uncommon to mention only coastal areas that are tourism-exposed, and that the continental region is completely ignored. In recent years, great efforts have been made to make Croatian winemaking recognizable on the international stage. One of the goals of the Polytechnic in Požega is to create an international recognition of Croatia's viticulture and enology. The Polytechnic in Požega was founded in 1998. Nine years ago, the Polytechnic received the first ERASMUS charter, which is also the first contact of institution with similar educational institutions in Europe.

A significant link between the Polytechnic and the French Wine Schools was done by Mrs. Corinne Samouilla (French Ministere de L'Agriculture et de L'Alimentation). The mentioned cooperation over the past three years has resulted in the inclusion of the Polytechnic in Požega on the European network of Wine Schools. Active participation in conferences and competitions The Polytechnic becomes an ambassador of Croatian viticulture and winemaking. Communication with colleagues from the European family with the aim of presenting Croatian wines has resulted with this research.

2. Objectives

The aim of the research was to present an importance of Erasmus+ program on the example of the Polytechnic in Požega in the promotion of Croatian viticulture and winemaking through partnerships with French and European educational institutions.

3. Methods

The study was performed with students involved in Erasmus+ mobility program. Besides the usual participants of exchange program we also include, students which attended the professional, international competitions that came from the collaboration of the French Ministry and the Polytechnic in Požega. The questionnaire contained the following questions that we are asked foreign students on international exchange program or in viticulture and winemaking competitions:

1. Do you know some Croatian grapevine (*Vitis vinifera* L.) varieties?
2. Do you know the three leading grapevine varieties in Croatia?
3. What is Graševina?
4. Do you know some vine growing areas in Croatia?
5. Where is Slavonia?
6. How are labeled wines in Croatia?
7. Did you taste any wine from Croatia?

The data were collected in the population of students from the wine school of Europe. The study also includes students from French wine schools who have been studying at the Polytechnic in Požega. All students are ages 18 to 25. The research has been conducted over the last three years.

4. Discussion

Research results suggest that colleagues from Europe have very little knowledge of the Croatian wine scene. The exception is neighboring countries such as Slovenia, Hungary and the northern part of Italy. First of all it should be noted that the study included mostly younger people, mostly aged between 18 and 20 years. Students do not know the most common wine varieties in Croatia (Graševina, Malvazija Istarska I Plavac mali). This is particularly important because the names of wines in Croatia are equal with names of grape varieties. Graševina, which is the most widely planted grape variety, is cultivated under different synonyms in the Danube Basin (Germany, Austria, Hungary, Slovenia, Serbia, Romania), and is not related to one of the synonyms of the variety. This indicates that Graševina wines are completely unknown to students from Europe. Graševina wines become interesting especially if we are presented as domestic grape variety of Croatia. Although Croatia is a small country area of wine growing is a very diverse. All wine-growing areas in the world are divided on the basis of the sum of effective temperatures. Of the five zones in Croatia we find four (B, C1, C2 and C3) (Maletić I sur. 2003). There is little known fact that two of the three types of climate are represented in Croatia both the Mediterranean and the Continental. The largest and most important wine sub-region, Slavonia is completely unknown and is often mixed with Slovenia or Slovakia.

Wine quality marks on labels are completely unknown since they are specific for the Republic of Croatia and Slovenia. The students of Slovenia still have more knowledge of Croatia's wine compared to other students thanks to the historical connection with Croatia

As the data collection was done in English, the research has also had a positive impact on the international affirmation of students of the Polytechnic in Požega.

5. Conclusions

Although the results indicate the currently weak recognition of Croatia as wine country, it is worth inclusion Polytechnic in Požega in international, professional associations. On this way the promotion of Croatian wine-growing areas, wine grape varieties and wines gives a significant contribution to Croatia's viticulture. The Polytechnic in Požega is currently the only Croatian representative in the European network of Wine Schools with the aim of including new institutions in the network, primarily a related professional study in Poreč. We will continue to research and promote Croatian wines during 2019 at student competitions in Paris and Schengen.

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CREATING CIVIC-MINDED GRADUATES THROUGH COMMUNITY ENGAGEMENT

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Abstract

The purpose is to present community engagement projects embedded in courses guided by Civic-Minded Graduate (CMG) model. The CMG model guides community projects that engage students. A civic-minded graduate (CMG) has completed a course of study and has the capacity and desire to work with others to achieve the common good (Bringle & Steinberg, 2010). Using the CMG dimensions of identity, educational experiences, and civic experiences (Steinberg, Hatcher, & Bringle, 2011; Steinberg & Norris, 2011), examples of community engagement projects will highlight each dimension. Identity dimension example will include an active listening course with campus community as a partner. Educational experience dimension will include student-created informal education programming at a zoo and student interviews with older adult residents. Civic experience dimension will include a student-designed program evaluation for an adoption agency and student support of a music and memory program for older adults with dementia. Impact of students' work on the community and student's sense of civic mindedness will be reported. Implications for using a CMG model for community engagement projects to enhance student learning and strengthen community will be shared.

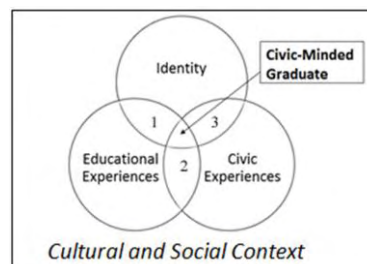
Keywords: *Civic-minded graduates, community engagement, active teaching pedagogies.*

1. Introduction

Civic-mindedness is having a knowledge and involvement in the community with a sense of responsibility and commitment as a member of that community (Bringle, Studer, Wilson, Clayton, & Steinberg, 2011). The conceptual framework for a civic-minded graduate represents the integration of identity, educational experiences, and civic experiences (Steinberg, Hatcher, & Bringle, 2011; Steinberg & Norris, 2011). See Figure 1 for the CMG model (see Figure 1). A student's inclination toward community rather than self is key in this model and nurtured through community-based engagement.

While course-learning outcomes are salient, the outcome of being civic-minded has become important. A student's sense of community and feeling of responsibility toward creates a sense of belonging. Course embedded community engagement experiences create a culture of relationships that nurture students' while simultaneously allowing students to feel a sense of group identity allowing them to work on the developmental task of individual identity.

Figure 1. Civic-Minded Graduate Conceptual Model.



2. Identity dimension

The identity dimension integrates a student's self-understanding and awareness with self-concept (Steinberg et al., 2011). Late adolescents, ages 18 to 24, have a developmental need for identity based on psychosocial theory. Providing late adolescents or traditional age college students with opportunities to practice and reflect on the process of "becoming" is developmentally appropriate (Landry-Meyer & Roe, 2013). Curriculum-based community engagement experiences nurture students' while allowing them to work on the developmental task of identity.

An example of community engagement supporting the identity dimension is an active listening course. The active listening course focuses on listening to self before one is able to listen to others. After mastery of self-awareness about identity primarily through reflection, there is the application of listening skills. Students listen on campus as a required community engagement service to the campus community. Listening on campus requires students to apply active listening skills for the good of the greater campus community.

Engagement with the campus community enhances the learning of active listening skills and increases awareness about the diversity of campus community members. Student listeners listen to others' journeys and challenges. The result is deeper course-based learning about self-awareness combined with campus community involvement and a feeling of commitment to being an active member of the campus community.

3. Education experience dimension

The educational experiences dimension represents academic knowledge and technical skills (Steinberg et al., 2011). For college students, learning is the primary reason for attending college. As students increase knowledge and skills, there is a need for higher order cognitive processes to continue to enhance the learning process. Application, analysis, evaluation, and creation are higher order cognitive skills enhanced with community engagement. Subsequently, the impact of students' work on the community can increase a student's sense of civic mindedness.

One example is informal education programming for an area zoo. Students create programs based on academic knowledge and programming and evaluation skills. Rather than a fictional sponsor, students create informal education programs for a community partner, the zoo. The zoo provides passes for students to visit the zoo. Students present final programs to the instructor, classmates, and zoo educational staff. Having the zoo as a community partner enhances student learning and provides insight into the mission and strategic plan of partially public-funded zoo. Students engage with the zoo and extend their programming for the 'public good'.

Another example is student-determined exams that resulted in the interviewing of older adults. Students determined the format of their exams for an upper-level family gerontology course. The student decision was to interview older adults in small teams about concepts learned to determine 'how these concepts were applied in real life'. For the midterm, students worked in small groups to visit an older adult in the community to interview and report their results for the midterm exam. For the final, students invited older adults to class to interview and write application for the final exam. These educational experiences enhanced academic knowledge (73% felt that they learned more through this format) and interviewing skills engaging older adults. The result were relevant assessment of learning and awareness of older adults' experiences in community.

4. Civic experience dimension

The civic experiences dimension embodies leadership, participation, civic organization, and service (Steinberg et al., 2011). A student's inclination toward community rather than self is primary focus. Ideally, a student's sense of civic mindedness would be sustainable over time. For college students, the level of community involvement is about depth and breadth. Depth is involvement that evolves into a routine or ongoing commitment to others. Breadth is about various community engagement activities that may include direct or indirect service, advocacy, fundraising, and other contributions. Civic mindedness evolves when students recruit or involve students not enrolled in the same course with community engagement and work toward addressing a community-civic challenge.

Engaging with a nursing home facility to raise awareness and funds for a music and memory program is an example of the civic experience dimension focusing on depth and breadth. Specifically, students in an adult development course involved themselves with a music and memory program. This program utilizes music with adults who have dementia to increase quality of life and interpersonal communication. Students became regularly involved with different departments at the nursing home and

involved friends, family, and the campus community to increase awareness and funds for music supplies (e.g., ipods, headphones). A student-led band marched through the nursing home delivering live music, students celebrated donations with cake and visits, and older adult residents listened to music on personal devices. Students witnessed community engagement that was beyond individualism.

A short-term example that focused more on understanding civic issues within societal context was with a national-based adoption agency. The agency was seeking assistance with evaluating the effectiveness of their awareness campaign about the number of children in foster care seeking permanent families. Becoming familiar with the agency and recognizing the agency's interrelationship with other public and private agencies and funding streams was required of students. Adoption is a civic issue that engaged students in a research methods course. Students operationalized components of the awareness campaign and translated the operationalization into a program logic model. The impact was increased student learning and extension of funding for the adoption agency. Students learned that civic involvement crosses state and regional boundaries. A contextual systems approach enhanced civic identity.

5. Summary

Combining course-based assignments with community engagement creates civic-minded graduates. Students transition to a sense of community rather than a sole focus on individual course performance. A CMG model can influence course requirements through assignments and activities. The capacity and opportunity to work with others to achieve the common good is part of the CMG model. The illustration of a CMG model used various course examples in this presentation. These examples illustrate how involvement in a community can integrate the CMG dimensions of identity, education, and civic experiences and enhance student learning.

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DESIGN YOUR OWN LAB EXPERIMENTS: PROJECT-BASED LEARNING APPROACH TO TEACHING CHEMICAL PRINCIPLES OF ENGINEERING

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Abstract

This study introduces the substitution of traditional laboratory practicals related to acid-base titrations and reduction-oxidation reactions carried out to date (where students only have to repeat the instructions provided by the teacher in a manual or script) by new ones where students are responsible for planning and conducting a small research project within the framework established by the teaching staff. Thus, each group of students develops an experimental design regarding topics such as, fabrication of an alcoholmeter, determination of the oxidative capacity of household cleaners or preparation of acid-base indicators based on natural products.

The promise of finding a real solution for a daily challenge becomes the motivation for learning. Therefore, the aim of the proposed methodology is focused in achieving greater involvement of students, as well as effective knowledge acquisition. Similarly, it is intended to promote students' initiative and expand their creativity.

Keywords: *Active learning pedagogy, chemical education, laboratory experiments, problem-based learning.*

1. Introduction

Present-day society is characterized by the free access to a seemingly endless amount of dynamic and changing information, the massive use of the Internet, and above all, a constantly evolving job market. Consequently, future engineers should excel, not only because of their specific and vast knowledge base, but also due to their "soft skills". These desirable qualities do not depend on acquired knowledge, but they allow complex problems to be resolved in multidisciplinary groups by means of an efficient and creative approach. For current engineering students, the challenge in adapting to this new reality will be to develop the capacity for self-directed learning throughout their whole working life (Dochy et al., 2005).

As a result, the implementation of the European Higher Education Area (EHEA) in 2010 following the Bologna Declaration meant the transformation of the studies related to Industrial Engineering specialties in Spain (European Higher Education Area [EHEA], 2016). The new teaching/learning paradigms focus on self-directed learning, which facilitate the ongoing process of developing, maintaining and documenting the professional skills, and the conversion of students into the main actors of their own learning process (Rodríguez Izquierdo, 2014). With the goal of helping students to become enthusiastic life-long learners, several actions should be taken into account by Universities:

- Adapt the work completed by the students (i.e., hours of class-time, written work and practicals, and individual-study) to the European Credit Transfer System (ECTS) structure.
- Design new study programs based on professional and academic profiles that address the aforementioned needs of the job market.
- Encourage student to take a more active role in their learning.

However, traditional lecture-based instruction is still predominant in many Spanish Universities, making it more difficult to achieve valuable skills such as the ability to learn, to organize and to plan, or to adapt to new situations. In order to turn the scenario around, EHEA recommends the implementation of active learning methodologies as the principal approach to teach students to learn how to learn. In an active learning classroom, students must think, create and solve problems rather than passively listen to lecture. In summary, it is the student who constructs knowledge following guidelines, activities or scenarios designed by the teaching staff.

2. Objective and conceptual framework

In this work, an alternative didactic approach based on active pedagogies is proposed in order to conduct laboratory practicals within the subject of *Chemical Principles of Engineering*, a compulsory first-year subject for students of Industrial Engineering specialties (i.e., Mechanical Engineering, Industrial Electronic Engineering, and Industrial Chemical Engineering) at the Faculty of Engineering Vitoria-Gasteiz (University of the Basque Country (UPV/EHU)).

Chemical Principles of Engineering (9 ECTS) is devoted to providing an understanding of knowledge regarding structure, properties and behaviour of matter, as well as a deep comprehension of certain industrial processes. The course curriculum is covered in 45 lecture hours and 15 classroom practical hours. Outside of class, after basic knowledge acquisition during the first quarter of the course, students perform five 3 h laboratory sessions in the 2nd quarter, which are individually evaluated by a multiple-choice test filled out at the end of each session and a written laboratory report. Laboratory practicals are considered a fundamental activity both to learn basic experimental techniques typically used within a chemistry lab and to attain the practical skills that graduates with a Bachelor's Degree in Industrial Engineering should demonstrate on a daily basis in their future profession.

3. Design and methodology

In an attempt to engage students in the classroom, real world applications related to course material are incorporated into the laboratory practical devoted to acid-base titrations and reduction-oxidation reactions. Thus, students are responsible for planning and conducting a small research project within one of the following frameworks (Figure 1):

1. Configuration of galvanic cells: Daniel cell and its construction based on natural products (e.g., fruits, liquids, etc.). Nernst equation.
2. Fabrication of an alcoholmeter (determination of alcohol concentration in gaseous media).
3. Determination of the oxidative capacity of household cleaners (e.g., bleach).
4. Understanding the acid neutralizing mechanism of commercial antacids.
5. Linking wine quality with acid-base balances and precipitation reactions.
6. Preparation of acid-base indicators based on natural products (e.g., purple cabbage or spinach) and determination the acidity of the soil from the University garden.

Figure 1. Covers of the daily challenges proposed to the students.



These small research projects are developed according to problem-based methodology (PBM). This method gives students the opportunity to highlight real-life applications of course content and it is intended to be an interesting challenge to demonstrate their chemical knowledge. As such, the activity is implemented using the following guidelines:

- Presentation of daily challenges: teaching staff must present some attractive research topics to bring chemistry closer to students.
- Articulation of the studies' boundaries or limitations: it should be taking into account that students could be swamped and feel overwhelmed due to their limited knowledges of chemistry. (Give students some tips: brief theoretical explanation, news appeared in the press, different approaches, etc.)
- Revision of the student proposal according to resources available in the laboratory of the University. Research protocol realized by students require an initial assessment to ensure the feasibility of the proposal (check chemical reagents, lab facilities and resources).
- Project Implementation: students check self-designed protocol in the laboratory and analyse obtained results:
- Elaboration of a final video report: students have to perform a video as an alternative to traditional paper-report.

4. Expected results

Proposed activity allows students to design their own lab experiments by means of project-based learning approach. The strengths of the teaching methodology presented herein are mostly related to the added value given to the learning program: students take a central role in their own learning process and are more motivated since they find pleasure in what they are doing. Regarding the learning outcomes, by the end of the practical, students will be able to:

- Acquire advanced chemistry knowledge by means of contextualized and practical learning.
- Realise the applicability of theoretical knowledge in real cases.
- Increase initiative and creativity levels.
- Improve oral communication skills.
- On the contrary, several threatening clouds on the horizon could doom this proposal to failure:
- Assessment criteria for the practical is much more complex and it could not be directly related to successful achievement of the challenge posed.
- Practical preparation and subsequent monitoring is much more time-consuming in comparison with the classical approach.
- Unreflective copying of inaccurate information on the Internet by the students.
- The requirement to expose new challenges every academic course to avoid any plagiarism.

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THE EFFECT OF REMEDIAL INSTRUCTION USING ADAPTIVE-LEARNING PLATFORM ON MATHEMATICAL ACHIEVEMENTS OF SEVENTH GRADERS

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Abstract

This study aimed to examine the effect of remedial instruction using adaptive-learning platform on mathematical achievements in the mixed operations with integers unit of seventh grade math. The system used in this study was developed for grade 1 to 9 math learning in Taiwan based on the knowledge structure theory. A quasi-experimental design was adopted to evaluate the effectiveness of the system. The participants were 141 seventh graders from three junior high schools in Taichung city. The experimental and control group included 76 and 65 students respectively. The adaptive-learning platform was used for the experimental group to receive the computerized adaptive remedial instruction based on individual diagnosis report, and the control group received the traditional remedial instruction with the lecture given by their teacher based on the testing report of the whole class. The result showed that the performance of experimental group was significantly better than that of control group. Moreover, most students (more than 70%) in the experimental group demonstrated positive attitude to the adaptive-learning platform.

Keywords: Adaptive learning, mixed operations with integers, individual diagnosis report, remedial math instruction.

1. Introduction

Recently, adaptive learning is an important research issue for developing e-learning systems. Adaptive learning is a student-focused approach to creating a personalized learning experience for students that employs “a data-driven, and in some cases, nonlinear approach to instruction and remediation, adjusting to a learner's interactions and demonstrated performance level, and subsequently anticipating what types of content and resources learners need at a specific point in time to make progress.” (Waters, 2014). Many studies have been showing that adaptive learning technology can help students achieve comparable results in less time, raise their scores, and improve retention (Wells & McCrory, 2011; Yang, Hwang, & Yang, 2013; Zimmer, 2014; Wu, Kuo, & Wang, 2017). However, little research has been done on the the effect of math adaptive-learning in Taiwan. To fill this research gap, the goal of this study is to examine the effect of remedial instruction using adaptive-learning platform (Ministry of Education in Taiwan, 2016) on mathematical achievements in the mixed operations with integers unit of seventh grade math.

2. Method

The system used in this study was developed for grade 1 to 9 math learning in Taiwan based on the knowledge structure theory. In this study, we took the mixed operations with integers unit of seventh grade math as an example, the procedures for constructing online teaching content of the system were as follows. First, analyzing teaching objectives, defining the important concepts and their sequence of the unit by the domain experts. Second, depicting relationships among these concepts in a tree diagram which was called knowledge structure. Third, constructing diagnostic tests and adaptive remedial teaching videos according to each concept node (there were 29 nodes in this unit). A quasi-experimental design was adopted to evaluate the effectiveness of the system. The participants were 141 seventh graders from three junior high schools in Taichung city. The experimental and control group included 76 and 65 students respectively. The experiment lasted for 4 classes. The adaptive-learning platform was used for

the experimental group to receive the computerized adaptive remedial instruction based on individual diagnosis report, and the control group received the traditional remedial instruction with the lecture given by their teacher based on the testing report of the whole class. The participants finished the pretest and post-test of “mixed operations with integers” respectively (two tests consisted of 40 items were parallel forms with the Cronbach α reliability coefficient of .89) to compare the differences in mathematical achievements between the two groups. A one-way analysis of covariance (ANCOVA) was conducted using pretest scores as the covariant, the remedial approaches as an independent variable, and the post-test scores as a dependent variable.

3. Results

3.1. Evaluating the learning effect of two remedial instructions

The test of homogeneity of regression coefficients was administered before ANCOVA, obtaining the results $F = .370$ and $p = .554 > .05$; this indicated that it fulfills the basic assumption of the homogeneity of the regression coefficients in ANCOVA. Then, one-way ANCOVA was implemented. The result showed that the experimental group significantly outperformed the control group, with $F = 563.088$ ($p = .000 < .05$, $\eta^2 = .825$), and the adjusted mean was 31.45 of the experimental group and 30.20 of the control group, respectively (the highest grade was 40). This finding supported the effectiveness of adaptive-learning platform on mathematical achievements.

3.2. The usability and user experience survey

To find out students' feelings about using the math adaptive-learning platform, those in the experimental group were requested to complete a questionnaire of usability and user experience with math adaptive-learning, which included 9 items with four-point scales (e.g., strongly agree, agree, disagree, strongly disagree). Most students (more than 70%) in the experimental group demonstrated positive attitude to the adaptive-learning platform.

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EDUCATING FOR GEOETHICS: RAISING STUDENTS' AWARENESS AND PUBLIC ENGAGEMENT

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Abstract

Several authors argue that Western thought and modern science look at nature as an offering to Man; accordingly, throughout the ages, human beings made use of natural resources without worrying about the impacts of their actions on Earth system. Conversely, Eastern thought asserts that people are one with nature; people are perceived as an integral part of nature, harmoniously interacting with it and respecting bio and geodiversity. In both cases, though for different reasons, the emergence of Geoethics proves to be imperative. According to the International Association for Promoting Geoethics, the discipline of Geoethics studies and reflects upon the values that underpin appropriate human practices, whenever human activities interact with the Earth systems. In view of this, the GOAL Erasmus+ project explores the emerging territory of Geoethics attempting to inter-relate formal knowledge with good and sustainable field practices. Members of different partner countries bring expertise in overlapping interdisciplinary areas, thus contributing to develop a relevant Geoethics syllabus for Higher Education and to offer suggestions of educational resources that promote students' awareness and public engagement. The ultimate purpose of GOAL implies fostering improved science education for all citizens, in such a way that it ambitions to have a huge impact in citizen science. It is expected (or at least hoped) that in the medium and long-term, at least some of the activities may integrate the daily routine of some civil institutions. Moreover, the on-going process of public awareness will guarantee that the impact of project lasts far beyond the funding period.

Keywords: *Educational project, geoethics, global science literacy, public awareness, teaching.*

1. Introduction

Given the importance of citizens' awareness in achieving the targets of the United Nations Agenda for Sustainable Development, more attention must be given to the educational context of its goals. In particular, the key challenge of connecting the scientific comprehension and familiarity of the goals with the educational learning process took specific relevance in the research scenery. Part of this learning process is about recognizing that geoscientific understanding influences the economic growth and development of each country and thereby its cultural framework (Vasconcelos, Torres, Vasconcelos, & Moutinho, 2016). As such, the emergence of Geoethics proves to be imperative. According to the International Association for Promoting Geoethics (<http://www.geoethics.org>), "*Geoethics consists of research and reflection on the values which underpin appropriate behaviors and practices, wherever human activities interact with the Earth system. Geoethics deals with the ethical, social and cultural implications of geoscience education, research and practice, and with the social role and responsibility of geoscientists in conducting their activities*". Geoethics may help to re-evaluate behaviors, to increase awareness for alternative human activities or even to redirect economic models of growth and development (Peppoloni & Di Capua, 2016). Equally, human activities increasingly interact with and irrevocably modify the Earth system. Such activities are underpinned world views, belief systems and values that are culturally defined, and which set the limits of geoscientific behaviors and practices. To respect the Earth is an ethical responsibility in as much as a necessity, if sustainable life is to endure. Commonly, there are different ways of looking at *Man* and *Nature*. Several authors argue that Western thought and modern science look at nature as an offering to human beings (Sterling, 2010). Conversely, the classic Eastern thought asserts that although human beings rely on Earth systems to sustain themselves, people are perceived as an integral part of nature respecting bio and geodiversity. In both cases, though for different reasons, the emergence of Geoethics proves to be imperative. An outstanding part of the research in Earth Science Education was conducted along the last four decades has been reviewed and summarized by Orion and Ault (2007) and Orion and Libarkin (2014) and it can be stated that at the end of the second decade of the 21st century, the quality of Earth Science Education in schools has established solid theoretical foundation. Nevertheless, there is an

urgent need for a Geoethics syllabus for the formal education curriculum, namely in higher education due to the student's lack of knowledge of this disciplinary field of research. Teaching tools directed at the development of awareness for Geoethics are imperative to enable students to become conscious and active citizens (Vasconcelos et al., 2016).

2. GOAL project

GOAL (Geoethics' Outcomes and Awareness Learning) project is an innovative Erasmus Plus partnership that fosters to improved Geoethics values in Higher Education. Geoethics is an emerging field of geosciences (Bobrowsky et al., 2017) and demonstrating its value and utility in sustainability science requires a concerted interdisciplinary effort. Stewart (2016), stated that is clear that geoscientists need to collaborate with allied Earth science disciplines such as biology, zoology, ecology, agronomy and environmental science. The author also mentioned that to fully appreciate the complexity of contemporary human-environment relations, we must also draw from the social sciences. After all, many of the societal issues relating to the planet are not concerned with the scientific understanding but rather *"...are about moral and aesthetic choices. They are about equity and ethics"* (Oreskes 2004, p.381). According to Di Capua, Peppoloni, and Bobrowsky (2017), Geoethics was born to define a conceptual substratum of categories to help geoscientists developing a new way of thinking and interacting with the Earth system – an ethics to the planet. This definition implies three dimensions: *"understanding when an issue arises; building a framework of common values to be adopted by geoscience community and society as a whole; identifying ethical criterion that can orient geoscientists, on which to base technical decisions"* (Di Capua, Peppoloni & Bobrowsky, 2017, p.2). Geoethics is an extremely timely curricular area since it takes into account the negative human impacts on Earth, which have gained prominence in the Anthropocene. Humans must recognize its role as participative beings on Earth's sub-systems and face that life on Earth depends on a Geoethics' commitment. Parallel to this, one must recognize that excellence in teaching demands for thorough planning and that whenever a new disciplinary subject emerges, the greater is the need to provide for both the design of its syllabus and the development of educational resources that will promote a competent and qualified conceptualization of its knowledge. Recognizing this breadth of concerns, GOAL project explores the emerging territory of Geoethics in order to develop a Geoethics syllabus and related higher education resources directed at promoting knowledge on the ethical and social implications of geoscience research and practice.

2.1. Objectives

With the aim to raise students' awareness and public engagement in Geoethics, the main objectives of the project GOAL are: (i) to establish a Geoethics syllabus for Higher Education students; (ii) to explore Geoethics cases related to Geoethics values in the country partners of the project; (iii) to design and develop educational tools to be used in the teaching of Geoethics in Higher Education and boost a student Geoethics' engagement; (iv) to develop operational capacities of revisiting and strengthening the conceptual substratum of Geoethics; (v) to pitch in to an excellent Geoethics Education approach across the world. All developed materials will be open access online GOAL platform (<https://goal-erasmus.eu/>).

2.2. The team

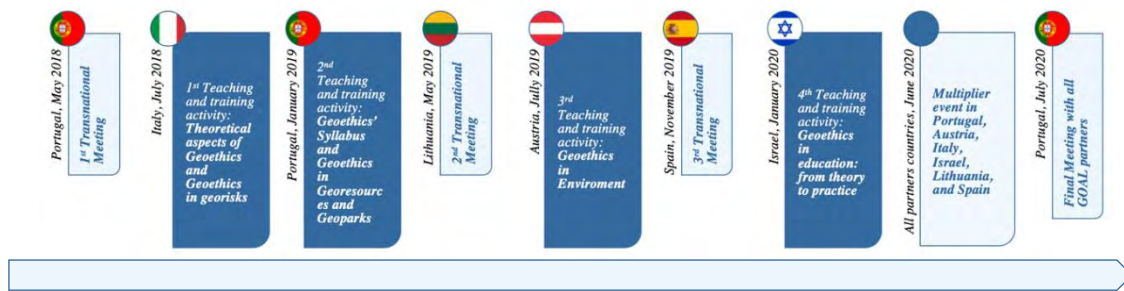
The interdisciplinary qualification of the GOAL team members, reflecting different overviews and approaches, constitutes an asset for the accomplishment of the project. The members of the different partner countries (Portugal, Italy, Spain, Israel, Lithuania and Austria) bring expertise in overlapping interdisciplinary areas, and these intellectual synergies will contribute for a wider approach of Geoethics. Specifically, the project integrates researchers and practitioners from geoscience education, geological heritage, georisks, environmental sciences, Geoethics and informatics in education. All partners have experience in interdisciplinary education and research projects and have previously been involved in EU funded programmes. The complementarity of the profiles involved will bring relevant and necessary competences and expertise to accomplish the identified aims and solve common challenges.

2.3. The project development

The GOAL project is being developed during 32 months and will end in 2020. It includes the organization of three transnational meetings and four teaching/training activities (fig.1), all of them will be organized and developed aiming the participation of at least two representatives from each partner institution.

From Lithuania, the GOAL project members will benefit from the extensive knowledge in Informatics applied to education. According to their expertise, they will be responsible for the development of the digital version of the final manuscript of the GOAL project (eBook) and the dissemination videos that will bring together the Higher Education materials developed throughout the project. Nevertheless, in all tasks all members will be involved to share knowledge and good practices in teaching in higher education, thus improving the final outcomes.

Figure 1. Transnational meetings and teaching/training activities of GOAL project.



3. Impact and final conclusions

GOAL sets the target on the attainment and surpassing of the objectives presented on section 2.1, as well as to achieve effective and meaningful impact especially amongst higher education professors, researchers and students. Its aim is also very clear – to provide during the duration of the project (32 months) a unique opportunity of collaboration between 6 institutions/countries, between a multitude of researchers at higher educational level. This collaboration not only ensures relevant and meaningful engagement with all partners while it also seeks to nurture and scale Geoethics and Earth science education, particularly in European Member-States. In terms of impact, the project estimates to involve several persons who directly or indirectly will benefit from it. Despite all efforts, sustainable policy implications take their time and may not happen (at least, not immediately). But it is important to notice that from the beginning of GOAL proposal a prominent international association (IAPG - International Association for Promoting Geoethics) supported the project. The relevance of this supporter will be reflected in the contributions to encourage policy buy-in and the mainstreaming of good practices and insights into policies, and hence sustainability and impact beyond the lifetime of GOAL funding.

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GENERATION Z: DECISION-MAKING PROCESS OF CAREER CHOICE

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Abstract

Purpose: Current adolescents (the Generation Z) are a generation who decides whether they will continue to study at the university after graduating from high schools and which university they will choose. This decision process carries long-lasting consequences for personality as well as for society. It influences their life satisfaction, the realization of potential in the future and social acceptance. Both explicit and implicit factors are involved in the decision-making process of Generation Z.

Key points: The aim of study is to reveal the key factors in the decision-making process of the Generation Z on the basis of existing theories describing human functioning. These are the basis for explaining career choices and career development. While psychologically oriented career studies emphasize personality predispositions, values or self-concepts, sociological studies are more oriented to prestige, the choice of occupation in terms of socio-economic hierarchy and social structure of society.

Methodology: In this study, theoretical analyses will be used.

Keywords: *Generation Z, career choice, decision-making process.*

1. Introduction

The adolescents who currently represent a Generation Z (born after the mid-1990s) are the generation who decides whether or not to study at university after high school and – if they go – which university and what field of study they will choose. This decision-making process is complicated (Germeijs et al., 2006) and carries long-lasting consequences for both individuals (life satisfaction, realization of personality potential in the future, social acceptance; Mann, Harmoni, & Power, 1989) and society (usability of the individual in the labour market according to current needs and long-term plans of the society). Both explicit/objective, and implicit/subjective factors are involved in the selection of the Generation Z professions. Explicit factors can be defined on the basis of quantitative or qualitative research methods. But many times the implicit factors play a major role in decision making. However, we know little about the Czech Generation Z, which is already beginning to enter the labor market and will soon be a significant force here. There is only partial research focused on some areas of their lives, e.g. identity, motivation preferences, gamification, branding, shopping behaviour (Macek et al., 2002; Šramová, Džupina, & Jurášková, 2013; Černíková, Šmahel, & Wright, 2018; Šramová, & Pavelka, 2019). The choice of profession represents one of the most important decision-making processes and at the same time an extremely complicated task that secondary school students have to solve (Hlad'o, & Drahoňovská, 2012). PR and the presentation of universities in the open days, higher education fairs, printed promotional materials, websites, social networks, etc. also play important roles in the decision-making process of high school students. However, there is a lack of research carried out on a representative sample of contemporary adolescents (Generation Z) which would examine decision-making factors and processes, whether to study or not at universities comprehensively, and when deciding to go further on, would examine the factors and processes associated with the selection of specific fields of study and future professions. The research also lacks the emphasis on the interdisciplinary synergy of research disciplines, which are essential for the complex involvement of the phenomena and processes in question, especially psychology, cognitive psychology, pedagogy, sociology, marketing, media studies, social policy, and behavioral economics. Therefore, it is important to know the decision-making process of career choices as the basis for research.

2. Models of the decision-making process and the career decision-making process

Classical models of decision making are based on mathematical models of human behavior. These models are based on the premise that people who make decisions are (Slovic, 1995; Sternberg,

1999): 1/ informed about all possible alternative decisions and their consequences; 2/ sensitive to the subtle differences among the alternatives; 3/ rational. The fundamental shift in the concept of judgment and decision-making was brought about by the collaboration of Tversky and Kahneman, which led to the construction of the behavioral economy concept (Thaler, 2017). Kahneman and Tversky accentuated the fact that man much more likely makes decisions based on concise reasoning, prejudices, and heuristics than rational reasoning. On the one hand, these procedures facilitate cognitive processes in decision making, but they also cause greater error rates and weaken the ability to make decisions effectively. The heuristics of representativeness, availability, illusory correlation, anchorage, and adaptation can be a good example (Kahneman, & Tversky, 1990; Tversky, & Kahneman, 1981; Thaler, 2017).

The crucial and decisive categories in the taxonomy of a career decision-making process are those that try to uncover decision-making difficulties (Gatti, & Saka, 2001). According to the authors, these are: 1/ lack of preparedness associated with a) motivation, b) indecision, and c) mistrust; 2/ lack of information about a) the decision-making process in career choice, b) about the person himself/herself, c) about the alternatives, and d) the ways of getting information, and finally; 3/ inconsistent information regarding a) unreliable information, b) internal conflicts, and c) external conflicts.

Several papers suggest that adolescents consider the consequences of their potentially risky behavior to be less risky in comparison with the adult populations (Beyth-Marom et al., 1993). This also corresponds to the triadic model of motivated behavior of adolescents, which is based on the assumption that motivated behavior is the result of three behavioral or neural systems (Ernst, Pine, & Hardin, 2006): 1/ reward-driven system; 2/ harm-avoidant system; 3/ system of regulators.

Modern theories of career choice and development are based on the premise already mentioned by Parsons (1909) and they emphasize the active involvement of the individual in the career decision-making (Holland, 1997; Dawis, & Lofquist, 1984; Super, Super, & Savickas, 1996). Active involvement results in individual satisfaction, low employer's costs, and increasing employment. The existing theories clarifying human behavior are becoming the basis for the selection and interpretation of a key career choice and career concepts. This is the case with the use and application of Rokeach's definition of values (Rokeach, 1973) by Brown's (Brown, & Associates, 2002) or Bandura's social learning theory (Bandura, 1971) by Mitchell and Krumboltz (Mitchell, & Krumboltz, 1996). There are four dominant theories in the academic sphere: 1/ Holland's theory of personality and vocational choices (Holland, 1997), 2/ Krumboltz's social learning theory (Krumboltz, 1979) 3/ Super's developmental theory (Super, 1990) and 4/ Davis's & Lofquist's work adjustment theory (Dawis, & Lofquist, 1984). All the above-mentioned theories try to reveal predicted degrees of suitability or congruence of an individual's personality to his job and work. These theories initially underestimated the influence of the social environment on vocational choice. Only later did they start to attribute their role (Holland, 1997; Blustein, & Ellis, 2000). One of the significant contributions are the traditional works by Sewell and Hauser (1976) who laid the foundations for the model involving school results as well as the influence of parents, teachers, and friends on career choices. While psychological studies on career selection emphasize personality predispositions, values or self-concept, sociological studies emphasize prestige in terms of socio-economic hierarchy or social structure (Mortimer, 1996).

3. Conclusion

If we want to reveal the motivations, characteristics, and predictors determining the decision-making processes of adolescents in the choice of the Czech universities, we have to know about career decision making. Only then we can create a theoretical model that will enable the interpretation and prediction of the communication tools and channels leading the choices. To use the concepts of behavioral economics is a handful. In just realized research project we focus on a representative sample of the Czech adolescents. The aim of the research is directed through quantitative and qualitative methods to reveal decision-making factors and mechanisms in the processes of higher education choices in relation to the value orientations of the adolescents, major influencers of these processes (parents, teachers, career counsellors), and to the recruitment and image-maker communications and PR of universities.

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CROSS-CULTURAL EDUCATION FOR INTERNATIONAL STUDENTS WHO INTERACT WITH JAPANESE PEOPLE: PRACTICAL LEARNING USING ROLE-PLAYS

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Abstract

This research aims to propose a style of cross-cultural education that can teach students how to behave and converse in a practical way with Japanese people in social situations by using role-plays. Role-plays were conducted in a Japanese language class for international students in Japan, and the goal of this class was to learn about different cultures based on the AUC-GS (Awareness, Understanding, Coping, General Culture, and Specific Culture) learning model. Specifically, 60 international students from 10 countries and 10 Japanese students who participated as guests were divided into 10 groups and role-played scenes from an “end-of-year party with classmates and the professor.” The Japanese students acted freely, showing international students natural interactions. The international students then repeated the role-plays with advice and feedback from the Japanese students. I analyzed the reactions of the learners before and after the role-plays using a questionnaire survey. Through role-playing, they learned about Japanese hierarchies, rituals associated with drinking, and practical Japanese phrases. Furthermore, their comments and the difference in their scores before and after the role-plays showed that their willingness to interact with Japanese people and their confidence in using the Japanese language increased. In addition, they recognized that facial expressions and attitudes are more important than speaking perfect Japanese. The international students learned about the various values and behaviors by engaging in role-plays and discussion with the Japanese students.

Keywords: *International students in Japan, cross-cultural education, cross-cultural social skills, role-playing.*

1. Introduction

In recent years, the number of international students has increased, and this trend has attracted considerable attention. However, with this increase, it is difficult to deal with their problems individually, and a wide viewpoint in educational practices is needed. It has been observed that education for international students is inadequate, and many studies have been conducted recently on the problems encountered by international students in foreign countries. International students living in Japan experience many cultural differences and are confronted with difficulties adapting to a different culture. Of these, cultural differences related to behavior in social situations and cultural differences in the expressions used in communication are known to be especially problematic (Takeuchi, Imahori, & Matsumoto, 2001). Gong (2003) argued that a learning process such as acquiring new skills and understanding cultural standards and proper behavior are essential for cross-cultural adaptation. A number of methods have been developed and some include role-plays to improve students' awareness of their own and different cultures (Ishi, 1997). These methods are called “social skills learning.” For skills learning, there are some educational practices in role-play such as “asking directions,” “visiting professor,” “using indirect expressions” and so on in Japan (for example, Tanaka & Nakashima, 2006). These studies show that learners can effectively learn the values and behavior of Japanese culture.

In this research, I carried out a social skills learning session using role-play focusing on “how to behave in social gatherings” aimed at international students and investigated its effectiveness.

2. Methods

2.1. Participants

Sixty international students from 10 countries (China, Korea, Thailand, Indonesia, Ukraine, Malaysia, Australia, France, Germany, Hungary) took part, 12 male and 48 female. Their Japanese proficiency level was upper intermediate. Their average age was 21.5 and each student had been in Japan either 4 months (46) or 10 months (14).

2.2. Procedure

Each participant completed a 90-minute session with role-plays. The sessions were conducted in a Japanese language class for international students in Japan, and the goal of this class was to learn about different cultures, including Japanese culture, based on the AUC-GS (Awareness, Understanding, Coping, General culture and Specific culture) learning model. This session aimed to teach the coping skills for a specific culture, in this case Japanese culture. Ten Japanese students participated as guests. International students and Japanese students were divided into 10 groups and role-played scenes from an “end-of-the-year-party with classmates and the professor.” The international students spontaneously played acted the roles of teacher, senior, junior, and restaurant waiter while the Japanese students observed their actions.

The sessions consisted of the following eight parts: (1) explaining the subjects of scenes for role-plays; (2) role-plays by the international students; (3) getting advice and feedback from Japanese students; (4) model play by Japanese students; (5) explaining Japanese behavior; (6) international students repeated the role-plays with advice and feedback from the Japanese students; and (8) summary. In the session, participants evaluated their own performances. The overall contents of sessions consisted of the following three parts: (1) pre-session ratings (5-point scale); (2) a skill-learning role-play session; and (3) post-session ratings (5-point scale) and writing comments.

3. Results and discussion

Before and after each skill-learning session, I asked the participants to rate their learning. Shown below (Table 1) is the result of the T-test: all items: Q1 ($t(59)=11.19, p<.01$), Q2($t(59)=3.03, p<.01$), Q3($t(59)=6.67, p<.00$), Q4($t(59)=8.23, p<.01$) and Q5($t(59)=6.62, p<.01$) showed a significant increase in the after session. The results show that learners have learned in a practical way how to behave in social situations in Japan and have increased confidence regarding their behavior.

Some learner comments after the session were: “In Japan, I did not know that there was a specific seat in a social context where I was supposed to sit according to my age or position”; “Japanese students’ behavior was completely different from ours”; “even if I cannot speak perfect Japanese, I think that I can have a good relationship with Japanese people if I can behave properly and politely”; “I became more confident, because I got comments from the Japanese students”; and “Actually, I would like to go to a year-end party with my lab mates due to this session.” They recognized that facial expressions and attitudes are more important than speaking in perfect Japanese.

The learners acted freely in the first performance, then observed how the Japanese students behaved, and shared their awareness with all their class mates. In the second performance, they mimicked the Japanese performance and received comments from the Japanese students. In the final summary of the session, we deliberately avoiding creating stereotypes or promoting assimilation into Japanese culture. Specifically, I said that the behavior of the Japanese students in this role-play cannot be determined as the only correct behavior, nor is it intended to compel such behavior in the future. The comments from the learners also included comments that “my range of expressions and behavior was expanded” and “I can combine what I learned with my cultural experience, and use what I learned today.” There were some comments along the lines of “I knew that Japanese people had specific cultural practices concerning the required manners in a hierarchical relationship, but I was surprised that the Japanese students who joined today’s session behave this way in contexts such as their club activities. But it was good to learn skills that are actually useful in everyday life in Japan.” These comments suggested that the participation of Japanese students prompted the learners’ awareness, understanding, and learning. The international students learned about the various values and behaviors by engaging in role-plays and discussion with the Japanese students.

Table 1. T-test statistics.

Questions	Pre M (SD)	Post M (SD)	t-value	df	Sig.
(1) I understand realistic Japanese cultural behavior in formal situations.	2.57 (0.93)	4.08 (0.70)	11.19	59	0.000**
(2) I understand how to deal with superiors like professors and seniors, and can behave appropriately.	2.62 (1.26)	3.42 (1.27)	3.03	59	0.004**
(3) I have mastered ways to cope with features of Japanese culture.	2.77 (1.11)	3.93 (0.84)	6.67	59	0.000**
(4) I can understand the Japanese cultural way of thinking properly and can cope without confusion.	2.55 (1.06)	4.03 (0.71)	8.23	59	0.000**
(5) I have enough self-confidence to communicate with Japanese people.	2.57 (1.24)	3.87 (0.83)	6.62	59	0.000**

Note: *p<.05, **p<.01

4. Further research

In this study, I conducted a session using role-play for foreign students in Japan to learn about cultural behavior in social situations in Japan. Learners learned Japanese social behavior and way of thinking in practice through role-play. Future research is required to examine the effects of this session, including a follow-up investigation into whether the skills and knowledge that they learned in the role-play will be useful in actual daily life. In addition, I need to prepare various types of task scenes for role-plays.

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INVOLVEMENT OF ATTENTION AND WORKING MEMORY OF CHILDREN WITH ADHD IN SCHOOL-AGE

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Abstract

This investigation analyzes the difficulties in attention and memory of children with Attention Deficit Disorder and Hyperactivity (ADHD) between eight and twelve years old (attending fourth, fifth and sixth grade of primary school) compared with a control group of the same age ($n = 80$), by applying three standardized tests: the test of perception of differences or test face, Children's Color Trails Test (CCTT) and test digit by Wechsler Intelligence Scale. These tests analyze selective attention, sustained attention, alternating attention, short term memory and working memory, respectively. The results show significant differences between the control group (group without ADHD) and ADHD group in all evaluated cognitive processes. In addition, differences in the correlations of these functions in both groups, checking that there may be a close relationship between attention deficit and implementation of other cognitive processes.

Keywords: *Memory, attention, cognitive processes, ADHD, primary education.*

1. Introduction

The Disorder Attention Deficit Hyperactivity disorder (ADHD), which is defined as a neurodevelopment disorder that is characterized by symptoms of inattention, hyperactivity and impulsivity that are inconsistent with developmental level and that impact negatively on social activities and academic (DSM-5, 2013). This symptomatology affects in different degrees and with different combinations that, in many cases, are supplemented with comorbid disorders, such as conduct disorders and/or learning difficulties.

According to the APA (2013), the ratio boys/girls is 4 to 1 in the general population and from 9 to 1 in the clinical population, differences that tend to disappear in adolescence. Children tend to show more severe symptoms than girls, especially hyperactivity, whereas girls are attention deficits (Barkley, 2006a; Biederman et al., 2004 as cited in Lavigne and Romero, 2010). The DSM-5 (APA, 2013) provides prevalence rates between 3% and 7% in the child population between 6 and 12 years, but the highest prevalence is found in the age range of 6-9 years. For this reason, its study is fundamental to the educational development of the people affected.

On the other hand, there are different types of ADHD, that is to say, that such a disorder encompasses different modalities, or have different manifestations. The DSM-5 defines the following three; predominantly inattentive, predominantly hyperactive-impulsive type and presentation combined. All subtypes are recognized under the label of attention deficit disorder with hyperactivity (ADHD), although present only attention deficit or predominant subtype hyperactive.

If we focus on the different presentations of ADHD, subtype is the most common inattentive even though the combined is the most diagnosed. In a study of meta-analysis of Willcutt (2012), it was found that the presentation inattentive is up to two times more frequent than the combined in-school age, although may seem paradoxical results is because those affected by the presentation of the combined flock prior to the consultation, and therefore it is diagnosed with greater frequency.

ADHD is understood as a neurodevelopment disorder that affects level maturational brain and to the knowledge areas of the brain. Shows that these alterations in certain areas of the brain translate into cognitive processes that are dysfunctional and result in behavioral responses different. On the one hand, the attention processes are essential in the executive functions of the school. For example, working memory refers to the ability to hold and manipulate for a short period of time the information needed to guide a certain behavior (Enseñat, 2015). School children with ADHD have difficulties in the ability to hold in mind the information necessary to guide the actions, remembering to do things in the near future, difficulty to memorize and follow instructions, forget a information while working in another and, also, difficult to

manipulate and transform the information stored at the service of guiding behavior toward a goal. That is to say, as stated by Díaz et al. (2013) the symptoms present in ADHD cause some functional impairment in the student body that presents it. The research carried out in the Autonomous University of Barcelona for Garcia, Estévez, & Junqué (2001), determined that students with ADHD have damaged your skills hygiene, that is to say, they have difficulties in working memory and in short-term memory, in particular, the immediate memory is more damaged.

This study seeks to answer the following question: do students with ADHD aged 8 to 12 years show largest deficits in the different types of attention and working memory that the children without ADHD of the same age? From this question it sets out two general objectives: to study selective attention, sustained and alternating, short-term memory and working memory in children with ADHD and to test whether there are significant differences between the groups.

2. Methods

The participants are students of educational institutions of the Autonomous Community of Madrid and the province of A Coruña, all of them in Spain. The sample was chosen intentionally according to the availability of facilities, the diagnosis of the school and the age range of the study. The final sample was composed by 80 school children between 8 and 12 years, 40 school children with ADHD and 40 school children without ADHD, all enrolled fourth, fifth, and sixth of Primary Education. In the group with ADHD is to affirm the prevalence of the male gender with a total of 29 school children (72,5%) and 11 girls (27,5%) compared to the control group that is homogeneous with a total of 20 school children (50%) and 20 school girls (50%). The mean age of the sample is 10.4 years in the group with ADHD and 10.3 years in the group without ADHD. The instruments used have been the following:

Test of Faces Revised (Thurstone & Yela, 2001). This revised version of the test includes scales from a sample at the national level that exceeds twelve thousand school children. The coefficient of reliability is a statistic that indicates the precision or stability of the results. Notes the amount in which the measures of the test are error-free casual. Thus, a reliability index of 0.90 means that, in the sample and the conditions used, 90 per 100 of the variance of the test should be the true measure and only 10 per 100 to random errors.

Children's Color Trails Test (CCTT) (Llorente, Williams, Satz, & DELia, 2003). CCTT is a test that consists of two parts. The first assesses sustained attention while the second evaluates the care alternate. In other words, the portion A is primarily a test of visual attention that involve follow-up perceptive, and a simple sequencing, while the part B, due to the sequence alternates evaluates more directly the frontal systems of operation.

Test of Digits in the Scale of Intelligence WISC-IV (Wechsler, 2005). The digit test assesses working memory, ability to retain it temporarily in the memory certain information, working or trading with it and generate a result. It is also a measure of the short-term memory and attention, assessing the capacity of the school to retain several elements that have no logical relationship to each other. The Digit test presents an adequate internal consistency, good test-retest reliability, and adequate construct validity.

3. Discussion and conclusions

The results show that children with ADHD show a lower performance that the students of the control group in reaction time, responding more slowly, the results obtained through the test CCTT, which assesses sustained attention and attention alternate. These results show that school children with ADHD have a greater attention deficit, as indicated by the current literature and the diagnostic criteria of the disorder. In addition, in the assessment of sustained attention have been found notable differences between the two groups, according to Barkley (1997), relate it clearly with a dysfunction attention.

In the second place, the results allow to conclude that the performance of children with ADHD in the digit test, especially in digits in reverse order, is lower than that of the students in the control group. These data are consistent with the existing literature (Hale et al., 2002), this test measures the working memory and short-term memory as in this study and in other studies (García et al., 2001), studies whose results have revealed a lower performance of school children with ADHD compared to children who do not have the disorder.

In the third place, Narbona and Crespo-Eguilaz (2005) highlights that the sustained attention and working memory operate synchronously to give continuity and coherence to the mental activity and human behavior. In our study, the association between sustained attention and working memory in the group with ADHD is very high, corroborating the claim.

Therefore, from the results obtained it can be concluded that children with ADHD have lower performance than children in the control group on tests assessing attention, and to a lesser extent, show

deficits in the cognitive processes assessed by the digit test. Showing that for students with ADHD is more difficult to focus and maintain attention to perform tasks that require the involvement of working memory. To conclude, it is considered necessary to emphasize the importance of further research on the disorder in order to improve the diagnosis and treatment of children who have ADHD. In addition to cope with the limitations of this study, as for example; to expand the sample to study, to take into account the subtype of ADHD (combined, inattentive and hyperactive-impulsive) or the fact that the groups are not equivalent in terms of gender.

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TECHNOLOGICAL CHANGES IN THE WORK OF ACCOUNTANTS AND CHANGES OF EDUCATION OF ACCOUNTING STUDENTS

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Abstract

The first two decades of the 21st century is a period of large changes in IT technology, which translates into a change of accounting professionals work. Instead of a calculator, paper T-accounts, there were changes resulting from the development of IT technology like:

- electronic documents that replaces traditional paper documents,
- electronic signature that replaces the traditional handwritten signature,
- shipment of electronic documents to tax authorities in the form of xml files replacing the transfer of paper copies of accounting documents.

The above changes necessitate a change of education of accounting students, because in addition to teaching the accounting principles and standards themselves, the job technique itself and the modern work environment play an increasingly important role in the accounting professionals work.

The study analyzed the current methods and curriculum of education of accounting students of the Faculty of Management at the University of Gdansk in the context of their relevance to today's accounting work environment. As a result, areas requiring updating were established.

The theoretical considerations were supported by a survey conducted among students of the summer semester 2019/2020 of the specialization in Accounting. The aim of the study was to gather students' opinions on the validity of teaching methods and subject them to evaluation of proposals for future changes in teaching methods.

The study also contains a proposal for necessary changes to adapt the curriculum of accounting students of the Faculty of Management at the University of Gdansk.

Keywords: *Electronic signature, computer accountants books, electronic shipment to the tax office, SAF-T files (Standard Audit File-Tax).*

1. Introduction

Until quite recently the accountant in Poland was associated with a stack of documents, paper-based account books, a calculator and a pencil in his hand. This image has long since gone to the past, and today's accounting work environment looks completely different than it looked a few years ago. The last two decades of the twentieth century is a period of rapid revolution in the development of accounting tools, which is associated with the dynamic development of computers and computer software. The first, very significant stage of this revolution was the introduction to the accounting of computerized registration systems, which replaced the previously used accounting books in paper form. In the initial stage it was very difficult, because the accountants are a very conservative profession, and hence reluctant to change. With time, however, accountants changed their attitude to computer accounting, because there were noteworthy benefits and simplifications in the daily work associated with keeping accounting books in electronic form. As a result, nowadays it is difficult to imagine that any company would keep accounting books differently than using the finance and accounting system.

The beginning of the 21st century is another revolutionary change in the everyday tools used in accounting, changes related to the digitization of our business and private life, and, among others, introduction of:

- a) a mandatory electronic system for settling social security contributions (the Payer system),
- b) electronic invoices (e-invoices in xml format) replacing invoices in traditional paper form,
- c) the obligation to prepare and submit tax returns to tax authorities only in electronic form,
- d) the obligation to prepare financial statements within the meaning of accounting only in electronic form (so called e-financial reports),

- e) an electronic signature that replaces the traditional signing of documents, including the introduction of the obligation to electronically sign e-financial reports and tax declarations,
- f) electronic document flow systems (DMS i.e. document Management System) inside many organizations.

Today's accounting is therefore innovative and based on the latest achievements of computer technology. The aim of the study is to assess whether the above changes were reflected in the teaching programs of the accounting students of the Faculty of Management at the University of Gdansk, who will have to use the latest technology in their daily work.

The theoretical considerations were supported by a survey conducted among students of the summer semester 2019/2020 of the specialization in Accounting. The aim of the study was to gather students' opinions on the validity of teaching methods and subject them to evaluation of proposals for future changes in teaching methods. The study, due to the limited size of the examined group, is not exhaustive, and is treated only as an indication of the direction of future changes in the methods of education of accounting students.

2. Electronic reporting in the practice of Polish enterprises

As mentioned earlier, the most important changes in accounting in Poland in the 21st century are changes that involve the introduction of electronic reporting. This is followed by the popularisation of the electronic signature, which is necessary for signing electronic reports, because the electronic document requires an electronic signature.

The first large area of changes was the introduction of a universal obligation to settle electronically with tax authorities in the field of VAT. Every VAT payer is currently obliged to prepare and send to the tax authorities electronic VAT declarations (Act of 29 August of 1997) and corresponding SAF-T files (Standard Audit File-Tax) (Act of 11 March 2004). The introduction of this obligation freed the tax authorities from tedious and time-consuming tax inspection procedures, because now all VAT settlement data are sent by taxpayers and are located on the servers of the Ministry of Finance. As far as tax reports are concerned, it has already been introduced an obligation to provide some reports on PIT and CIT by electronic means, which however did not have such a universal dimension as the introduced obligation to submit VAT returns and SAF-T files.

The second area that has been covered by digitalization is the area of annual financial statements in the sense of accounting (balance sheet, profit and loss account, cash flow, etc.). The year 2018 is the first financial year for which entities conducting business activity had to transfer their balance sheets and profit and loss accounts electronically (Act of 29 September 1994). The end of the first quarter of 2019, the period when these reports were to be created, electronically signed and electronically transferred to the registration authorities, it was a very hot period, because most of the entities for a long time ignored this obligation.

And the third area of major changes is the area associated with the electronic signature, as the preparation and transmission of reports in electronic form requires the submission of an electronic signature. The area of the electronic signature itself is a very foggy and unclear area. On the one hand, in Poland, as well as in other EU countries, the eIDAS Regulation (Regulation (EU) No 910/2014) is in force, whose purpose was to sort out problems related to the electronic signature. On the other hand, there is quite a lot of legal regulations in Polish legislation that have not yet been adjusted to the eIDAS regulation both in terms of legal norms and - what is also important - terminology being used. All this means that electronic signing is neither as popular as one would expect nor as simple as it was supposed to be.

3. Current curricula of accounting of the Faculty of Management at the University of Gdansk

The changes in the accounting technique described above - changes related to electronic reporting and electronic signing - can be compared to changes taking place at the end of the 20th century, which were related to the transition from paper accounting (manual records in paper books) to computer accounting (records in computer financial and accounting system). Both these past changes required, as well as current changes, require appropriate adjustment of students' curriculum, as the accounting technique is as important for the future accountant as well as the knowledge of accounting standards and tax rules.

A review of current curricula (2019/2020) at the undergraduate and graduate studies at the University of Gdansk shows that while issues related to computerized accounting have already been included in the student curriculum – there is a subject of Computerized Accounting on the 5th semester of

bachelor degree – issues related to electronic tax and financial reporting have not yet been reflected in curricula (Study programs of the Faculty of Management at the University of Gdansk).

In order to empirically verify the need for changes in the curriculum of accounting students of the Faculty of Management at the University of Gdansk, a survey was conducted. This study aimed to determine whether current accounting students have heard about changes related to the digitization of financial and tax statements and whether they deem it necessary to have their curriculum adjusted accordingly so that these issues become a subject of teaching and practical exercises. The study was conducted during the summer semester 2019/2020 among a group of full-time and extramural students of accounting specialization. As a result of the study, it was found that students participating in the survey:

1. are not able to distinguish particular types of electronic signature and the rules for their use in order to sign accounting and tax documents, and
2. agreed that the study program requires correction of issues related to the creation, signing and sending of electronic reports.

4. Conclusions

In connection with the current technological changes in accounting profession, it should be introduced into the curriculum of accounting students of the Faculty of Management at the University of Gdansk:

1. theoretical classes, during which students would get acquainted with the legal issues of electronic signature, so that they would be able to distinguish the basic types of electronic signature and the possibility of their application in accounting practice,
2. practical classes, during which students could prepare electronic tax declarations, electronic financial statements and sign them with an electronic signature and send them electronically to the test server of the Ministry of Finance, which has just been made available by the Ministry of Finance for such purposes.

Looking at the above, it seems that the changes necessary to introduce in the teaching programs of the accounting students of the Management Faculty of the University of Gdansk are relatively simple.

Summarizing, students' education programs should be updated both in situations of substantive changes in accounting and tax rules, which seems to be obvious, as well as should be updated also when introducing major changes in the very work of accounting. Otherwise, graduate graduates, despite the substantive preparation, will not be a full-fledged employee for future employers.

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 Regulation (EU) No 910/2014 of the European Parliament and the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC
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The background features a vertical color gradient from light green at the top to light blue at the bottom. Overlaid on this is a network of white lines forming irregular polygons, with a fine grid of small white dots in the background.

VIRTUAL PRESENTATIONS

STUDENT ACCESS TO AUTOMATED MARKING TOOLS AS A WAY OF IMPROVING THEIR COMPREHENSION

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Abstract

Feedback, on both a summative and formative basis, is a critical component of modern teaching. At the same time as institutional expectations on quality and volume of feedback grow, learner expectations of turnaround times also become increasingly hard to meet, especially in large cohorts. One approach is to provide automatic feedback which can be applied on a formative basis or to support summative marking. To support learner experience on one large module a version of the automated summative marking system was provided on a formative basis to learners throughout their project offering a representative subset of all the marking criteria used and detailed feedback on errors found in submission. This tool has been offered over two student cohort years, 2018 and 2019, and been widely used by the learners. In 2019 there were a total of 13,141 unique submissions to the tool from at least 312 individuals (of 362 enrolled). Feedback from both learners and academic staff has been very positive, helping both pro-active problem solving and domain knowledge in the learners while reducing workload for staff, showing the approach has been highly effective in this domain.

Keywords: *Feedback, automation, problem solving.*

1. Introduction

Feedback is an essential part of the student journey of learning and progression providing the opportunity to see where and how they can improve their understanding (Leckey & Neill, 2001). Such feedback can be either summative or formative in nature with the vital component being the ability to “feed forward” with feedback being used to inform the learner in their next steps not simply if they were right or wrong (Quinton & Smallbone, 2010). Providing, timely, consistent, and clear feedback to students however remains a challenge, especially when dealing with large class sizes and tight deadlines between assessments. In such large cohorts there will naturally also be a wide range in learner preferences for the type and volume of feedback provided (Rowe & Wood, 2008) in addition to a continued pressure for fast turnaround times (Milanova et al., 2018).

One approach that may be employed in some domains is the use of automated tools, whereby assessment of submissions is performed by software, usually by checking submissions against a sample solution (Joy & Luck, 1998; Blumenstein, Green, Nguyen, and Muthukkumarasamy, 2004). Automation itself is not uncommonly used in computer science and tools are often applied by the marking staff for summative assessment after submission, a useful tool to reduce turnaround time and increase consistency but not in itself a facility directly used by the learner. Automated tools used directly by learners are normally formative in nature offering immediate feedback and forming part of the education process itself (Gerdes, Heeren, Jeurung, and van Binsbergen, 2017; Heckman & King, 2018).

With summative marking tools in place an option is available to provide access in some form to the automated tools to learners before submission, providing instantaneous formative feedback which is directly aligned to some or all of the same criteria with which their summative marks will be given. Providing such access directly to learners would also allow each individual to make their own use of the tools according to their preferences (Rowe & Wood, 2008).

To this end in 2018 a first-year module project was set to c. 400 learners to implement a database. While the intention had always been to automatically generate the summative marking for this work using tools (a bot) by comparing weighted requirements against a specimen that met all the requirements, an opportunity was identified to provide learners with early access to the bot. This would allow learners to

upload their proposed solutions and run these against a subset of the real marking tests (not all tests were included but there was good coverage of the types and areas to be tested) providing detailed output and a score of marks awarded against the theoretical maximum for their submission. In this way any learner could take advantage of the facility and have portions of their work examined, graded, and returned with feedback showing exactly which areas were lacking and needed further attention. The feedback would be sufficient to allow common areas to be inferred and corrected even in elements for which feedback was not directly provided. The intention was to reduce the load on staff while allowing learners to identify weaknesses and self-address those themes or concepts as required, resubmitting work for further feedback once changes had been made. Having been implemented and used in 2018 the same tools and techniques were re-applied to the next years cohort of learners in 2019.

2. Design and implementation of automated assessment tools

There were three main components to the databases submission comprised of SQL statements; the creation of a schema of 12 tables from a provided data dictionary, the insertion of given sample data into each table, and a set of ten queries of varying complexity to exploit the database. To facilitate automatic assessment a full sample solution was created and verified by staff against the requirements. An automated analysis was then performed to generate a set of meta files (in JSON format) showing all of the properties within the sample solution including names and types. Further tests were defined to check specific functionality which wasn't immediate obvious from the meta files, for example were the correct constraints in place to stop data being illegally inserted into the database. Finally each of these elements, several hundred in total, was assigned a relative score weighting. Minor items had small scores so if missed would have little impact whereas more major or key elements had much higher weighting. In total the available marks exceeded 2,000 across all the checked areas. A software system, AME (Automated Marking Engine), was then implemented to compare submissions against the sample solution using the defined scoring. For each submission a temporary protected database was created and used to run the submitted SQL before being checked.

With these definitions in place and an offline AME process complete to take a submission in three parts and score it, focus turned as to how the service could and should be exposed to learners to use. Having always desired to not make all facets of the assessment available each of the items tested had a flag to indicate if it should be made "public" (available through an external interface or not). Each test was considered and a decision made if it should be available to learners. The intention was to provide a meaningful subset of tests of different types to allow all common errors and checks to be at least inferred. For example not all tables were fully tested but some were showing that all fields including types and indexes were to be checked. All the ten output queries were included in the learner-facing test set as they varied significantly from each other.

One area of discussion at this point was the possibility for "follow-on failures" in learner submissions. An error in the schema for example could stop data being loaded and break the queries extracting the correct data. An error in one part could therefore cause perfectly correct code to later fail. To avoid this a decision was made to test each submission section against both the previous elements of the submission and again using the previous elements from the sample solution – using the score from whichever scored highest.

Once the determinations on learner-facing tests had been made a web interface, the Automated Marking Engine for You (AMEY), was implemented and hosted on the school network. This would provide a simple facility for learners to upload their submissions, in the same format as required for final project submission, and generate feedback. Each of the three stages would be progressive in that it would be possible for example to just test the schema component and see a score against the maximum for just that component before adding more elements. In the AMEY presentation just the submitted work was tested, there was no attempt to test later elements with the earlier elements being provided from the sample solution as this would potentially expose the sample solution SQL. Each test element was highlighted in the output and colour coded (green when all elements passed, yellow when some passed, and red when none passed).

To facilitate questions being asked to staff, each run through AMEY had an associated unique alphanumeric Session ID (SID) which was displayed. Learners could save this themselves to refer back to previous runs but could also provide this to staff when asking questions. Staff were then able to see in detail the complete student submission and marking output making it much more straightforward to identify issues and provide assistance to learners.

3. Learner use of automated tools

AMEY was provided to learners in both the 2018 and 2019 cohorts. In both years throughout the duration of the project significant use of the system was made, unsurprisingly peaking near to the date of submission. In total there were 6,231 submission in 2018 and 13,141 in 2019. Submission statistics for AMEY in 2018 are shown in Figure 1 and the same data for 2019 in Figure 2. In 2018 AMEY was only available on the campus network or through a remote virtual desktop environment, something with was identified as a barrier in feedback and addressed through a firewall change in 2019 which may explain the greater volume of submissions.

In 2018 there was no facility to capture which learners were using AMEY but in 2019 an extra field for student number was introduced. To avoid barriers to adoption this field wasn't validated or required and so the data is lacking for a number of submissions but from this it is clear that at least 312 individual learners (of 362 enrolled) made at least one submission to AMEY. Some individuals made high numbers of submissions (one made 483) and seven learners made just a single submission each. The mean was 37.5 submissions per valid student number entered with a standard deviation of 45.8.

Figure 1. AMEY statistics for 2018 cohort showing number of submissions along with both the average score and average maximum achievable scores (of elements submitted).

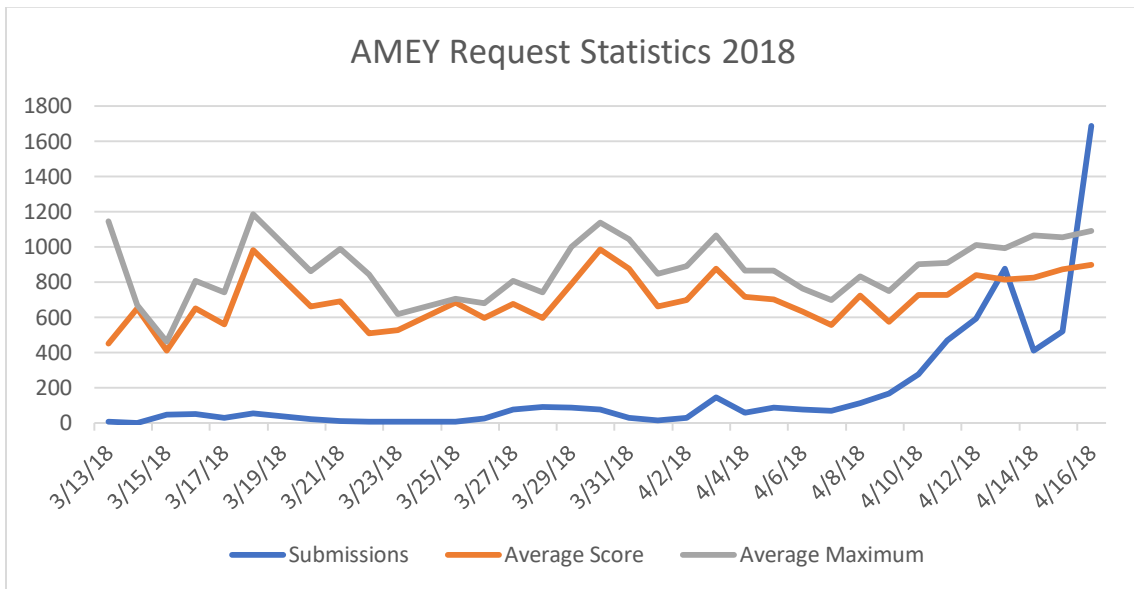
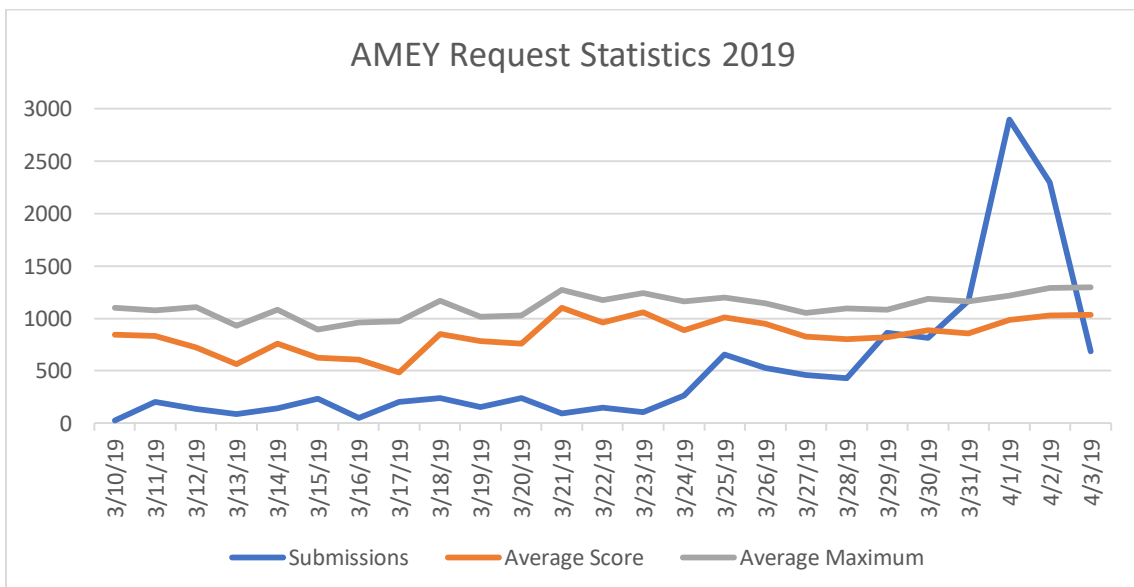


Figure 2. AMEY statistics for 2019 cohort showing number of submissions along with both the average score and average maximum achievable scores (of elements submitted).



4. Discussion and evaluation

The use of automated assessment and support in teaching such a large cohort was seen as essential given the relatively low staffing resources (one academic and one teaching associate) assigned to the module. Using this in part to meet the university requirements for formative feedback was seen to be promising and the results both in feedback from learners and anecdotal evidence from staff on the positive impact on their workload bears this out. Automated feedback and/or assessment is by no means a “one size fits all” option, the domain must be suitable ideally containing absolute right or wrong answers which can be evaluated.

Even within the context of this assessment on databases where there is a correct answer for each and every item use of automated assessment is far from perfect. When marking manually consideration may be given for minor structural or presentational issues, for example a spelling mistake or the inclusion of spaces in an element where there should be none. In such cases it’s common practice to assign some penalty to the error but still mark the overall answer for general correctness against a rubric. Without developing much “cleverer” automated systems which could detect these sorts of minor mistakes automated marking is completely “black and white”. For example, a mis-named table in the database would result in that table scoring 0 and all the expected components in that table also being scored 0 even if the individual fields and structure were themselves correct.

Using the automated approach to provide early access as formative feedback but on the exact same basis on which summative marking is performed addresses this problem. Learners on submission would regularly discover that an entire table was being scored zero and be able to investigate, determining that naming was at fault and not just fixing that for the table in question but inferring that they should pay close attention to naming conventions throughout. Common errors in this way are identified and overcome by the learner problem solving themselves as to why points were missing from the scores.

The provision of AMEY and the feedback it provided were appreciated by learners as shown in their end-of-year module evaluations (at the time of this paper only evaluations for 2018 are available) which were overwhelmingly positive and included comments that AMEY “saved my project” and they “wish[ed] everyone did this”. The negative comments in 2018 revolved around accessibility from off-campus (fixed for 2019) and too much information in the output. Analysis of submissions along with anecdotal evidence based on student email queries shows a distinct group of “early adopters” who made continued use of AMEY to refine their project as well as a number of “late adopters” who it can be assumed started their projects much nearer to submission. In 2018 an optional anonymous survey of students was performed which received 90 responses. Of those respondents who had used AMEY 100% either agreed or strongly agreed that “[AMEY was] useful in preparing my coursework” and 98.3% that they were “glad such as system was available”. Beyond just getting the coursework to submissions standard 86.2% agreed or strongly agreed that their “understanding of SQL increased through finding and fixing errors [with AMEY]”.

5. Conclusions and future work

In this paper we have presented the findings of provisioning an automated feedback tool which provided learners early access to a subset of their summative assessment criteria for project work in a large first-year computer science class on databases. Originally intended purely to support marking, opening the tool up in part to learners themselves led to widespread use of the tool, positive evaluations, reduced workload for teaching staff, and hopefully a greater understanding of the content through pro-active problem solving. Although far from perfect we believe the solution was highly beneficial in terms of this module and also shows the potential for a new kind of formative-summative pairing with automated assessment in future.

The next steps will be to continue to refine AMEY in terms of database modules and consider other modules or areas in which such an approach could be applied. The refinement to AMEY will focus in large part of the user experience and trying to minimize the amount of data presented to the user where there is no issue for them to address, focusing on problem areas only. Research will also take place into how any “fuzzy” approaches could be incorporated to identify things such as minor typos and correcting them for assessment with just a minor deduction to the score.

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PERCEPTIONS OF ENGLISH LANGUAGE PRIMARY SCHOOL TEACHERS IN VIETNAM TOWARDS THE IMPLEMENTATION OF ENGLISH AS A MEDIUM OF INSTRUCTION

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Abstract

The implementation of English as a medium of instruction (EMI) in English-as-a-foreign-language (EFL) classrooms is beneficial to the amelioration of students' English skills. It is assumed that the earlier EMI is engaged in teaching, the more effectively English language students can enhance their skills. Because of this assumption, EMI is being implemented in many EFL classrooms, starting from primary schools. Recently, Vietnamese primary school teachers of English have been encouraged by the Ministry of Education and Training (MOET) to implement more EMI in their classrooms with the belief that its implementation helps students develop their communicative competence, contributing to the realisation of making English as a competitive advantage for Vietnamese high school/college/university graduates by the year of 2020.

Teachers' implementation of EMI depends on many factors, one of which is their perceptions of EMI. This study surveyed English language primary school teachers about their perceptions towards the implementation of EMI in their EFL classrooms. 311 teachers from three provinces in southern Vietnam took part in an online questionnaire. Findings elicit that the majority of English language primary school teachers possessed a positive perception towards the benefits of the implementation of EMI to students such as: English language proficiency improvement, better interaction, cost-effectiveness for their learning, etc. Further, teachers admitted that the implementation of EMI can help themselves as well. They felt the need to participate in innovative English teaching methodologies, skill training as well as sharing sessions on the implementation of EMI. They recommended that in order to help them successfully implement EMI in their EFL classrooms, the facility need to be invested and the class size be smaller.

Keywords: *EMI, perceptions, implementation of EMI.*

1. Introduction

Currently, English is regarded as a dominant, international language used in multiple fields of education, business, trade, and culture because it facilitates access to knowledge as well as worldwide information (Crystal, 2012). Because of its popularity and the manner in which it empowers people, English language has become a compulsory subject in most non-native English speaking countries and their schools (Dearden, 2015). According to Kirkpatrick (2011) and Nguyen (2011), there is a tendency that students begin learning English at a younger age and Vietnam is no exception. Dang, Nguyen and Le (2013) indicate that since English has become more universally engaged, the demand for English language proficiency is increasingly developing and there are more schools in which EMI is under implementation to meet the diverse needs of language learners in Vietnam. Under Vietnam's National Foreign Language 2020 (NFL2020) initiated by the Vietnamese government, since 2008, many English language teachers throughout the country have participated in professional development training workshops and seminars on the use of EMI. As stipulated from Vietnam's MOET, EMI is now being encouraged to be used in EFL classrooms from basic to higher education in Vietnam; however, very little research in Vietnam has been gathered to explore English language teachers' perceptions towards the implementation of EMI and this is especially in the use of EFL in primary schools. Therefore, this study aimed to investigate the perceptions and attitudes of English language primary school teachers towards the adoption of EMI in Vietnam. Developing an evidentiary basis for understanding English language teachers' perceptions towards the implementation of EMI in primary schools will help Vietnam's MOET, NFL2020 Project Managing Board and provincial leaders of Departments of Education and Training

(DOETs) to develop customised teacher-training on the adoption of EMI which is more beneficial to the primary teachers of English, contributing to the establishment of professional learning communities in Vietnam.

2. Literature review

Literature elicits that EFL teachers' positive perceptions and attitudes towards professional development training influence their successful teaching performance (Al-Seghayer, 2014; Truong, 2015a; 2015b). So, it can be implied that should teachers possess positive perceptions towards the use of EMI, they will offer to manipulate it in their EFL classrooms if obliged to do so (Corrales, Paba Rey & Escamilla, 2016). Otherwise, they will have the feeling of being compelled to implement EMI as an act of compliance, which may lead to less favourable outcomes in the classrooms. The EFL students may also suffer. Besides those in favour of EMI and those opposed to its implementation, there are teachers who are ambivalent and unsure of the effectiveness of EMI or L1 use. The literature would indicate that these three positions and the perceptions of EFL teachers towards the adoption of EMI could be labelled as 'positive', 'ambivalent' or 'negative'.

Research denotes that the discernments of teachers, students, parents and researchers towards the implementation of EMI are positive (Al-Qahtani & Al Zumor, 2015; Corrales et al, 2016; Kim, Kweon & Kim, 2017). Apart from the positive perceptions, in a study conducted addressing EMI in China, Hu (2016) concludes that some teachers have a very ambivalent perception towards the use of EMI in their classrooms. They are satisfied with their English and they believe that their English is sufficient to carry out assigned teaching goals. However, they also express their concern about the implementation of EMI due to the lack of support as well as challenges for both teaching and learning that they cope with in their daily teaching performance. They believe that the government needs to support them during the process of their implementation of EMI. Quite different to previous studies, discernments of many teachers and students towards the implementation of EMI are negative (Jiang, Zhang & May, 2016; Kim et al, 2017; Sali, 2014).

To sum up, teachers possess mixed perceptions towards the implementation of EMI in their classrooms. However, as confirmed by Dearden and Macaro (2016), English language levels of teachers may impact on their attitudes to EMI. Therefore, to help English language teachers possess a positive perception towards the implementation of EMI, their English levels have to be improved and they need to believe in the genuine benefits that the implementation of EMI brings to their students and themselves.

3. Methodology

An online questionnaire was utilised because of its convenience for research participants to readily access (Evans & Mathur, 2005). More importantly, it could help reach many participants from different areas at a time (Selm & Jankowski, 2006). This study's online questionnaire surveyed 600 English language primary school teachers from three provinces which represent three different developmental areas in southern Vietnam.

4. Findings

From the hyperlink sent to 600 English language primary school teachers to gather both quantitative and qualitative data (200 teachers in each province), 311 teachers responded, yielding a response rate of 51.83%.

4.1. Demographics and information from research participants

Of 311 teachers taking part in this online questionnaire, 70.4% were female and 29.6% were male. Regarding the highest qualifications which English language primary school teachers obtained, the majority of the respondents (n = 233, 74.9%) had a Bachelor degree while 75 out of 311 (24.1%) earned their College degree. A very small number had obtained a Master degree (n = 2) or other certificates (n = 1) (see Table 1).

Table 1. Highest qualifications teachers obtained in three provinces.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	College degree	75	24.1	24.1	24.1
	Bachelor degree	233	74.9	74.9	99.0
	Master degree	2	.6	.6	99.7
	Other	1	.3	.3	100.0
	Total	311	100.0	100.0	

Table 2 illustrates that teachers taking part in the online questionnaire were quite experienced in primary school English teaching. 207 out of 311 teachers had from 4 to more than 6 years of teaching English in primary schools, which accounted for 66.6% of the entire respondents as compared to 30.5% of teachers who had from 1 to less than 4 years. Only 9 out of 311 (2.9%) lacked experience of primary school English teaching (with less than one year).

Table 2. English language teaching experience in primary schools of teachers in three provinces.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 1	9	2.9	2.9	2.9
	1 to < 4	95	30.5	30.5	33.4
	4 to 6	96	30.9	30.9	64.3
	> 6	111	35.7	35.7	100.0
	Total	311	100.0	100.0	

4.2. EFL primary school teachers' perceptions towards the benefits of the implementation of EMI to students

Of all the 311 teachers' responses, more than 85% of the teachers showed the benefits which EMI brought to their EFL primary school students. Specifically, primary school teachers of English expressed their two levels of agreement (agreement or strong agreement) with the belief that the adoption of EMI helps primary school students. They stated the benefits to:

- (1) generally improve students' English skills efficiently (95.5%);
- (2) enhance students' English language proficiency (95.5%);
- (3) maximise students' exposure to English (92.6%);
- (4) better students' listening skills (88.5%);
- (5) better students' speaking skills (96.5%);
- (6) generally make students become more confident (94.8%);
- (7) interact with their EFL teachers and peers in English (92.6%);
- (8) practise students' thinking in English (93.9%);
- (9) memorise English words and lessons easily (92.0%);
- (10) improve students' pronunciation (86.9%); and,
- (11) become dynamic whilst still young English language learners (92.9%).

Most teachers (n = 241, 77.5%) showed their agreement or strong agreement with the belief that the implementation of EMI helps EFL primary school students to engage more in-class EFL activities.

Overall, data shows that English language primary school teachers in the three surveyed provinces in southern Vietnam possessed a positive perception towards the benefits that the implementation of EMI brought to their students.

4.3. EFL primary school teachers' perceptions towards the benefits of the implementation of EMI to themselves

Of 311 teachers' responses, more than 80% of the teachers indicated that they had positive perceptions towards the benefits of the implementation of EMI to themselves. They also expressed their two levels of agreement (agreement and strong agreement) with the benefits of the implementation of EMI. Specifically, the implementation of EMI:

- (1) made themselves more confident English language teachers in their classrooms (93.9%);
- (2) made them practise their English everyday (96.7%);
- (3) was cost-effective for their learning (94.5%);
- (4) required that they spend more time preparing their lessons (83.3%);

- (5) developed their own English language proficiency (95.8%); and,
- (6) highly motivated them to improve their teaching skill (96.2%).

However, less than 60% of teachers (58.8%) expressed their agreement or strong agreement with the belief that the implementation of EMI helped the creation of an authentic English environment for them as EFL teachers.

In summary, the data demonstrates that the majority of English language primary school teachers in the three surveyed provinces in southern Vietnam possessed a positive perception towards the benefits that the implementation of EMI brought to themselves. They shared relatively similar opinions about the merits to themselves when engaging with EMI in their EFL classrooms.

4.4. Implications for teachers implementing EMI in EFL primary school classrooms in Vietnam

The question relating to teachers' implications for their implementation of EMI in EFL primary school classrooms in Vietnam was optional because the researcher did not expect participants to leave the online questionnaire unfinished. Of 311 participants taking in part in the online questionnaire, only 53 teachers responded to this question, accounting for 17.0%. Below are teachers' implications of the implementation of EMI in EFL primary school classrooms in Vietnam.

4.4.1. Enhancement of teacher professional development training on the use of EMI. 30.2% of teachers (n = 16) responded that teachers should be offered more opportunities to attend training on the implementation of EMI. At the inception, teachers commented that the implementation of EMI is very important because it helps:

- (1) improve students' oral skills (n = 7);
- (2) create an English-speaking environment for students in the classrooms (n = 6);
- (3) ameliorate teachers' English (n = 5); and,
- (4) build students' confidence in using English to communicate with their peers and teachers (n = 4).

Other teachers indicated that the implementation of EMI helps (1) enhance the quality of teaching and learning English; (2) interact effectively between students and teachers as well as between students and their peers; and, (3) improve students' thinking in English.

Teachers also pointed out that their opportunities to engage in trainings on the use of EMI were to be provided by their units of education, DOETs and MOET.

Six out of 16 teachers mentioned the need of the training on English teaching methodologies in their responses. They expressed their hope to gain more English teaching skills via the training and to have opportunities to apply what was trained in their EFL primary school classrooms. Half of the teachers (n = 3) asserted their needs to attend trainings on innovative English teaching methodologies which were more applicable in their classrooms to stimulate students' interests in their studies rather than regular sessions that were heavily theory-based.

Four out of 16 teachers highlighted the training on skills when EMI was under implemented in their classrooms. They wanted to be provided with chances to practise specific skills trained from the training.

Two out of 16 teachers suggested that sharing sessions between teachers and teachers on the implementation of EMI should be conducted regularly so that teachers could study from each other. They were also opportunities for teachers to share with their colleagues experiences as well as challenges they might encounter when EMI was under implementation in their classrooms.

4.4.2. Facility investment. More than one fourths of the teachers (n = 14, 26.4%) pointed out that facilities in schools and classrooms had to be upgraded so that teachers' implementation of EMI could be more possible. Teachers indicated that many schools in Vietnam, especially those in rural areas did not have enough facilities as well as function rooms for English language teachers. They wrote that even if schools did have function rooms, they were not designed specifically for English language teaching. Besides, softwares and teaching aids for English language teachers like pictures, flashcards, realia, etc. had to be invested as they helped boost students' English learning when EMI was under implementation.

4.4.3. Smaller class size. 22.6% of teachers (n = 12) indicated that class size was one of the problems which hindered their implementation of EMI in classrooms. They pointed out the following challenges when EMI was implemented in big class size.

- (1) They found it hard to observe students and check students' language practice.
- (2) Big class size lessened the quality of English language teaching and learning.
- (3) Big class size exhausted teachers as it took away their energy for teaching.

5. Conclusion

Findings elicit that the majority of English language primary school teachers in the three different provinces in southern Vietnam possessed a positive perception towards the benefits of the implementation of EMI to students such as: English language proficiency improvement, better interaction, cost-effectiveness for their learning, etc. Further, teachers admitted that the implementation of EMI can help themselves as well. They felt the need to participate in innovative English teaching methodologies, skill training as well as sharing sessions on the implementation of EMI. They recommended that in order to help them successfully implement EMI in their EFL classrooms, the facility need to be invested and the class size be smaller.

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THE LIGHT AND SHADOW OF ASSESSMENT PRACTICES: FOCUSING ON SGH IN JAPAN

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Abstract

This research will discuss the assessment practices in global education in the context of upper secondary education in Japan. It will also aim to clarify some of the features, challenges and measures of methods for assessing learning outcomes, progress and transformation. In 2014, MEXT started a Super Global High School program, a national project toward fostering global human resources. A whole-school approach is utilized to design curriculum, such that teachers put an emphasis on global consciousness, and encourage the connection between local and global aspects by the students themselves. This leads to inquiry-based learning that inevitably results in the acquisition of competencies, and expands learning resources beyond classrooms. A comprehensive quantitative and qualitative analysis based on practical reports for each fiscal year and students' works that each SGH provided, and interview and questionnaire surveys to teachers and students was utilized. Some features, challenges and partial measures for formatively assessing student-centered inquiry learning that differs from didactic education types, will be revealed in reference to the diagnostic tool of curriculum evaluation that was originally developed based on the critical comments of MEXT's interim evaluation. The actual situation and issues to overcome regarding the formative and summative function of assessment and their linkage to global education in Japan, very relevant to the SDGs, will be considered in the discussion part to show the light and shadow.

Keywords: Super global high school (SGH), inquiry-based learning, assessment practices, formative assessment, whole-school approach.

1. Introduction

To “foster globalized leaders who will be able to play active roles on the international stage through education at high schools that contribute to this mission,” Japan began a Super Global High School (hereinafter, SGH) Program in 2016 (Super Global High School, n.d.). SGH practices, which have been implemented as part of global education, have the same concepts as the ESD (Education for Sustainable Development) in the SDGs 4.7 (Sustainable Development Goals 4.7), which is associated with the SBCD (School Based Curriculum Development) that was developed to respond to the societal demands to foster global human resources and actualize individually optimized education. In addition to its four pillars of education, UNESCO also suggested “learning to transform oneself and society” as a new pillar to both explicitly and implicitly embody the aforementioned philosophy (UNESCO, 2009). Since the Tohoku Earthquake and Tsunami in 2011, the OECD Education 2030 Project has been cooperating in SGH's active learning approaches through policy dialogs with Japan (Arimoto et al., 2017).

However, implementing 21st century education models and assessment systems that include global learning methods such as inquiry-based learning and problem-based learning is a global challenge as balancing accountable and empirical assessment is extremely difficult because of the many contextual influences (Hargreaves, 2005; James, 2008; OECD, 2005). In accordance with the OECD (2005), this paper distinguishes assessment (judgments between the teaching and the learning), and evaluation (judgments between the teaching and the curriculum).

Of all the issues embodied in the ESD concept, the assessment for learning improvements is only the tip of the iceberg. Therefore, this research targeted the global education assessment practices in an SGH context to clarify the features, challenges, and partial measures needed to formatively assess student-centered inquiry learning, explain the differences from didactic education assessment, and provide direction on the development of appropriate assessment methods for global education practice.

The development of the SGH program, which gives designated schools financial assistance for five years, has been ongoing for more than five years. Initially, during the first phase, from the announcement of the SGH concept up to the public call for schools to participate in FY2014, the Minister of Education, Culture, Sports, Science and Technology (hereinafter, MEXT) in Japan was focusing on improving English language proficiency and globalizing Humanities and Social Science education. The initiatives for English language education improvements were actively adopted; however, in the second phase, which overlapped with the project start, the initial focus on the Humanities and Social Sciences was weakened and was eventually replaced by a problem-based learning approach focused on the Natural Sciences (Arimoto et al., 2017). As a result of the evaluation of the initial SGH outcomes, in FY2015, the program was again redefined and a basic foundation established in the third phase. From FY2017, there has been data available on curriculum development and practices, and the project is now focused on the fourth phase of stabilizing the educational activities.

2. Methodology

At the beginning of August, 2018, surveys were mailed to all 123 faculty members in charge of the SGH projects along with requests for the schools' annual research, development reports, and copies of student work. The survey had 26 Likert-type questions to be rated based on a school consensus as well as three open-ended questions focused on the efforts made by the school and their associated practices. By December 31, 2018, 55 schools had responded, a return rate of 44.7%.

Mid-project evaluations were conducted in the third year on all 123 SGHs to evaluate their progress and provide remedial action if necessary, all of which were completed in 2018. Although to date no school has withdrawn, withdrawal notices are to be given to schools in which there have been no improvements. Their practices are to be rated from one to five and each school will receive three comments regarding their characteristics, strong points, and shortcomings. While the evaluative criteria have yet to be made public, the first author used open coding to divide the comments into 22 broad classifications, and a checklist was developed outlining the identified good SGH practices. The analysis in the following section was based on the reports and the survey results for the following items: C05 (Effective Use of the Administrative Guidance Committee), C07 (Organization Management where All Teachers are United), C16 (Process-oriented Inquiry Activities), C18 (Curriculum Evaluation), C19 (Assessment of Learning), and C22 (Student Agency).

3. Results and discussion

To deepen learning and enhance the quality of the school's activity systems, assessments needed to be formative. If there was a lack of transparency and organization, the assessment methods used to assess the learning progress and adjust and expand the learning would possibly only reflect a fraction of the overall learning process. Therefore, understanding the ambiguities related to the formative assessment (hereinafter, FA) and knowing how to deal with the possible barriers was vital to revealing the various SBCD inquiry-based learning assessment characteristics and implementing strategies with certainty. Five issues, I01 to 05, were extracted, that revealed the fragmented practices at different SGHs and offered insights into the assessment issues, as discussed in more detail in the following.

I01: Teachers do not have sufficient time to get involved in feedback and feedforward for students.

Teachers found it difficult to find the time to fully assess the inquiry activities of the individuals or small groups one by one as they had to do their everyday work as well as manage the SGH. From the survey, 46 of the 55 schools were worried about the teachers' workload. Some schools had external partners such as university and graduate students and were able to take advantage of an ICT system for remote feedback and feedforward for the students. However, as such external partners require financial support, the schools will have to cover these expenses once the designation period ends.

Another partial measure would be to dedicate time to interact with the students, as exemplified at High School A. When the first author conducted the interview research (February 1, 2019), the teacher in charge of the SGH project emphasized that he wanted to "build a school where everyone can continue learning." To achieve this, he and his colleagues had been attempting to develop a more flexible curriculum to break down the barriers between the subjects and planned to continue the inquiry activities after their designation ends in 2019. One example is that they plan to make use of one of the outcomes that has been cultivated as part of the SGH practices; that is, "classes will be limited to 6 periods, with teachers having the freedom to teach what they want for the 7th period." This freedom does not mean another class based on the interests or specialties of the teachers, but a time reserved for student

interaction to optimize individual student-teacher learning. The school is seeking to respond to the student needs by establishing a flexible curriculum that honors the students' decisions.

I02: The school assessment methodology is undeveloped.

Generally, to develop the SGH performance activities assessments, support is given by senior students (*senpai*) and university researchers. The SGH committee concurrently develops the curriculum, research themes, pedagogy, and assessment methods. However, as the development of the assessment tools is given a lesser priority than the development of the course content and the associated teaching and curriculum values, focus is placed on visualizing the learning outcomes and validating the summative assessment (hereinafter, SA) learning transformation. On the other hand, in some schools, the assessment methods were developed by devoted groups within the school organization to ensure the implementation of formative feedback. Therefore, it appeared that the focus on developing appropriate assessment methods depended on the school scale, the allocation of duties, and the availability of assessment methodology instruction from university teachers and specialists. For example, High School B established an international fieldwork research team, a domestic fieldwork research team, a publicity/information and research outcome/practice report team, an accounting team, an assessment research team, an inquiry course research team, and an English class inquiry team as a part of the SGH promotion committee.

However, it should be noted that what was mentioned above means teachers in Japan just don't function the Western-oriented theory of assessment. As Arimoto and Clark (2018) pinpointed the cultural identity on which the cognitive assessment has the bedrock, assessment events mediated by cultural scripts can be seen with the unorganized, improvised, and informal traits. They might be called Japanese-style assessment to achieve the responsibility that builds loose interrelationships between teachers and students, which is perfectly independent from the accountability.

I03: Feedback functionality depends on psychometrics assessments.

If FA was not adequately conducted at the school, standardized tests developed by external private companies based on a psychometric paradigm were utilized to ensure accountability for the educational outcomes, reduce the labor burden, and allow for the visualization of the outcomes for authorities. As this type of assessment is merely a measure or a superficial snapshot of improvement, it runs the risk of being taken as a be-all assessment (Hargreaves, 2005). While many SGHs were attempting to develop tools that worked with the school assessment tools such as rubrics as well as using the objective tests, it was not clear whether the measures had clear and positive correlations (refer to I04).

The methodology being used to validate the SGH program course effectiveness was also questionable. It was found that some schools conducted consciousness surveys as indirect SA for which a comparison was made between students who had engaged in SGH inquiry activities and students who had not. For example, to assess the validity of the SGH learning activities at High School C, students who were not engaged in the SGH (the control group) were compared to the students who were engaged in the SGH (the experimental group), from which it was found that the engaged students had greater global competencies; however, in High School D, there were few statistically significant differences between the non-SGH and SGH students. In High School E, it was found that the scores for students who were partially engaged in the inquiry activities declined compared to non-SGH students. These results raise the question as to what the SGH curriculum brings to education and also cast doubt on the validity of SA such as self-assessment type consciousness surveys.

I04: The curriculum is evaluated based on summative de-contextual assessment.

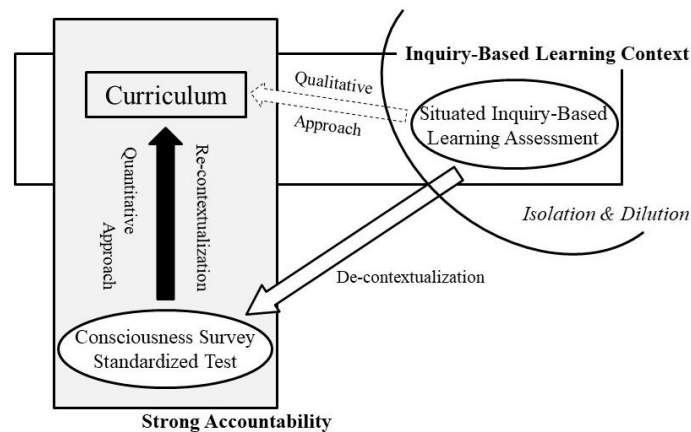
In general, because the curriculum evaluations were designed in reference to the learning assessment data (OECD, 2005), schools tended to employ validation methodologies that measured the degree to which the students were influenced by the SGH curriculum. It should be noted that these methods were not assessments that reflected the students' learning situations, but rather were decontextualized assessments. Essentially, curriculum validation should be conducted by extracting the assessment data related to its related inquiry-based learning context; however, it was found that the curriculum was being validated based on information that had been separated from the actual learning activities; that is, decontextualized objective tests and general consciousness surveys.

Most SGHs have been using rubrics as the assessment tools for the inquiry activities. If the performance assessments related to the rubrics are unsatisfactory but the external objective test scores taken at the end of the term are high, is it justifiable to say that this was a result of SGH inquiry-based practices? There are also cases where students had high total rubric scores but poor standardized test scores. These results indicate that the decontextualized assessment data in many of SGH annual reports resulted in a misinterpretation of the effectiveness of the curriculum and a lack of reliability on the inquiry-based learning assessment procedures; that is, there was a disconnection between the situated inquiry-based learning assessments and the decontextualized assessments, which meant that either the curriculum organization or the inquiry activity assessments method were invalid or that the measurable abilities of the situated inquiry activity assessments differed from the decontextualized assessments.

For example, High School F conducted a cross analysis between the assessment scores and the standardized tests for the “thinking skills” from the private company and the teacher assessed rubric scores for the “presentation” or “research papers” activities, for which positive correlations were found in 2016 (second year of designation), but not in 2017 (third year). Therefore, it is necessary to further investigate the validity and benefits of comparing the assessments, and fully understand the different psychological constructs behind the school-based learning standards and the standardized tests.

At High Schools E and G, to assess the summative transformation, a text-mining approach was used to quantitatively analyze the qualitative data in each student’s research paper. Qualitative and holistic judgment activities were included as a part of the third-generation assessment procedures, which were based on socio-cultural constructivist framework in which the assessments are embedded in the situated learning (James, 2008). Because these individually specific data are not enough evidence to prove overall curriculum effectiveness, the rubrics offer nothing more than supplementary information on the learning activity. Therefore, it is preferred that the comprehensive assessment data be re-contextualized at a group level in inquiry activity curricula. To ensure accountability, educational organizations are also interested in summative evidence of the decontextualized and factorized learning outcomes. Indeed, the fact that the terms assessment and evaluation are synonymous with “*hyoka*” in Japanese, complicates this issue. If curriculum evaluation is confused with learning assessment, the decontextualized assessments will not reflect the nuances in the learning and the assessment activities aimed at determining the learning progress will become progressively isolated and diluted (see Figure 1).

Figure 1. Assessment System in SGH.



105: Learning intentions and criteria are unilaterally decided by teachers.

This comment was not related to feedback and feedforward opportunities, but rather the quality. Most SGHs set performance issues every year, with the rubrics being developed, presented, and shared at the beginning of the fiscal year with the students. The standards and criteria have generally been based on the competencies that each school established as the learning intentions. However, what was found was a pseudo agency problem. Summative dominant-assessments based on the criteria were only developed by the teachers and were executed scientifically and technically without any consideration of the particular situation (Almqvist et al., 2017); that is, it appeared the aim of improving the students’ learning was discharged and a top-to-bottom unequal power relationship retained between the students and teachers in which the students were only able to demonstrate free subjectivity within an instrumentalized learning situation. The students had constrained assessments under a pseudo freedom, which meant that the teachers were not associating with the students through FA, which in turn reduced the learning motivation of learners who were unable to keep up with the externally imposed instructions (Hughes, 2014).

It was found that many of the SGHs have been unable to shake off the passive attitude of “feeling forced.” In reference to the student agency in the evaluation tools (C22), some schools said that they were having trouble with free riders in the group activities. Further, for the over ten SGHs that required external intervention by an administrative guidance committee (C05), it was reported that there were many students who had become demotivated in the presentations or problem-based learning research. This indicates that students reluctant to follow the teachers’ instructions. Therefore, it may be necessary to develop situated and diverse assessments that are focused on each student’s needs. Although this may be a time-consuming process, High School I had taken the time to develop criteria that specifically fit their students’ personalities and strengths while at the same time embracing the teachers’ qualitative and quantitative assessment aims. The value of the SGH project has been first and foremost to change the traditional secondary school focus on accountability and college entrance examination requirements, and to develop curriculum and assessment tools that are designed to enhance the students’ global agency.

4. Conclusion

The research into the effectiveness of inquiry-based learning revealed the difficulties in adjusting from traditional subject-oriented learning. Inquiry-based learning allows students to get and give feedback and feedforward from teachers, peers and specialists, which lead to an expansion of their learning environment, give them the opportunity to participate in their learning, and develop a deeper dialog with the materials and a clearer understanding of their progress. What this research review indicated was that it has been difficult to fully understand student progress if the feedback and feedforward between the teacher and the student is insufficient and not focused on the student's specific learning style. Unfortunately, it appears that only a few teachers were bearing the burden, and there were few schools which took a whole-school approach in which all faculty and support staff work together to support the students; however, this is a prerequisite for a successful qualitative transformation. The "feedback" and "advice" received in the open-ended responses indicated that many teachers were unfamiliar with the educational philosophies underlying FA; however, As mentioned in I02, it is needed to deliberately observe the practices and school organizations, and to analyze social languages and narrative used in assessment events for the conceptualization of Japanese-style assessment.

Although there has been some FA research in Japan at the subject-oriented level, further discussions are necessary to address the issues found in our evaluation. One SGH had been able to resolve these problems, and even though their solutions may not be a cure-all for all schools, learning from good practice could give rise to further innovations through a retranslation through each community's cultural lenses (Phuong-Mai et al., 2005). The SGH curriculum and assessment are challenging issues for teachers who are not familiar with the theory. Nevertheless, by sharing and re-interpreting knowledge, each school will be able to transform and innovate while considering culturally appropriate strategies.

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THE NATURE OF CLASSROOM DISCOURSE IN PRE-SERVICE LIFE SCIENCES TEACHERS' LESSONS IN JOHANNESBURG

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Abstract

This is a qualitative case study which sought to determine the nature of classroom discourse in three pre-service Life Sciences teachers' lessons. There has been fervent discussion on the need for dialogic teaching with researchers indicating its potential in learner cognitive development and yet the approach exerts increasing demands on teacher input. Unlike a normal conversation, dialogic teaching involves the teacher initiating dialogue and making follow up on learners' responses. As such, there is a coherent process of enquiry occurring in the science classroom, rather than disjointed communication between the teacher and the learners. Previous research has revealed that science teachers encounter daunting challenges in their bid to ensure their teaching becomes more dialogical. It is against this background that three pre-service Life Sciences teachers were observed each teaching one lesson and then interviewed once after the analysis of the videos of the lessons. The interviews solicited teachers' intentions when they asked questions, and engaged learners in class interactive activities. Analysis of the videos and interviews showed that classroom discourse in these three lessons alternated between being dialogic and authoritative teaching styles. The findings showed that in as much as the pre-service teachers plan for dialogic teaching, sometimes they abort their plan due to various issues which include failure to initiate a sustained dialogue, inability to probe learners' ideas, lack of knowledge of some of the ideas learners bring in the discussion and also lack of effective classroom management skills. These findings inform teacher professional development programmes and teacher educators on the pertinent knowledge and skills that science teachers require for effective science teaching and learning.

Keywords: *Classroom discourse, pre-service teachers, life sciences.*

1. Introduction

There has been increased discussion on the need for dialogic teaching with researchers indicating its potential in learner cognitive development and yet increasing demands on teacher input. Unlike a normal conversation, dialogic teaching involves the teacher initiating dialogue and making a follow up on learners' responses. As such, there is a coherent process of enquiry occurring in the science classroom, rather than disconnected communication between teacher and learners. In fact in dialogic teaching, there is support and reciprocity in terms of interaction and the teacher's role also includes initiating learner sharing of divergent ideas in terms of science and their everyday views. Sociocultural theorists explain how individuals acquire knowledge when they interact with others, and also how interactions amongst individuals create collective understanding. Cognisant of this, social constructivists acknowledge that knowledge construction involves socialisation of individuals into the practices of the communities in which they are embedded, hence the importance of interactions in science teaching and learning. Previous research has revealed that it is quite challenging for science teachers to ensure their teaching becomes more dialogical (Scott, Mortimer & Aguiar, 2006).

2. Literature review

The nature of a social environment, in this case science classroom is crucial. Social interaction between individuals has been emphasised in ensuring meaningful teaching and learning in science classrooms (Lemke, 1990). The interaction referred to is the teacher-learner and learner-learner interactions. Walsh (2006) insists that classroom discourse, language use and interaction are the basis of good teaching and learning. Discourse refers to the use of language in context (Kaya, 2016) and in this case the context is the Life Sciences classrooms.

Unlike the normal conversation, dialogic teaching involves the teacher initiating dialogue and makes a follow up on learners' responses (Alexander, 2006). As such, there is a coherent enquiring process occurring in the science classroom, rather than disconnected communication between teacher and learners and learners and learners (Lehesvuori, Viiri & Rasku-Puttonen, 2011). In fact, in dialogic teaching, there is support, reciprocity in terms of interaction and the teacher's role also includes initiating learner sharing of divergent ideas in terms of science and their everyday views (Lemke, 1990; Mortimer & Scott, 2003). The practice of dialogic teaching has been acknowledged as a productive teaching practice as it leads to positive learning outcomes (Littleton & Howe, 2009). Unfortunately, in most classrooms group work has been found to be unproductive due to failure by learners to communicate and work collaboratively in an effective manner (Littleton & Howe, 2010). Teachers tend to make assumptions that learners are capable of engaging in meaningful conversation with each other in class. In line with social constructivist epistemology, Wells (2007) noted that effective learning takes place when learners are engaged in restructuring their knowledge and understanding cognitively.

It is quite challenging for science teachers to ensure their teaching becomes more dialogical (Scott, Mortimer & Aguiar, 2006). Knowledge construction involves socialization of individuals into the practices of the communities in which they are embedded, hence the importance of the role of learners' socio-cultural background in science teaching and learning. Sociocultural theory explains how individuals acquire knowledge when they interact with others, and also how interactions amongst individuals create collective understanding (Mercer & Howe, 2012). It is against this background that the study aimed to determine the nature of discourse in the Grade 10 and 11 Life Sciences classrooms. The study sought to answer the research question: What is the nature of classroom discourse in three pre-service Life Sciences classrooms?

The study uses the communicative approaches as the conceptual framework as espoused by Mortimer and Scott (2003). These approaches describe the classroom interaction patterns between the teachers and learners in the classrooms. Accordingly the first dimension is made up of dialogical and authoritative conversations. The second dimension comprises interactive and non-interactive conversations. As such, Mortimer and Scott put forward the interactive/authoritative (IA) approach where the lesson presentation is mostly question and answer session, Interactive/Dialogical (ID) approach where discussion takes the centre stage during the teaching and learning process, Non-interactive/Authoritative (NA) approach where the lesson takes the form of a seminar or conference and lastly Non-interactive/Dialogical (ND) communicative approach where the teacher summarises and explains concepts that were mentioned or discussed before.

3. Methodology

The study employed an explanatory mixed method research design (Creswell, 2014), which is a combination of both quantitative and qualitative research designs. The researcher collected quantitative data, analyzed it and then collected qualitative data to explain or inform quantitative data (Creswell, 2003). The method enabled the examination of the nature of classroom discourse and how teachers created such discourses in their classrooms.

3.1. Context of the study

The study involved five pre-service Life Sciences teachers in their final year (fourth year) who were enrolled in the module Methodology and Practicum FET Life Sciences. These participants had shown interest in taking part in the study. In the previous three years, they studied the theories of teaching and learning and content on all the topics in the Curriculum and Assessment Policy (CAPS) Life Sciences document, which encapsulates the requirements of the what, how and why the subject is supposed to be taught. During the three years and the first semester of fourth year, the participants had been involved in teaching practice, where they have been deployed in different schools to firstly observe many lessons of their mentors teaching Life Sciences learners of grades 10-12 and also teaching the subject. Therefore, the participants were familiar with Life Sciences teaching in different South classroom contexts.

For this particular session during second semester of fourth year, the participants were placed in schools for seven weeks and were expected to plan, prepare and teach Life Sciences to grade 10 and/or grade 11 learners. In this instance they had the autonomy to design their own lessons and implement teaching strategies they had learned during lectures without any restrictions from the mentors. The results of only three participants are reported. These participants taught in diverse school and classroom contexts which were assumed to have an influence on the classroom interaction patterns because of the diverse learner backgrounds in terms of race, language and socio-economic background. Table 1 shows the participants' profiles.

Table 1. Teacher profiles and research context.

Teachers' pseudonyms	Mantwa	Zola	Sarath
Gender	Female	Male	Female
Race	Black	Black	Indian
School type	Township	Suburban	Private
Grade taught	10	11	10
Number of learners	45	42	38

3.2. Data collection

Each teacher was observed teaching three lessons to determine the nature of classroom discourse in three pre-service Life Sciences classrooms and then interviewed three times after the analysis of the video of each of the lessons. The interviews were meant to solicit the pre-service teachers' intentions when they engaged learners in the different lesson activities and also for them to elaborate on observed incidences. Both the lessons and interviews were video and audio recorded with permission from the participants. In this paper only the findings of three lessons and three interviews are reported.

3.3. Data analysis

Data from the videos of the lessons were analysed using Mortimer and Scott's (2003) four communicative approaches. The four communicative approaches are Interactive/Authoritative (IA), Non-interactive/Authoritative (NA), Interactive/Dialogic (ID) and Non-interactive/Dialogic (ND). Every lesson was partitioned into five minute intervals and the researcher coded the interaction as IA, NA, ID and ND. At the end each communicative approach was quantified for each teacher's lesson to determine the overall nature of the lesson in terms of interactions portrayed. A comparison was then made using descriptive statistics.

Data from interviews was transcribed verbatim and then subjected to content analysis to clarify and seek elaboration on episodes observed in the lessons particularly on how they managed to create dialogical interaction and the challenges they faced. Content analysis is a flexible method for analysing text data (Cavanagh, 1997) and in this case the text came from pre-service teachers' reflections. Qualitative content analysis involves interpretation of the content of text data by systematically coding and identifying themes or patterns (Hsiu-Fang Hsieh & Shannon, 2005). The codes were categorised deductively using the key aspects in the questions given by the researcher. To promote more dependability on both quantitative and qualitative data, coding was done as soon as data were collected and then recoded after some time and then results compared (Krefting, 1991). An example of how lessons were analysed to determine the nature of classroom communicative approaches is shown in Figure 1.

Table 1. An example of the analysis of nature of communicative patterns in Mantwa's observed lesson.

5 minute intervals	Communicative approaches			
	IA	NA	ID	ND
1st	1	1	1	
2nd		1		1
3rd	1	1		1
4 th		2		
5 th	1			
6 th	1	2		
7 th		3		1
8 th	2			
Total 40 minutes	6	10	1	3

4. Findings

Analysis of the videos of the lessons portrayed the communicative approaches mostly used during the three pre-service teachers' lessons. An analysis of data from interview transcripts showed the reasons teachers lessons were more oriented to a particular communicative approach. Table 2 shows the overall percentages for the occurrence of each communicative approach in the three lessons.

Table 2. Summary of the nature of classroom approaches in the three teachers' lessons.

Communicative approach	Percentage attained		
	Mantwa	Zola	Sarath
Interactive/Dialogic (ID)	5	25	10
Non-interactive Dialogic (ND)	15	35	20
Interactive/Authoritative (IA)	30	20	50
Non-interactive/Authoritative (NA)	50	20	20
Total	100	100	100

From the summary table, it shows that Mantwa, who taught in a township Life Sciences class had the lowest percentage in interactive communicative approach (5%) and non-interactive dialogic approach (15%) compared to the other two teachers Zola and Sarath, who are in suburban and private schools respectively. The most communicative approach in Mantwa's lesson was non-interactive authoritative (50%). During interviews, Mantwa explained how she resorted to mostly presenting concepts without asking for learner input because township learners were not proficient in English language, which is the medium of instruction. English is their second language as it is different from learners' home languages. Mantwa said, "It is frustrating to keep on rephrasing questions when teaching because learners are not proficient in English". As such, the teacher presents the content in 'ready form' for learners to assimilate.

Both Zola (from a suburban school) and Sarath (from a private school) have the same percentage for non-interactive authoritative communicative approach though for different reasons. Zola pointed out that the learners were very vocal so much that if he asks for their opinions, it would create classroom management problems. Indeed, during lesson observations, the researcher noted how the pre-service teacher struggled to maintain discipline in his class. These learners were fluent in English but once given an opportunity to discuss issues, they could go overboard as evidenced by the highest percentage in both interactive (25%) and non-interactive (35%) dialogic communicative approaches.

On the other hand, Sarath who taught in a private school with goal driven learners had low percentages for both interactive (10%) and non-interactive (20%) dialogic communicative approaches. Unlike in the other two teachers' lessons, the teaching was driven by learners. For instance, the learners showed disinterest when the teacher asked them questions or provided an opportunity to discuss amongst themselves. As a result, the teacher resorted to authoritative communicative approach in a bid to cover as much content as possible, which the learners enjoyed. From the lesson observations, the researcher noticed the teacher dodging learners' questions. When asked in an interview, Sarath confirmed when she said, "These learners are very clever, some of the issues or questions they bring for discussion are quite challenging". By attaining a 50% in the interactive authoritative communicative approach, Sarath created a classroom environment where she limited learner autonomy and took control.

From the three pre-service teachers' lessons, it shows that the communicative approaches were determined by the teachers' prior knowledge of the nature of their learners. For instance, Mantwa's knowledge that her township learners had difficulty in expressing themselves in English, which is a second language, necessitated her to provide more content and notes to the learners. As such, there was more of non-interactive authoritative communicative approach and less dialogical. On the other hand, Zola's knowledge that his learners were outspoken and were proficient with the medium of instruction determined how he taught the lesson. Because Zola struggled with maintaining discipline during the teaching and learning process, he decided to limit the level of dialogical conversations in the class. In as much as his lesson had the highest percentage of interactive dialogical (25%) and non-interactive dialogical (35%) communicative approaches, more could have been achieved. In the other lesson Sarath's knowledge that her learners and parents to a certain extent had high expectations of learners' scores in assessment tasks, she focused more on content coverage. When asked in the interviews, Sarath said,

My first encounter with these learners was not pleasant, I felt they resisted my teaching. It was only later on when I realised that they felt I wasted time by asking them questions, whose answers they could get on their own when they study the content.

When probed further, Sarath indicated that there were several learners who tended to bring in challenging issues for her to explain. On that note she said, "I appreciate it if those few just listen and not contribute". What the pre-service teacher said confirmed the researcher's observation that in as much as the learners in that class were interested in content coverage, there were instances where the teacher deliberately manipulated them so that they could not ask questions or make contributions in class. It can be interpreted that the pre-service teacher had limitations in the subject matter knowledge and by involving learners, she would be exposed.

During lesson observations, it was noted that all the three pre-service teachers had intentions of involving learners in dialogic interactions as shown from the way they introduced the lessons and also the nature of the activities planned for the lessons. It was however unfortunate that such intentions were mostly aborted during the course of the lesson. Different reasons have been observed and mentioned by the participants themselves during interviews.

5. Discussion

The research findings showed how lack of proficiency in the language of teaching and learning impacted on the interactions in a township Life Sciences classroom. By shunning away from using learners' home languages, the teacher did not accord learners the full opportunity to access scientific concepts. Previous researchers argued for the use of learners' home languages as an effective strategy that makes science concepts more accessible to learners and also as a strategy that shows some degree of transformation in previously colonized African countries (Alidou et al., 2006). The findings also showed that pre-service teachers' lack of appropriate content and pedagogical knowledge impacted on their abilities to engage learners in interactive dialogical communicative approaches during the teaching and learning process, a challenge also identified by Scott et al. (2006).

6. Conclusion and implications

It can be concluded from the research findings that the pre-service teachers were aware of the importance of learner involvement in the teaching and learning of science. This is evidenced by their initial intentions during the introduction of the lessons where dialogic interaction is more prevalent compared to any other stage of the lessons. The pre-service teachers failed to sustain learner interactions mostly intentionally due to their shortcomings in terms of subject matter and pedagogical knowledge. The lesson taught in a township school was less dialogic compared to the lesson in a suburban school due to the medium of instruction, which learners are not fluent in. The findings inform teacher professional development programmes of the shortcomings and challenges that pre-service teachers need to be developed in even in their last year of study for effective teaching.

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TEACHERS' OCCUPATIONAL WORK ETHIC SCALE IN SOUTH KOREA

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Abstract

The Teachers' Occupational Work Ethic Scale (TOWES) was developed to provide schools with psychometrically sound teacher survey for assessing work ethic. Based on an extensive literature review on work ethic instruments and interviews of 16 principals from K-12 schools, initial survey questions were developed. A series of content and face validity of the initial items were examined by panels of judging experts. A total of 500 teachers across K-12 schools in South Korea provided usable data. Exploratory and confirmatory factor analyses verified the scale's structure and suggested a four-factor model: Work Ethic in Instruction, Work Ethic toward Students, Work Ethic in Overall Performance at School, and Work Ethic toward Fellow Teachers. The factor structure was shown to be stable across school levels (i.e., elementary, middle, and high school) and gender. Additional support for the construct validity of the TOWES was obtained based on scores of each of the four factors correlated moderately, across groups and at the school level, with job satisfaction and Teachers' Vocational Ethics. Implications and suggestions for further research and practice are discussed.

Keywords: *Work ethic, teachers' work ethic, scale development, factor analyses.*

1. Introduction

Education is a foundational driving power not only for students' development but also for a nation. The contemporary society accounts schools and teachers more and more for student learning and expects teachers to model behaviors reflective of moral virtues like honesty and fairness (Lumpkin, 2008). The public expects teachers to perform according to professional codes of conduct (Lumpkin, 2008). Teachers are often put into educational contexts to cope with questions of what is right and what is good (Paolitto, 1977) and continually face moral dilemmas surrounding issues such as treating and guiding students, telling the truth, and keeping promises. Teachers are considered moral philosophers (Paolitto, 1977). Jobs of teachers are viewed as professions which require high moral stature (Hill, workethicsite) in that teachers greatly influence the lives of students who experience special development stages as human beings (Lumpkin, 2008). Students not only acquire knowledge and skills but also have opportunities for their character development through social interactions with teachers, and thus teachers are to serve as role models of character by making professional decisions and judgements based on societal and moral virtues (Lumpkin, 2008). Korea is not an exception. The contemporary Korean teachers tend to perceive their roles as a "service representative, customer consultant, care worker, academy teacher, and sometimes, civil affairs official (Kweon & Kim, 2015, p. 108)." However, ethically wrong behaviors of some teachers such as leaking of exam questions, sexual abuse, unfair grading, authority abuse, and inappropriate punishment have been continually issued in Korean school settings.

2. Objectives

Thus, the purpose of this study was to develop a scale to assess teachers' occupational work ethic for K-12 school teachers in South Korea. This study was guided by the following research questions.

RQ1: What constructs comprise the occupational work ethic of Koreans teachers in K-12 schools as measured by the Teachers' Occupational Work Ethic Scale?

RQ2: What is the work ethic of Koreans teachers as measured by the TOWES?

RQ3: Do differences exist in the work ethic for women and men and for school levels?

3. Methods

The main purpose of the present study is to create a scale to measure teachers' occupational work ethic in Korea. To conduct this study, the IRB was first approved by the institute that the first author is affiliated. In order to develop the measure, existing literature on work ethic, work ethic instruments, characteristics of desirable teachers was examined to determine potential factors that are considered part of the teachers' occupational work ethic. In addition, 16 principals in K-12 public schools were interviewed to reflect the contemporary views on teachers' occupational work ethic. Based on the literature review and interviews of principals, four domains were identified: work ethic in instruction, work ethic toward students, work ethic in overall performance, and work ethic toward fellow teachers.

Next, items were developed by the first author to tap into these constructs. Specifically, work ethic measures developed by Park and Hill (2016), Mann, Taber, and Haywood (2013), and Miller, Woehr, and Hudspeth (2002) were mainly considered for the general work ethic. For the factors of teachers' work ethic were based on studies by Lumpkin (2008), Markert (2004), Turk and Vignjević (2016), and Paolitto (1977). A total of 153 items were collected and developed at this stage. Based on the conceptual factors, open-ended questions were developed to interview principals in K-12 schools. Examples of interview questions include 'Define work ethic and teachers' work ethic on your own', 'What characteristics do represent teachers' occupational work ethic', 'If you have met or seen a teacher who had or has a strong work ethic as a teacher, describe the teacher's behaviors or words that impress you.' From one hour to one and a half hours were spend in interviewing each principal.

3.1. Sample

A total of 393 K-12 school teachers in South Korea participated in the survey. The data file was randomly split into two subsamples for the purposes of conducting exploratory and confirmatory factor analyses to examine the structure of the TOWES (Tabachnick & Fidell, 2007). For all other purposes of this study, the entire file was used.

3.2. Materials

Teachers Occupational Work Ethic Scale. All participants in the present study completed the newly developed Teachers Occupational Work Ethic Scale (TOWES). The TOWES is a 77-item self-report scale that measures the four dimensions of teachers' work ethic: work ethic in instruction, work ethic toward students and parents, work ethic in overall performance at school, and work ethic toward fellow teachers and school staff. All items are rated on a 7-point Likert scale (1=Strongly Disagree to 7=Strongly Agree). Example items include "I do not waste class time.", "When grading students' outcomes, I am fair." The second domain of the TOWES is to measure teachers' ethical behaviors toward students and parents. Sample items include "I treat each student with respect." "I care about students." "I listen to each student when he or she has a problem." The fourth domain of the TOWES is designed to assess teachers' overall ethical behaviors at school and in the society. Example items include "I follow school policy and rules." "I make my efforts to model before students and fellow teachers." The last domain of the TOWES is to measure teachers' ethical behaviors toward their fellow teachers and school staff. Sample items include "I treat fellow teachers fairly." "I listen to each fellow teacher and staff even though his or her opinion is different from mine." Work ethics (or employability skills) were measured by the occupational work ethic inventory-short form (OWEI-SF) (Park & Hill, 2018), which is designed for students, trainees, or adults to assess their own work ethic in a relatively short time and in combination with other instruments (Park & Hill, 2018). The OWEI-SF consists of 12 items and has three subscales; interpersonal skills, initiative, and being dependable based on a seven-point Likert scale for rating each item with 1 (never); 2 (almost never); 3 (seldom); 4 (sometimes); 5 (usually); 6 (almost always); and 7 (always). The first factor, interpersonal skills, has four items (e.g., friendly), the second factor, initiative, includes five items (e.g., ambitious), and the third factor, dependability, has three items (e.g., following directions). Reliabilities of each subscale were .83 for interpersonal skills, = .75 for initiative, and = .76 for being dependable, respectively (Park & Hill, 2018). The model indices of the results of confirmatory factor analysis model of the OWEI-SF: $\chi^2(df)=889.161(54)$, CFI = .902, SRMR = .045, and the overall Cronbach's alpha was .910.

3.3. Data analysis

To establish the TOWE scale construction, several subsequent statistical analyses were involved: (1) exploratory factor analysis to identify the desirable common factor model of the TOWES, (2) confirmatory factor analysis to examine the stability of the derived factor model, and (3) examination of the internal consistency of the TOWES (Crocker & Algina, 1986).

4. Findings

Principal component analysis was performed on the first sample ($n = 226$) to examine the underlying structure of the 77 items of the TOWES. Next, principal axis factoring was used to derive a common factor model. A number of PCAs and PAFs were repeated to find a best common factor model. Based on the criteria set up for selecting items, a six-factor model with 29 items was finally selected. Factor loadings of each item, eigenvalues of the six factors, and the common variance explained are presented (see Table 1).

Table 1. Factors of the TOWES and Loadings.

Item: As a teacher, I	Factor					
	1	2	3	4	5	6
1. Consider each student as a precious human being.	.70	.26	.23	.19	.10	.31
2. Welcome students' questions and encourage students to ask questions in class.	.68	.17	.15	.16	.25	.04
3. Encourage students to treat each other with respect.	.68	.23	.22	.30	.11	.18
4. Respect and encourage students' efforts and their accomplishments.	.67	.25	.22	.24	.22	.14
5. Endeavor to cultivate students' positive mindset and attitudes.	.67	.18	.11	.24	.34	.14
6. Listen to students' opinions and feel sympathetic on their feelings.	.60	.28	.30	.24	.06	.30
7. Encourage cooperation among students.	.49	.33	.29	.31	.10	.23
8. Teach virtues of citizens such as diligence, integrity, responsibility, loyalty, respect of others, fidelity, respect-for the law, for human life, for others, and for self.	.48	.29	.36	.23	.13	.14
9. Strive for cooperation among school community members such as students, parents, school staff, and fellow teachers for the development of the school.	.23	.74	.26	.16	.29	.06
10. Participate in school staff events actively.	.09	.64	.24	.22	.21	.15
11. Share useful information and skills with fellow teachers.	.20	.62	.18	.20	.06	.21
12. Am kind and pleasing to other staff members.	.28	.60	.09	.13	.07	.29
13. Maintain a clean and neat appearance.	.27	.58	.16	.19	.15	.17
14. Make efforts and contribute to the development of the school.	.33	.58	.24	.17	.22	.01
15. Introduce career suitable for a student's aptitude.	.19	.12	.91	.10	.07	.03
16. Encourage and help students develop their talents steadily.	.24	.31	.62	.22	.27	.04
17. Present students the relevant jobs besides the content knowledge I teach.	.16	.18	.57	-.01	.26	.07
18. Provide cumulative records of counseling and guidance from the students and cooperate with them.	.15	.24	.46	.13	.15	.20
19. Seek ways to help students who need extra instruction.	.36	.20	.45	-.02	.32	.13
20. Do not receive goods, money or entertainment from parents in any case.	.20	.07	.10	.73	.07	.18
21. Do not misrepresent the official policies and systems of schools and institutions and clearly distinguish them from my personal views.	.23	.29	.10	.66	.11	.16
22. Do not use institutional or professional privileges for personal purposes or for the benefit of the particular organization to which I belong.	.27	.26	.12	.65	.10	.18
23. Do not use the student for my promotion or benefit.	.24	.23	.02	.45	.08	.25
24. Seek advice and feedback from others to refine my instructional methods.	.22	.16	.19	.07	.75	.09
25. Actively participate in seminars and professional development programs in order to learn new instructional strategies,	.11	.18	.11	.11	.74	.06
26. Continually endeavor to learn new knowledge and skills related to my major and subject that I teach.	.23	.15	.28	.09	.64	.03
27. Provide every student with information about school events fairly.	.18	.20	.13	.26	.12	.72
28. Do not reveal students' personal information less laws ask.	.26	.17	.03	.29	.03	.65
29. When delivering school-related information, convey facts without distortion, bias, or personal bias.	.26	.31	.38	.16	.08	.48
Eigenvalue	14.62	12.32				
Variance explained						
Cronbach's alpha						

Note. A principal axis factoring was performed to produce loading values (prior communality estimates were not 1.0). Factor loadings > .40 are in boldface.

The first factor includes eight items with loading values ranged from .70 to .48 and named *respect of students*, which reflects teachers' attitudes towards students. Factor 2 includes six items with loading values ranged from .74 to .58 and was labeled as *active engagement in school activities*, which represents active participation in school events, cooperative projects, and overall maintenance as a teacher. The third factor consists of five items with loading values ranged from .91 to .45. This factor was named *meaningful caring of students*. Factor 4 consists of four items and their loading values ranges from .73 to .45. It was labeled as following school rules and laws, which reflects teachers' integrity to keep laws, rules, and principles. Factor five includes three items with loading values from .75 to .64, which reflects taking initiatives to become more professionally developed. It was labeled as *initiatives*. The last factor consists of three items and reflects fair job performance such as providing information fairly. It was labeled as *fairness*. Next, CFA with the proposed six-common-factor model of the TOWEI was conducted. Selected modeling information indices were RMSEA = 0.068; 90% CI [.059, .064], p-value < .0001; CFI = .92, SRMR = 0.04, and TLI = .91. Finally, the internal consistency was examined, using Cronbach's alpha: for f1, $\alpha = .93$; for f2, $\alpha = .88$; for f3, $\alpha = .84$; for f4, $\alpha = .82$; for f5, $\alpha = .77$; and for f6, $\alpha = .79$.

5. Conclusions and discussion

This article presents a measurement instrument to assess Korean teachers' individual occupational work ethic. The results of a series of EFA and CFA suggested a six-common-factor model of the TOWES and model indices produced satisfied the statistical criteria of a good model fit to the data collected. This research study can provide policy makers and program developers for pre-service and in-service teachers for their own professional development.

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IS IT BAD TO PROVIDE NEGATIVE FEEDBACK TO STUDENTS? THE ROLE OF REGULATORY FIT: A CASE FROM A UK UNIVERSITY

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Abstract

Drawing on regulatory focus theory, this research examines how students' chronic promotion or prevention foci influences their preference for receiving positive versus negative feedback for their assignment. This research further investigates the compatibility effect of students' chronic regulatory focus and goal orientation (regulatory fit). This research involves a total of about 215 respondents in two studies through questionnaires. Two experiments are conducted to test the role of chronic regulatory focus on students' preference for receiving positive versus negative feedback on their assignment (study 1) and the role of regulatory fit (promotion-focused students with gain-framed feedback versus prevention-focused students with loss-framed feedback) on students' motivation to improve after receiving feedback (study 2). The result of study 1 shows that students with chronic prevention focus prefer to receive negative feedback compared to students with promotion focus who prefer to receive positive feedback. Result of study 2 shows that students' motivation for improvement increase when they experience regulatory fit. This means that when students with chronic promotion focus receive gain-framed feedback they become more motivated to improve their performance toward their next assignment compared to when they are exposed to regulatory non-fit condition (receiving loss-framed feedback). Similarly, when students with chronic prevention focus receive loss-framed feedback they become more motivated to improve their performance compared to when they are exposed to regulatory non-fit condition (receiving gain-framed feedback). Overall, the studies offer important contributions to theory and practice relating to providing appropriate feedback to students at higher education level.

Keywords: *Promotion focus, prevention focus, higher education, students, feedback.*

1. Introduction

A significant growth of literature in higher education demonstrates that feedback plays an important role in the assessment to help improving students' experience in learning (Evans, 2013; Lizzio & Wilson, 2008; Nicol & Macfarlane-Dick, 2006; Pereira, Floresb, Simão, & Barrosd, 2016). An effective feedback must be transparent, timely and suitable to the context (Ramsden, 2003). Prior studies show that different factors such as modularization of the course, fewer tasks (Boud & Molloy, 2013), and psychological factors (Idson & Higgins, 2000; Van-Dijk & Kluger, 2004) influence the effectiveness of feedback. While earlier studies have emphasized the importance of appropriate feedback from multiple perspectives, individual differences and their influence on students' motivation, particularly in the higher education context, remain nascent. This study seeks to investigate how students are different in their motivation to improve their learning after receiving different types of feedback for their assignment by employing regulatory focus theory (RFT).

2. Regulatory focus theory and feedback preference

Regulatory focus theory conceptualizes how individuals approach pleasure and avoid pain toward a desired end-state by using different strategies; namely, an approach strategy and avoidance strategy (Higgins, 1997). People with a promotion focus rely on an approach strategy and adopt eagerness-related means to achieve a match with a desired end-state. Whereas, people with a prevention focus rely on an avoidance strategy and adopt vigilance-related means to prevent a mismatch with a desired end-state (Higgins, 1997). Both promotion- and prevention-focused individuals aim for the same desired end-state; however, their motivational strategic means and goals differ significantly (Higgins, 1997; Shah, Higgins, & Friedman, 1998). Promotion-focused individuals put a greater emphasis on ambitions, advancement, and gains in pursuing their ideal goals, whereas prevention-focused individuals are more inclined to place emphasis on duties, commitment and non-losses in pursuing their ought goals (Higgins, 1997). People with

a promotion focus pursue their goals in an approach strategy and are sensitive to presence or absence of a positive outcome, whereas, people with a prevention focus follow their goals through an avoidance strategy and are sensitive to absence or presence of a negative outcome (Higgins, 1997). A key assumption underlying regulatory focus theory is that different forms of regulatory focus are chronic disposition features, formed during socialization processes throughout individuals' formative years (Higgins, 1997).

Moreover, successful feedback should contain performance-gap evidence and a positive element such as praise (Lizzio & Wilson, 2008). However, individuals may perceive feedback differently from each other because feedback is a social process and the effectiveness of feedback might be altered accordingly (Carless, 2006). The current study aims to extend the application of regulatory focus theory to students' feedback preference, as feedback perception also comprises many socio-psychological aspects. Therefore, hypothesis one is developed as follows:

H1: Students with chronic prevention focus are more inclined to receive negative feedback than students with chronic promotion focus.

2.1. Regulatory fit and intrinsic motivation

A match between chronic regulatory focus and goal orientation produces a state of regulatory *fit*, which increases task engagement and positive feelings about the goal pursuit (Higgins, 2005). These orientations can also be activated by situational demands, such as through an experimental promotion or prevention stimulation (Avnet & Higgins, 2006). When individuals with chronic regulatory focus are exposed to a situation that is matched with their regulatory focus they experience regulatory fit. Regulatory fit allows an individual to derive additional utility from the degree to which the means used are compatible with the individual's regulatory focus (Higgins, 2005). Consequently, when individuals perceive a regulatory fit, they experience heightened motivation and a sense that 'it just feels right' (Aaker & Lee, 2006). This influences decision-making, behavior, and judgment leading to an increased engagement in a task and enhancement of the action's values. For example, individuals with promotion focus experience regulatory fit and become motivated to pursue their ideal goals by thinking of gains whereas; prevention-focused individuals experience regulatory fit and become motivated to pursue ought goals by thinking of avoiding loss (Aaker & Lee, 2006). Moreover, motivation is significant in the learning process. The feedback provided by tutors evidently can increase or decrease motivation toward a task (Zacharias, 2007) that makes feedback a significant element in learning. In summary, in following a goal, the adoption of 'fit' enhances the intensity of engagement in a task and increases the value of the action.

Intrinsic motivation has been studied through the lenses of different theories such as self-determination, flow and self-efficiency. For example, individuals' motivation increased when there is a high feeling of self-efficiency (Deci & Ryan, 1980). However, there is limited knowledge regarding the role of regulatory focus and fit on students' motivation after receiving feedback for their assignment. Moreover, according to Deci and Ryan (1980) certain needs determine people behavior and intrinsic motivation. Similarly, according to regulatory focus individuals with promotion focus regulate their nurturance needs (e.g., gain, hope and advancement) and individuals with prevention focus regulate their security needs (e.g., avoiding loss, protection and commitment). Study 2 extends study 1 by investigating the effect of regulatory fit (promotion-focused students with gain-framed feedback versus prevention-focused students with loss-framed feedback) on students' motivation to improve after receiving different types of feedback. Therefore, hypothesis two is developed as follows:

H2: Compatibility between students' chronic regulatory focus and goal orientation will influence their motivation toward their next task, such that,

H2a: When promotion-focused students are exposed to a gain framing feedback (fit), their motivation increase more than when they are exposed to a loss situation (non-fit). And,

H2b: When prevention-focused students are exposed to a loss framing feedback (fit), their motivation increase more than when they are exposed to a gain situation (non-fit).

3. Method

A quasi-experimental design and quantitative method was employed for the purpose of this study. Table 1 summarizes the method, samples sizes, and major focus of the questionnaires used in studies 1 and 2.

3.1. Study 1

3.1.1. Sampling and Procedure. Seventy-nine university students at level 5 studying Business Management Degree (41 men and 38 female) aged 18 to 24 (i.e., in classroom) participated voluntarily in the study. The questionnaires consisted of three sections. First section focused on demographic questions. In section two, students answered regulatory focus questionnaires (Higgins et al., 2001) to determine their

chronic regulatory focus (prevention focus $\alpha = 0.72$ and promotion focus $\alpha = 0.65$). In section three they were asked to answer two questions regarding their preference to receive positive versus negative feedback for their recent assignment (they had already received their feedback in the previous week). Due to space constraints items list is not included within the study however is available upon request.

3.1.2. Data Analysis and Results. The data was analyzed using independent-samples t-test wherein the preference for negative versus positive feedback of students was compared with regards to their chronic regulatory focus. The results show that prevention-focused students have higher preference to receive negative feedback for their assignment ($t = 2.97, p < 0.05$) compared to promotion-focused students, supporting H1.

3.2. Study 2

Extending the Study 1 where it was observed that prevention-focused students demonstrate a higher preference to receive negative feedback for their assignment, in this study I explore students' motivation to improve after receiving a feedback, which is compatible with their chronic regulatory focus.

3.2.1. Sampling and Procedure. One hundred thirty six university students (60 men and 76 female) aged 18 to 26 (i.e., in classroom) participated voluntarily in the study. This study consisted of four sections with the same pattern as in the first two sections in study one. Chronic prevention ($\alpha = 0.74$) and promotion ($\alpha = 0.61$) were above the recommended threshold. Section three of the questionnaires randomly introduced students to two different scenarios (promotion/gain-framed feedback and prevention/loss-framed feedback). In order to stimulate students' promotion goal, the structure of the scenario was framed in gain format, while in order to stimulate students' prevention/ought goal, the structure of the scenario was framed in loss format. The overall idea of framing manipulation (i.e., gain frame versus loss frame) was adopted from prior studies (i.e., Lee & Aaker, 2004; Rothman, Martino, Bedell, & Detweiler, 1999), with particularly similarity to the one developed and used by Shah, Higgins and Friedman (1998) (see section 2.4.3.5 for more detail). However the scenarios were produced based on recent feedback that students had received for their assignment in order to make it relevant to the context of the current study. Section four measured students' feedback perception in terms of how motivated they would become after reading the scenarios to make improvement by using four-items scale ($\alpha = 0.81$) adopted from prior study (Lizzio & Wilson, 2008) and modified to fit in the current study context such as "after receiving this feedback, I became motivated to work harder to achieve a good result", "the feedback motivated me to think deeply about the subject", "I found the feedback very constructive and encouraging", "the feedback helped me to improve my weak points toward next assignment". All these questions were measured on a 7-point Likert type scale. A manipulation checks item including "Does the above scenario place more emphasis on the gain associated with the feedback or loss associated with the feedback" followed this on a 9-point scale with -4 and +4 as anchors.

3.2.2. Data Analysis and Results. In order to understand whether the framing manipulation was perceived as intended, an independent-samples t-test was conducted. The results revealed that the loss- and gain-framed manipulation was successful as students in the loss-framed feedback ($M = -2.67, SD = 2.02$) report significant higher score toward loss and students in the gain-framed feedback ($M = 3.18, SD = 1.88$); $t(119) = 4.68, p < 0.05$) report significantly higher scores toward gain. Moreover, evaluating the respondents' overall feelings toward the scenario indicated that the average scores were similar apart from the two different versions of the scenario; that is the gain-framed scenario ($M = 3.02, SD = 1.27$) and for the loss-framed scenario ($M = 2.84, SD = 1.32$; $t(116) = 0.40, p > 0.05$). Thus, the results revealed that although respondents' evaluations of each scenario's desirableness were equal, they accurately recognized the emphasis that the scenarios were intended to convey. This means that the gain/loss manipulation was not confounded by the desirableness of the scenario evaluations. In order to test H2, a between-group ANOVA was conducted and results showed that the interaction effect between students' chronic regulatory focus and goal orientation of feedback was statistically significant ($F(1, 102) = 4.53, p < 0.05$). This means that when prevention-focused students were exposed to read prevention-framed feedback (loss-framed scenario), they were more motivated to make improvement to their study and found the feedback more useful. On the other hand, when promotion-focused students were exposed to read promotion-framed feedback they were also more motivated to make improvement to their study compared to when they were exposed to prevention-framed feedback.

4. Discussion and implication

Although prior studies in social psychology well documented how this 'feeling right' (regulatory fit) influences decision-making, behavior and motivation (Dijk & Kluger, 2004; Higgins, 2000; Idson

& Higgins, 2000), it is less validated in the higher education context and assessment/feedback. This study reported the results of two experiments supporting the hypotheses in terms of interaction between regulatory focus and students' perception on a feedback. According to Higgins (1997) people with prevention focus pay more attention to the absence or presence of negative outcome (positive outcome) while pursuing their goal compared to people with promotion focus. So, in the first study I hypothesized that students with chronic prevention focus are more inclined to receive negative feedback versus positive feedback compared to students with chronic promotion focus. This hypothesis was confirmed and the result is consistent with prior findings (e.g., Higgins, 1997; Van-Dijk & Kluger, 2004). Study 2 built upon the groundwork laid in Study 1 by framing a specific situation (either prevention or promotion) to address the compatibility hypotheses. This experiment validated the previous theoretical assertions and explained that students with chronic prevention focus perceived prevention/loss-framed feedback for their assignment more encouraging for further improvement than promotion/gain-framed feedback. On the other hand, students with promotion focus found the promotion/gain-framed feedback more encouraging than prevention/loss-framed feedback. This means that students use either of the avoidance or approach strategies that are matched with their chronic regulatory focus to follow their goal; however, the avoidance strategy (i.e., avoid loss) does not simply mean holding back or being discouraged, but also involves promise from and responsibility and motivation for the action (Shah, Higgins, & Friedman, 1998). Thus, students would experience a greater regulatory fit when the feedback framing is compatible with their chronic regulatory focus.

One of the main contributions of this study is that university tutors should develop more effective feedback for students' course work by considering students' differences in their psychological traits. As prevention-focused students become more motivated to improve after receiving negative and loss-framed feedback, this study suggests that university tutors should particularly attempt to provide feedback emphasising loss avoidance and negative points to increase students' motivation for improvement toward the subject or next assignment. On the other hand, for students with promotion focus the feedback should emphasize on gain, personal rewards and accomplishments that fit with the prospective students' strategy. Further, previous studies show that an effective feedback should consist of different elements, such as being timely, appropriate (Ramsden, 2003), and must be understood by tutors and students (Orsmond, Merry, & Reiling, 2005). The current findings extend the literature on feedback in a way that effective feedback should not only include a positive element such as praise (Lizzio & Wilson, 2008), but also negative component, as based on regulatory focus theory a single issue can be observed in different ways depending on the 'eyes' of the person involved (Pham & Higgins, 2005). Moreover, prior studies investigating the role of regulatory focus on different contexts; however, the current study extends the application of regulatory focus on higher education context by highlighting the important role of students' psychological trait on feedback perception.

5. Research limitations and future research directions

While offering a number of noteworthy implications, limitations of this research offer several directions for future exploration. This study manipulated feedback framing by using a single module of the course to prime students' goal orientation. However, researchers in future study may be interested in including different modules keywords in constructing the scenario. Additionally, for the purpose of this study both international and British students participated in the study and cultural effect was not controlled. Therefore, cultural factor should be considered in the future study. Finally, as a methodological limitation, this study used only four items to measure motivation. Future study should use more items to measure performance, task importance and task enjoyment.

Table 1. Methods.

	Method	Sample size	Focus of questions
Study 1	Experimental design, Questionnaires	41 Male & 38 female, Age 18-24 Business Management degree students level 5 (British & international)	Regulatory focus questionnaires to determine chronic regulatory focus, Negative versus positive feedback preference
Study 2	Two groups; experimental design, Questionnaires	60 Male & 76 female, Age 18-26 Business Management degree students level 5 (British & international)	RFQ to determine chronic RF, Compatible feedback (scenario) Motivation measure

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EXPLORING THE IMPACT OF THE COMPLEXITY OF COGNITIVE DEMANDS ASSOCIATED WITH CURRICULUM CONTENT ON STUDENT ACADEMIC PERFORMANCE: A CASE OF MATHEMATICS

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Abstract

Student academic performance is intrinsically linked to the complexity of the cognitive demands associated with curriculum content on offer. Skills development is largely regarded as a fundamental process that serves to engender critical expertise required for economic growth and sustainable development. The ability to operate at various cognitive levels is central to meaningful enhancement of human capital development. Meaningful development of mathematical skills in particular hinges to a large degree on the extent to which students are able to grasp curriculum content associated with various learning areas. The development of adequate cognitive competence to grapple with mathematics curriculum content would certainly make it possible for students to perform routine operations as well as complex procedures associated with various mathematical tasks. In response to this key imperative, the impact of cognitive demands associated with curriculum content on student academic performance was explored by tracking the academic performance of undergraduate engineering students in mathematics at a South African university over two semesters as part of a longitudinal study. This cohort of students was purposively selected as mathematics is largely viewed as an intellectually stimulating discipline providing opportunities for students to indulge in tasks pitched at various cognitive levels. The study revealed that student academic performance based on mathematics curriculum content offered in the second semester was inadequate. This inadequate academic performance can partly be attributed to the students' inability to cope with the complexity of the cognitive demands associated with mathematics curriculum content offered in the second semester. Theoretical implications for meaningful critical reflection on the complexity of cognitive demands associated with curriculum content are discussed.

Keywords: *Cognitive demands, mathematical skills, cognitive levels.*

1. Introduction

The ability to operate at various cognitive levels is central to meaningful enhancement of human capital development. Meaningful development of mathematical skills in particular hinges to a large degree on the extent to which students are able to grasp curriculum content associated with various learning areas. Bloom (1956) devised a model for classifying thinking into six cognitive levels of complexity. The cognitive levels in order of increasing complexity are: knowledge, comprehension, application, analysis, synthesis, and evaluation. However, the original Bloom's Taxonomy was revised by Anderson and Krathwohl (2001) and this revision culminated in a transformation of the six cognitive levels to indicate action verbs. The revised model by Anderson and Krathwohl (2001) generated the following six cognitive levels: remembering, understanding, applying, analysing, evaluating, and creating. In view of the fundamental revision of Bloom's Taxonomy, the mathematics education community called for a reform in the knowledge and skills required for enactment of effective teaching practice (Heck, Banilower, Weiss, & Rosenberg, 2008).

The meaning of cognitive demand has been subjected to various scholarly interpretations. According to Stein, Smith, Henningsen and Silver (2009), the cognitive demand is the variation in the kind of thinking required of students engaging in a mathematical task. They identified the four levels characterising cognitive demand, namely: (a) memorization; (b) procedures without connections; (c) procedures with connections; and (d) doing mathematics. More specifically, the level of cognitive demand determines the depth of understanding acquired by students in the learn process (Stein, Smith, Henningsen, & Silver, 2009). On the other hand, Park (2011: 5) defines cognitive demand as the 'amount

of intellectual activity required to perform a task'. The cognitive demand is further viewed by Henningsen and Stein (1997: 529) as the 'kind of thinking processes entailed in solving the tasks'. It is against this background that this research study primarily explored the impact of the complexity of cognitive demands associated with curriculum content on student academic performance in mathematics as a key knowledge domain.

2. Research design and methodology

This study adopted a cohort design as it involved participants who are united by some commonality or similarity (Healy & Devane, 2011). The cohort consisted of undergraduate students who were enrolled for a degree program in Metallurgical Engineering. This cohort constituted a purposive sample within the context of this study. The student academic performance in mathematics was tracked over two semesters with a view to assess the complexity of the cognitive demands associated with the mathematics curriculum content covered.

3. Results and discussion

Table 1 below provides mathematics curriculum content covered in the first semester and second semester.

Table 1. Mathematics curriculum content covered in the first semester and second semester.

Mathematics curriculum content covered in the first semester	Mathematics curriculum content covered in the second semester
<i>Functions and relation</i>	<i>The meaning of complex numbers</i>
<i>Algebraic graphs</i>	<i>Algebraic operations with complex numbers</i>
<i>The binomial</i>	<i>Differentiation</i>
<i>Determinants</i>	<i>Limits of functions</i>
<i>Transcendental functions</i>	<i>Rates of change</i>
<i>Exponents and the exponential function</i>	<i>Rules for differentiation</i>
<i>Logarithms</i>	<i>Derivatives of transcendental functions</i>
<i>Graphs of the exponential and logarithmic functions</i>	<i>Higher derivatives</i>
<i>Formulae</i>	<i>Applications of differentiation</i>
<i>Trigonometric function</i>	<i>Integration</i>

The academic performance in the first and second semester is depicted in Figure 1 below. The academic performance in the second semester was dismal (24%) as compared to the first semester (80%). This performance disparity can partly be attributed to the comparative complexity of the cognitive demands associated with the mathematics curriculum content covered during the two semesters. The academic performance demonstrated by the students in the first semester can be attributed to the strong connection between the mathematics curriculum content covered in the first semester and school mathematics curriculum content. Battista (1994) argues that students are not achieving their fullest potential in mathematics for various reasons, but it is clear that improvement in the quality of mathematics teaching needs to occur in order to combat low student achievement. Other researchers such as Karp *et al.* (2011) are of the view that some students are not given ample opportunities to learn important mathematics while other students are not challenged by the curriculum, and yet other students do not actively engage in the mathematics. This has profound implications for the design of the mathematics learning tasks students engage in. Mathematics learning tasks in which students engage ought to provide rich pedagogic benefits and experiences for students to realise their key learning outcomes. The development of adequate cognitive competence to grapple with mathematics curriculum content would certainly make it possible for students to perform routine operations as well as complex procedures associated with various mathematical tasks. As noted by Resnick (2006), the mathematical tasks in which students engage serve to convey a message about the nature of mathematics and influence students' understanding of concepts and processes. Implementing tasks of high cognitive demand can be an arduous process in itself as problems of high cognitive demand are more ambiguous and have multiple solution paths (Henningsen, & Stein, 1997).

Figure 1. Academic performance in the first and second semester.

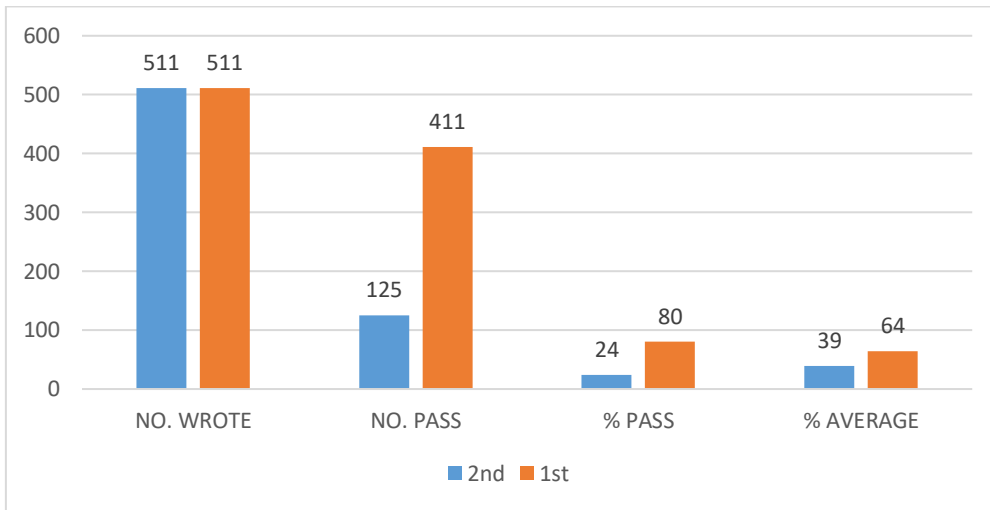
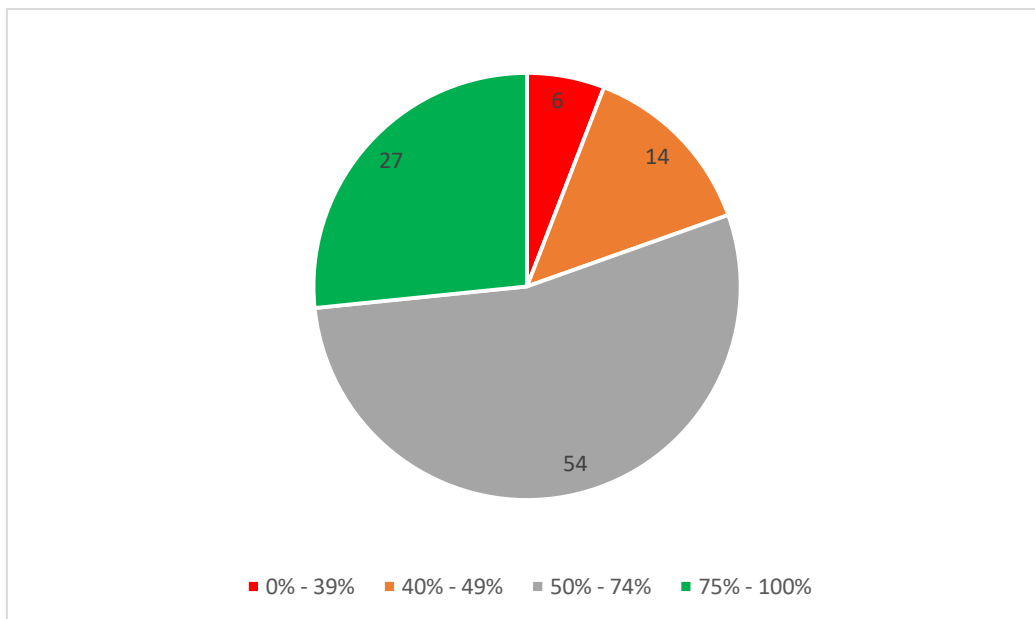


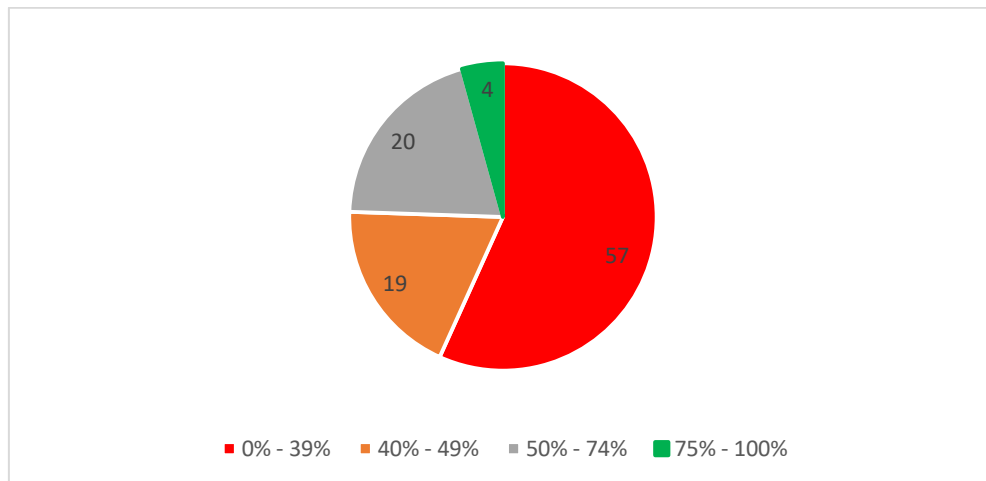
Figure 2 below depicts academic performance across the various percentage bands in the first semester. The performance of a substantial number of students (54%) fell within the 50%-74% band.

Figure 2. Performance across various percentage bands: First Semester.



The academic performance across the various percentage bands in the second semester reflects a gloomy picture as the performance of most students fell within the 0%-39% band. This predicament calls for creative ways through which mathematics curriculum content can be taught in an intellectually accessible manner. This key goal can be accomplished by selecting tasks that promote deep engagement and meaningful discussion in the classroom (Smith, Bill, & Hughes, 2008; Stein, Smith, Henningsen, & Silver, 2009). In addition, student understanding can be enhanced through the lens of a particular learning trajectory which essentially helps instructors to visualize a continuum of student understanding and how to help the students increase or deepen understanding (Clements & Sarama, 2009; Sarama & Clements, 2009).

Figure 3. Performance across various percentage bands: Second Semester.



4. Conclusions

The complexity of the impact of cognitive demands associated with mathematics curriculum content in particular requires constant interrogation in order to provide meaningful learning opportunities to students. Student under-preparedness is a pervasive problem afflicting meaningful development of mathematical skills within the broader South African context and concerted efforts in this regard would serve to enhance throughput which is intrinsically linked to quality and improved student academic performance. The ability to operate at various cognitive levels is central to meaningful enhancement of human capital development and this key strategic imperative requires instructors to demystify the complexity of the impact of cognitive demands associated with curriculum content.

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A MOBILE EEG STUDY ON THE NEUROPHYSIOLOGICAL CORRELATES OF ORAL READING IN DYSLEXIA

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Abstract

Cognitive neuroscientists have already begun to examine the neural basis of reading in dyslexia. In this study, the neurophysiological characteristics of reading in Filipino children with dyslexia were investigated. Using mobile EEG (mEEG), the researchers sought to determine brain differences between four normal reading children (NR group; mean age = 9.61; SD = 1.00) and five children with dyslexia (DYS group; mean age = 9.61; SD = 1.7) as they were tasked to read regular words, irregular words, and non-words. Significant differences were revealed for irregular words ($U = 0$, $p = .01$) and non-words ($U = 1.5$, $p = .04$), but not for regular words ($U = 3$, $p = .08$). mEEG analysis revealed that the DYS group exhibited slower brain activity in the left frontal and posterior regions, as well as stronger activity in the right hemisphere. These findings signify that the reading impairment in dyslexia is caused by reduced communication and weaker connectivity in the frontal and posterior regions which are important areas for visual word processing. Furthermore, stronger connectivity in the right hemisphere during reading indicates a compensatory mechanism in dealing with reading difficulties.

Keywords: *Dyslexia, reading, mobile EEG.*

1. Introduction

Dyslexia is a neurodevelopmental disorder characterized by severe and persistent reading difficulties despite normal intellectual functioning and appropriate schooling (Pina Rodrigues et al., 2017). Although dyslexia is usually only diagnosed after two to three years of schooling, neuroanatomical precursors have been identified in pre-reading children at family risk for the disorder (Goswami, Power, Lallier, & Facoetti, 2014; Clark et al., 2014). This implies that if a child has a parent or a sibling with dyslexia, it is important that he or she be carefully observed for signs of reading difficulties. One approach to understanding reading is through the dual-route cascaded (DRC) model of visual word recognition and reading aloud by Coltheart and colleagues (2001). The DRC model proposes that written language is processed by two independent but interactive pathways: the lexical route and the sub-lexical route. The *lexical (or direct) route* processes familiar and orthographically irregular words but would fail to process unfamiliar words or pseudowords. The *sub-lexical (or indirect) route*, on the other hand, involves an understanding of grapheme-to-phoneme correspondences through which one can read unfamiliar words and pseudowords but fail to produce accurate responses to irregular words. To be a skilled reader, one must acquire both these routes. On the other hand, an impaired reader is characterized by a dysfunction in either or both of these routes (Bosse & Valdois, 2009; Gori, Cecchini, Bigoni, Molteni, & Facoetti, 2014).

Reading requires the cooperation and integration of several neurocognitive processes situated in multiple brain regions. According to the neural model of reading by Shaywitz and Shaywitz (2008), a number of interrelated neural systems, primarily located in the left hemisphere, are involved in reading: 1) the *dorsal system*, which involves phonologically-based reading and facilitates grapheme-phoneme conversions, includes the posterior superior temporal and inferior parietal regions; 2) the *ventral system*, which consists of left ventral occipito-temporal areas and is associated with visual-orthographic word recognition; and the 3) the *anterior system*, which involves the left inferior frontal region and facilitates speech articulation and word analysis (Martin, Kronbichler, & Richlan, 2016; Richlan, 2014). To investigate the neural dynamics of reading, researchers in the field of cognitive neuroscience use neuroimaging techniques such as mobile electroencephalography (mobile EEG or mEEG), which allows researchers to observe patterns of brain frequencies (or waves) in a practical, accessible, and easy-to-use manner (Badcock et al., 2015). Each frequency band underlying function: A dominance of slow

frequencies (i.e., delta and theta) when one is engaged in a cognitive task would suggest slow brain activity and possibly even cognitive dysfunction (Kamel & Saeed Malik, 2015), whereas faster frequencies (i.e., beta and gamma) are dominant when the brain is actively processing information (Magazzini & Singh, 2018). The alpha band, which is dominant at resting state, is associated with cortical and behavioral inhibition (Bastos et al., 2015). These frequencies are used to explain the differences in brain activation between normal controls and those with neurological deficits. In normal readers, stronger activity characterized by a dominance of beta and gamma frequencies is typically found in the left hemisphere. In contrast, brain activation in readers with dyslexia typically involve a dominance of slow frequencies (i.e., delta and theta) in the left hemisphere, reflecting a dysfunction in the left hemisphere reading network (González-Garrido, Gómez-Velázquez, & Rodríguez-Santillán, 2014; Jiménez-Bravo, Marrero, & Benítez-Burraco, 2017; Paulesu, Danelli, & Berlingeri, 2014; Richlan, Kronbichler, & Wimmer, 2013; Shaul, Arzouan, & Goldstein, 2012; Žarić et al., 2014, 2017). The aim of this study is to illustrate the neurophysiological characteristics of Filipino children with dyslexia as they engage in an oral reading task using mEEG as a brain imaging tool.

2. Method

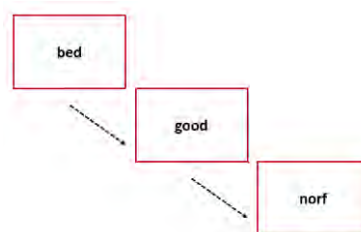
2.1. Participants

The participants were divided into the Dyslexia (DYS) group ($n = 5$; mean age = 9.61; $SD = 1.7$) and the Normal Reader (NR) group ($n = 4$; mean age = 9.61; $SD = 1.00$). For both groups, non-verbal IQ results obtained using the Raven's Colored Matrices (Raven, Raven, & Court, 2003) were found to be within the normal range (at least at 75th percentile or an IQ of at least 90). The DYS group had been previously diagnosed with Specific Learning Disorder with an impairment in reading by a professional (medical doctor, clinical/educational psychologist, or special educator/reading specialist). On the other hand, the NR group had no history of reading difficulties. All participants were male, right-handed, with normal vision (as previously assessed by their physicians), and free of any co-morbid conditions, such as attention deficit/hyperactivity disorder, autism spectrum disorders, and any speech/language and visual impairments. Furthermore, parental consent and child assent were obtained before data gathering.

2.2. Experimental task

The Castles and Coltheart Reading Test 2 (CC2; Castles, Coltheart, Larsen, & McArthur, 2009) was used to assess the functioning of the key processes in single word reading: sounding-out ability and whole word recognition ability. Sounding-out ability involves knowledge about letter-sound relationships and is assessed by accuracy in reading aloud nonwords (e.g., /gop/). Whole word recognition ability involves knowledge about familiar words and is assessed by accuracy in reading aloud irregular words (e.g., /yacht/), which cannot be read correctly via sounding-out rules. The test also includes regular words, such as /cat/, which can be read correctly via either sounding-out or whole word recognition processes. Consisting of 40 regular words, 40 irregular words, and 40 nonwords, test items were presented one-at-a-time, in mixed order, and with gradually increasing difficulty. Presentation was discontinued on each subscale after five consecutive items are read incorrectly. This test is administered to children ages six years to 11 years and 6 months. For each list, the total accuracy score was obtained and converted to into a z-score.

Figure 1. Illustration of the Oral Reading Task (CC2).



In this study, the online version of CC2 was used. The participants would sit in front of the computer screen as the instructions were read to them. Once it was clear that they understood what to do, the experimenter would click on "RUN TEST." The experimenter would mark their first response using the appropriate key and the next word would be prompted. If the child would not respond to a word within five to 10 seconds, he/she would be prompted to guess. If the child would be unable to respond within another five seconds, he/she was assured that it was alright and the incorrect response key was pressed. The program stopped automatically when the participants reached their limit of ability (Macquarie Online Test Interface, 2009).

2.3. Data collection and analysis

Brain signals were obtained by the Emotiv EPOC Neuroheadset (Emotiv Systems, Inc., 2013), a non-invasive, high-resolution, neuro-signal acquisition and processing wireless headset designed for contextualized research (see Figure 1). It has 14 channels (AF3, F7, F3, FC5, T7, P7, O1, O2, P8, T8, FC6, F4, F8, and AF42) distributed according to the internationally accepted 10–20 system of electrode placement and includes two references in the CMS/DRL noise cancellation configuration P3/P4 locations. Only 12 channels were included in the study (i.e., T7 and T8 were excluded).

Figure 2. The Emotiv EPOC Neuroheadset and its scalp locations.



Data were transferred via Bluetooth to the computer and raw EEG data were acquired using the EmotivPRO software. Further signal processing was carried out using EEGLAB, an open source MATLAB toolbox for processing data from EEG. The EEG recordings were segmented into epochs to be extracted, visually inspected, and cleaned for artifacts. Absolute power analyses using fast Fourier transform (FFT) for delta (1–4 Hz), theta (4–8 Hz), alpha (8–12 Hz), and beta (12–25 Hz). Mann–Whitney U tests were performed using IBM SPSS Statistics version 25.0. Before putting on the headset, the 14 electrode recesses were fitted with a moist felt pad. The headset was then placed on the participant's head and subjected to software set-up which took approximately 10 minutes. After verifying that the built-in battery was fully charged and the wireless signal reception was reported as good, the experiment began. The participants were instructed to relax and keep their eyes closed for five minutes.

3. Results and discussion

3.1. Oral reading task

In order to determine significant group differences in reading accuracy assessed by the oral reading task, Mann-Whitney U tests were carried out. As seen in Table 1, the performance of the NR group was significantly higher than the performance of the DYS group on two reading lists: irregular words ($U = 0$, $p = .01$) and non-words ($U = 1.5$, $p = .04$). No significant difference was revealed for regular words ($U = 3$, $p = .08$). These results suggest that the DYS group suffer from an impairment in both lexical and sub-lexical reading wherein they not only exhibit poor word knowledge and recognition of unusual words, but also demonstrate ineffective grapheme-phoneme correspondences and difficulties in both visual and phonological encoding. The most severe reading deficits involve a dysfunction in both irregular word and non-word reading (Bosse & Valdois, 2009; Gori et al., 2014).

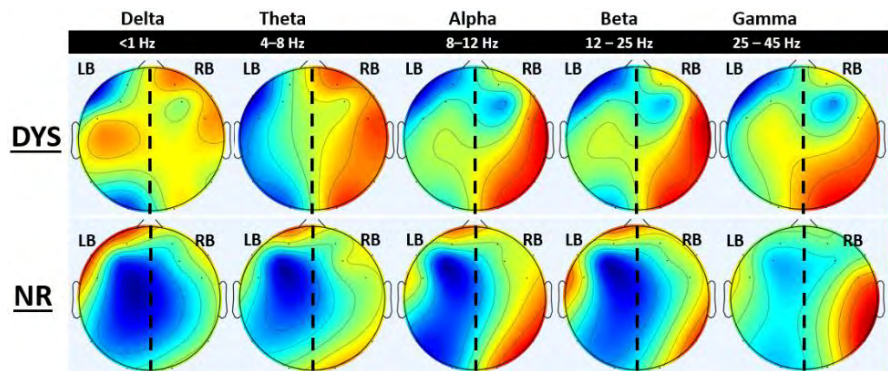
Table 1. Mean ranks and sum of ranks for regular word, irregular word, and non-words in the oral reading task.

	Group		U	p-value
	NR	DYS		
Regular Word	6.75 (27)	3.60 (18)	3	.08
Irregular Word	7.50 (30)	3.00 (15)	0*	.01
Non-word	7.13 (28.5)	3.30 (16.5)	1.5*	.04

3.2. mEEG analysis

For the DYS group, delta and theta power was concentrated in frontal and parietal regions, signifying slower brain activity in these areas. Alpha power was concentrated in the frontal and right parietal regions, whereas beta power was exhibited at the frontal and occipital regions. On the other hand, gamma power activation was significantly stronger for the NR group. The DYS group was found to have a right-lateralized activation network, as well as increased delta power that is lateralized to the right hemisphere.

Figure 3. Power distributions according to frequency band for Resting State. Power (in dB) is represented by colors (dark red = very high, orange = high, yellow = average, light blue = low, dark blue = very low).



The results of the mEEG experiment show that the reading impairment in dyslexia is reflective of reduced communication and weaker connectivity in the left frontal and posterior regions, which are all involved in the reading and visual-to-phonology processes (Paulesu et al., 2014). Moreover, the DYS group demonstrated increased right hemisphere activity. Previous studies have also reported evidence of right-lateralized hyperactivations in dyslexia while reading, indicating a dysfunction of a left hemisphere reading network consisting of areas involved in speech processing and reading acquisition (Jiménez-Bravo, Marrero, & Benítez-Burraco, 2017; Richlan, Kronbichler, & Wimmer, 2013). Overall, these findings suggest a compensatory mechanism involving the right posterior brain regions when a disruption in visual word processing occurs (González-Garrido et al., 2014; Shaul et al., 2012; Žarić et al., 2014, 2017).

4. Conclusions

Using mEEG as a brain imaging tool, this study confirmed the existence of an atypical left hemisphere reading network marked by a dominance of slow frequencies in left cortical areas, as well as a possible compensatory mechanism for reading in dyslexia characterized by stronger activity in the right hemisphere. This proposes an interesting opportunity to investigate further a neurophysiological framework for reading.

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EXTENDED CURRICULUM PROGRAMS AS A SUPPORT MECHANISM TO ENHANCE SOUTH AFRICAN UNDERGRADUATE SCIENCE STUDENTS' ACADEMIC PERFORMANCE IN MATHEMATICS

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Abstract

The complexity of the articulation gap between school and higher education posed enormous challenges to institutions of higher learning in South Africa. In response to this predicament, various strategic interventions were adopted with a view to adequately address student under-preparedness for tertiary studies. As a gateway knowledge domain, mathematics forms an integral part of various curriculum programs geared towards the cultivation of skills required by the mainstream economy. However, inadequate student academic performance in mathematics remains a pervasive pedagogic challenge afflicting meaningful enhancement of human capital development through inculcation of critical skills. In recognition of this fundamental challenge, undergraduate science students' academic performance in mathematics was tracked over a two year period as part of a longitudinal study at a South African university with a view to assess the efficacy of the remedial interventions underpinning the concomitant extended curriculum program. The students were enrolled for a degree program in science specialising in Analytical Chemistry. In addition, the students were placed in the extended curriculum program by virtue of their inadequate overall admission score. The student cohort constituted a purposive sample within the context of this study. By its very nature, the intrinsic structure of the concomitant extended curriculum program makes provision for the implementation of remedial interventions to provide critical academic support to the students as they are viewed as at-risk cohort by virtue of their profile. The duration of the extended curriculum program is longer than the normal duration of a mainstream curriculum program. The students were divided into two groups according to the profile of their overall admission score. Analysis of student academic performance in mathematics over the two year period revealed disparity in the performance of the two groups. Students in the group with a comparatively higher overall admission score demonstrated a higher academic performance in mathematics during the period under review. While the students with a comparatively lower overall admission score derived benefits from the remedial interventions put in place, there is a crucial need to reconfigure the inherent structure of the remedial interventions in order to address the performance disparity between the two groups. Theoretical implications for meaningful curriculum reform are discussed.

Keywords: *Articulation gap, remedial interventions, curriculum reform.*

1. Introduction

The complexity of the articulation gap between school and higher education in South Africa remains a fundamental challenge afflicting the provision of higher education particularly in the mathematics, science, engineering and technology arena. South African higher education institutions responded in a variety of ways to student under-preparedness for tertiary studies. Extended curriculum programs were introduced as a support mechanism to enhance the academic performance of undergraduate science students in mathematics in particular. While the dawn of democracy in South Africa engendered significant increase in access to higher education for previously disadvantaged students (Mentz, 2012), inadequate student academic performance in mathematics as a key knowledge remains a key area of concern. It has been acknowledged by a vast array of research studies that persistent problems limit the quality of learning and therefore constrain student success (CHE, 2013; Letseka 2005; Badat, 2009; Scott et al, 2007). Other researchers call for a critical appraisal of the remedial interventions and sociocultural and knowledge practices of universities with a view to improve the overall student academic performance across disciplines (Morrow, 2009; Jansen, 2004; Marshall & Case, 2010).

At a policy level, the National Development Plan (NDP) envisages an overall 23 percent target in undergraduate graduation rate by 2030 (CHE, 2013). This ambitious projection hinges to a large degree

on the critical examination of the impact of institutional policies and conditions on students' academic success (Tinto & Pusser, 2006). It is against this background that this research study primarily focused on the efficacy of extended curriculum programs as a support mechanism to enhance undergraduate science students' academic performance in mathematics as a key knowledge domain.

2. Research design and methodology

This study adopted a cohort design as it involved participants who are united by some commonality or similarity (Healy & Devane, 2011). The cohort consisted of undergraduate students enrolled for an extended curriculum program in Analytical Chemistry during 2017 and 2018. This cohort constituted a purposive sample within the context of this study. The students were divided into two groups according to the profile of their overall admission score. The student academic performance in mathematics was tracked over a two year period as part of a longitudinal study at a South African university with a view to assess the efficacy of the remedial interventions underpinning the concomitant extended curriculum program. The module identification codes for the two groups of students are MATCXA1 and MATCXB1, respectively.

3. Results and discussion

The curriculum content of the Mathematics Module offered is depicted in Table 1 below.

Table 1. Mathematics curriculum content.

<i>Functions and relation</i>
<i>Algebraic graphs</i>
<i>The binomial</i>
<i>Determinants</i>
<i>Transcendental functions</i>
<i>Exponents and the exponential function</i>
<i>Logarithms</i>
<i>Graphs of the exponential and logarithmic functions</i>
<i>Formulae</i>
<i>Trigonometric function</i>
<i>The meaning of complex numbers</i>
<i>Algebraic operations with complex numbers</i>
<i>Differentiation</i>
<i>Limits of functions</i>
<i>Rates of change</i>
<i>Rules for differentiation</i>
<i>Derivatives of transcendental functions</i>
<i>Higher derivatives</i>
<i>Applications of differentiation</i>
<i>Integration</i>

Academic performance demonstrated by the two groups during 2017 and 2018 is illustrated in Figure 1 and Figure 2 below. While the academic performance during 2017 for MATCXA1 was satisfactory, the academic performance for MATCXB1 remained inadequate as reflected in Figure 1. The academic performance trend exhibited by the two groups during 2018 remained largely similar. In particular, students belonging to the group MATCXB1 demonstrated notable inadequate academic performance. This performance trend appeared to be commensurate with the profile of the two groups in terms of their overall admission score. Students in MATCXA1 group were admitted on the basis of a higher admission score as compared to students in the MATCXB1 group. A research study conducted by McDonough (1997) found that students from low socio-economic backgrounds usually attend high schools that are poorly resourced and students are not well prepared for university and may have no career guidance services. The performance trend demonstrated by the two cohorts can also partly be attributed to the complexity of the cognitive demands associated with the mathematics curriculum content itself as well as the contextual factors such as the institutional culture. This notion is consistent with the assertion that the social and academic institutional culture ought to provide a conducive teaching and learning atmosphere that makes provision for diverse cultural capital and adapts to diverse student needs (Thomas, 2002). In addition, various research studies posit that contextual factors such as equity of opportunity and outcomes critically depends on supportive institutional environment, culture, curriculum innovation, appropriate induction and support in academic learning (Badat, 2010; Boughey, 2005; Scott, 2013; Gorinski & Abernety, 2007). According to Letseka (2005), inadequate academic performance can be attributed to other key factors which include the dysfunctionality of the education system and student

under-preparedness for higher education. There is a crucial need for key remedial interventions embedded within the extended curriculum programs to be responsive to students' academic needs in order to break down barriers that inhibit meaningful learning.

Figure 1. Student academic performance during 2017.

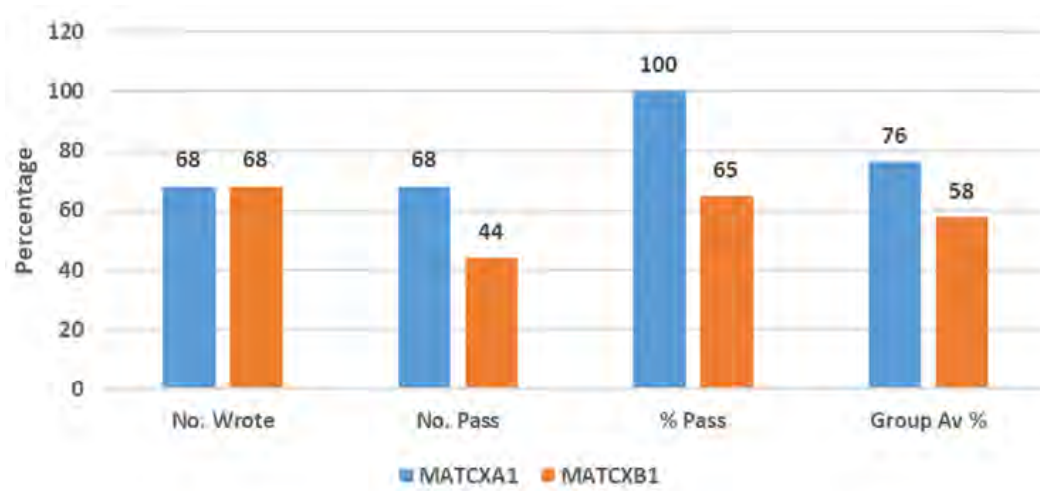
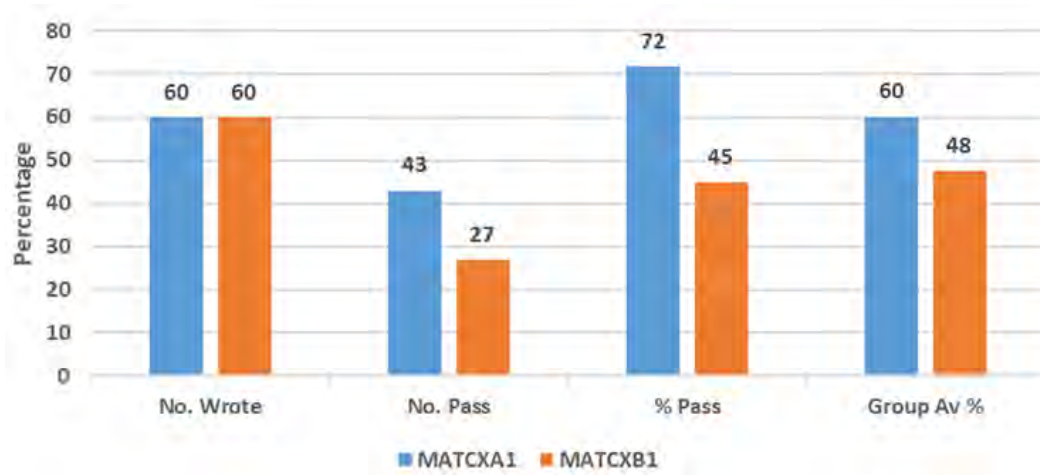


Figure 2. Student academic performance during 2018.



The academic performance across the various percentage bands during 2017 is illustrated in Figure 3 and Figure 4 below. The academic performance of the majority of students (54%) fell within the 75%-100% band in relation to group MATCXA1. However, the academic performance of a substantial number of students in this group fell within the 50%-74%. The academic performance in relation to group MATCXB1 presented a mixed picture across the percentage bands with the performance of a significant majority falling within the 50%-74% band. The complexity of the articulation gap between school and higher education afflicts meaningful provision of instruction that is responsive to the critical needs of students. This predicament ought to be viewed within the context of the seriousness of the need to address the articulation gap between the demands of higher education and the preparedness of school leavers for tertiary studies. Kuh, Kinzie, Bridges and Hayek (2007) advocate for early interventions and continued support to students as these key undertakings would serve to provide meaningful opportunities for students to engage in beneficial educational activities which make it possible for students to connect with others within the institutional environment. As observed by the Department of Higher Education and Training (2011), meaningful efficacy of extended curriculum programs can be achieved through sustained focus on the improvement of the quality and impact of learning and teaching resources for meaningful pedagogical access.

Figure 3. Academic performance across various percentage bands during 2017: MATCXAI.

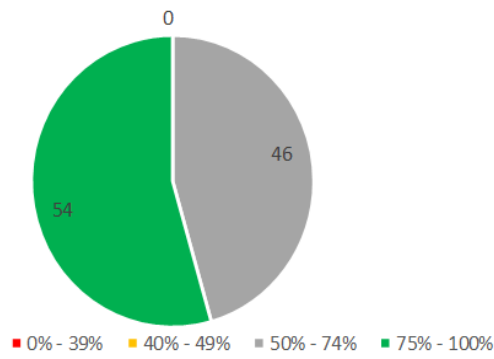
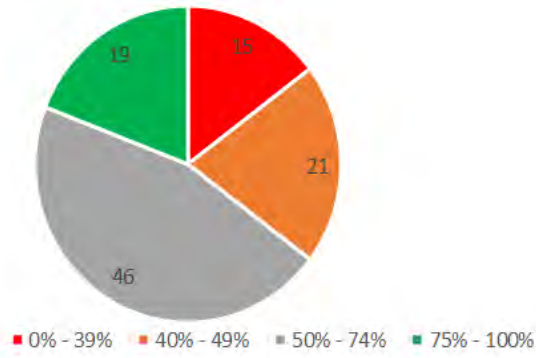


Figure 4. Academic performance across various percentage bands during 2017: MATCXB1.



As reflected in Figure 5 and Figure 6 below, the academic performance of a substantial number of students during 2018 fell within the 50%-74% band. The overall academic performance of the MATCXB1 group remained strikingly inadequate.

Figure 5. Academic performance across various percentage bands during 2018: MATCXAI.

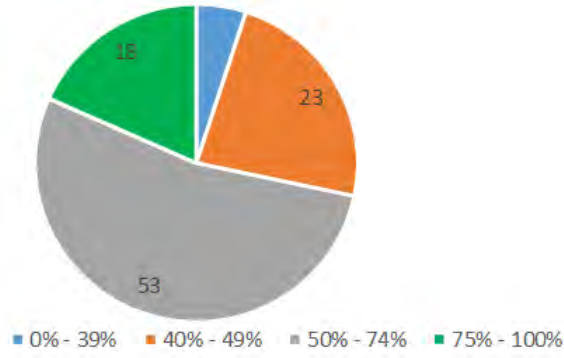
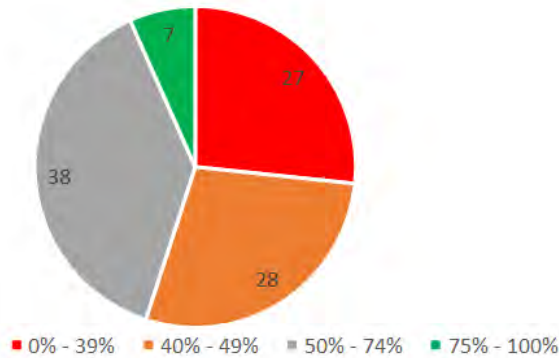


Figure 6. Academic performance across various percentage bands during 2018: MATCXB1.



4. Conclusions

There is a crucial need for the inherent structure of extended curriculum programs and the concomitant remedial interventions to cater for diversity in terms of the profile of students entering universities. This key strategic imperative calls for the reconfiguration of the structural nature of remedial interventions employed in order to enhance student academic performance. While extended curriculum programs proved beneficial to students since their inception, there is a need for constant monitoring in order to ensure their efficacy going forward. As a key strategic imperative, extended curriculum programs ought to be characterised by provision of adequate resources and well-organised learning opportunities that would serve to maximise students' academic experience required for meaningful human capital development.

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GENDER DIFFERENCES BETWEEN THE PERCEPTIONS OF PHYSICS AND SCIENCE IN GENERAL AMONGST SENIOR AND JUNIOR STUDENTS AT A SOUTH AFRICAN UNIVERSITY

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Abstract

It is widely accepted from literature (Agra et al., 2017) that male students outperform their female counterparts in science, and in particular physics. Accordingly, gender differences stem from their prior backgrounds in mathematics, physics and differences about their attitudes and beliefs about the subject. To measure students' differences in perceptions regarding physics and science, use is made of a questionnaire that is comprised of two sections, A (four questions) and B (fifteen questions). In section A students were required to respond to questions that relates to their relationship between life and physics, chemistry and mathematics, while in section B, a probe is made regarding their confidence in physics and chemistry. A total of 101 students participated in this study, ranging from junior students (62 emergency medical care and podiatry students) to senior students (37 analytical chemistry fourth year students). Results are presented in both numeric and in percentage form. The fundamental difference between the genders is that in both groups there appears to be a strong affinity for chemistry for the female students, and even a stronger liking for chemistry by the senior analytical chemistry students. The males on the other hand shown an average liking for chemistry in both cohorts, but a slightly better liking for physics as a subject. From this anecdotal study, it appears that females show more preferences for science and chemistry than their male counterparts.

Keywords: Physics, gender, chemistry, anecdotal, questionnaire.

1. Introduction

Physics as a subject is important for any country's welfare and technological advancement (Baran, 2016). Thus, the contribution by physicist is of paramount importance for any growing scientific economy. The lack of which can be detrimental for any technological endeavors. In this case, it can be said that equal contribution by both males and females to science would be any ideal scenario. However, research points to the converse of this scenario. This stems from the fact that physics is considered a difficult subject and thus there are variations in perceptions between males and females. Accordingly females' lack of interest in the subject, results in them showing less enthusiasm for the subject (Baran, 2016; Bamidele, 2001). Research by Visser (2007) and Ozgun Koca & Sen (2011) revealed that males preferred physics more than their female counterparts. In the same vein, research by Wei-Zho Shi (2012) reveals a very different scenario for Chinese students. He found that female students preferred physics learning by relating and by analysis and this correlated to their better understanding in the subject, while the males preferred to study physics by rote learning, and this resulted in a negative correlation in their performance. In comparison to research done by Kessel et al. (2006), they found that male students preferred physics more than their female counterparts. Because of this, they found that females were not interested in physics and were lesser successful in the subject (Baran, 2016). This correlates well with the research done by Saleh (2014), who indicated that females experienced a higher level of difficulty in understanding physics. In the same token, research done by Zavale et al. (2015), points towards to students generally failing first year physics and mathematics courses. This unfolds because they do not see the relevance of physics and mathematics as part of their professional career progression. In this respect, this research aims to shed more light on students' perception of physics and science in general with respect to gender between senior and junior students at a South African university. It is hoped that this research will fill a gap in understanding of how student's pre-knowledge of physics from their high school studies would change through their progression of their studies at university.

2. Methodology

This study was undertaken to measure students' perception of physics and science in general as function of gender between the junior and senior students at a South African university. To measure such perceptions, use is made of a questionnaire developed by Keith Wurtz (2007) for this study. This questionnaire consists of two parts; with section A (comprised of 4 questions) and section B (comprised of 15 questions). Section A probes the students' relationship to science (mathematics, physics and chemistry) and section B probes their confidence with respect to chemistry and physics. A total of 101 students participated in this study, comprising of juniors (27 males and 37 females) from the Emergency and Medical Care and Podiatry departments, while the senior students (12 males and 25 females) came from the Analytical Chemistry department. These students were studying physics (non-major) as part of their curricular studies. Results are expressed in both numeric and percentage form. Prior to the start of this research, permission was sought from each of the above groups of students to conduct the research. Further, an explanation was provided as why such a project was undertaken. The survey took no more than 10 minutes to complete. The students were required to respond to each of the questions of the questionnaire on a rating scale of between +1 (Disagree) to +6 (Agree). For convenience, the rating scores of the following were combined: (+1, +2), (+3, +4) and (+5, +6).

3. Results and discussions

The results of the students' perception about physics and science in general are presented in tables 1 to 4, with tables 1 and 2 referring to the junior students while tables 3 and 4 refers to the senior students.

Table 1. Comparisons of the junior students' perceptions about their relationship between their lives and physics, mathematics and chemistry.

No	Description	Males			Females		
		+1 and +2	+3 and +4	+5 and +6	+1 and +2	+3 and +4	+5 and +6
1	I understand the relationship between my life and physics	0	2	25	0	22	15
		0%	8%	59%	0%	59%	41%
2	I understand the relationship between my life and chemistry	0	7	20	1	17	19
		4%	37%	59%	3%	46%	51%
3	Math is important to the understanding of science	0	1	26	1	2	34
		0%	4%	96%	3%	5%	92%
4	I am confident in my mathematics ability	0	7	20	2	14	21
		0%	26%	74%	5%	38%	57%

Table 2. Comparison of the junior students' perception about their confidence in physics and chemistry.

No	Description	Males			Females		
		+1 and +2	+3 and +4	+5 and +6	+1 and +2	+3 and +4	+5 and +6
1	The parts of an atom	1	4	27	2	9	26
		4%	15%	82%	5%	24%	70%
2	Static electricity	1	10	16	4	21	12
		4%	37%	59%	11%	57%	32%
3	How atoms form compounds	1	6	20	0	16	21
		4%	23%	74%	0%	43%	57%
4	Inertia	0	5	22	2	8	27
		0%	19%	82%	5%	22%	73%
5	How iron forms rust	3	9	15	2	16	19
		11%	33%	56%	5%	43%	51%
6	Simple machines	1	10	16	2	17	18
		4%	37%	59%	5%	46%	49%
7	How atoms forms ions	1	11	15	2	11	24
		4%	40%	56%	5%	30%	65%
8	Magnetism	3	8	16	3	13	21
		11%	33%	59%	8%	35%	57%
9	The difference between organic and inorganic compounds	1	5	21	2	4	31
		4%	19%	77%	5%	11%	84%
10	The relationship between magnetism and electricity	3	12	12	2	17	18
		11%	45%	45%	5%	46%	49%

11	The different states of matter	2	7	18	1	5	31
		7%	29%	67%	3%	14%	84%
12	How sound moves through air	0	11	16	3	13	21
		0%	41%	59%	8%	35%	57%
13	Acidic and basic compounds	0	8	19	2	7	28
		0%	30%	70%	5%	19%	76%
14	How heat is transferred from one substance to another	0	11	16	1	21	15
		0%	40%	60%	3%	57%	41%
15	How batteries form electricity	2	14	11	2	27	8
		7%	52%	41%	5%	73%	22%
16	The properties of light	2	10	15	0	24	13
		7%	37%	56%	0%	65%	35%

Table 3. Comparisons of the senior students' perceptions about their relationship between their lives and physics, mathematics and chemistry. Order of presentation is females first followed by males.

No	Description	Females			Males		
		+1 and +2	+3 and +4	+5 and +6	+1 and +2	+3 and +4	+5 and +6
1	I understand the relationship between my life and physics	1	17	7	4	4	4
		4%	68%	28%	33%	34%	33%
2	I understand the relationship between my life and chemistry	0	2	23	0	0	12
		0%	8%	92%	0%	0%	100%
3	Math is important to the understanding of science	1	6	18	0	2	10
		4%	24%	72%	0%	16%	84%
4	I am confident in my mathematics ability	2	16	7	1	3	8
		8%	64%	28%	8%	25%	67%

Table 4. Comparison of the senior students' perception about their confidence in physics and chemistry.

No	Description	Females			Males		
		+1 and +2	+3 and +4	+5 and +6	+1 and +2	+3 and +4	+5 and +6
1	The parts of an atom	0	5	20	1	3	8
		0%	20%	80%	8%	25%	67%
2	Static electricity	1	19	5	2	4	6
		4%	76%	20%	17%	33%	50%
3	How atoms form compounds	0	4	21	1	3	8
		0%	16%	84%	8%	25%	67%
4	Inertia	0	15	10	1	4	7
		0%	60%	40%	8%	34%	58%
5	How iron forms rust	0	5	20	0	4	8
		0%	20%	80%	0%	33%	67%
6	Simple machines	1	15	9	1	6	5
		4%	60%	36%	8%	50%	42%
7	How atoms forms ions	0	4	21	1	3	8
		0%	16%	84%	8%	25%	67%
8	Magnetism	0	12	13	3	3	6
		0%	48%	52%	25%	25%	50%
9	The difference between organic and inorganic compounds	0	2	23	0	1	11
		0%	8%	92%	0%	8%	92%
10	The relationship between magnetism and electricity	0	14	11	2	5	5
		0%	56%	44%	17%	41%	42%
11	The different states of matter	0	2	23	1	2	9
		0%	8%	92%	8%	17%	75%
12	How sound moves through air	1	7	17	0	7	5
		4%	28%	68%	0%	58%	42%
13	Acidic and basic compounds	0	4	21	0	1	11
		0%	16%	84%	0%	8%	92%
14	How heat is transferred from one substance to another	0	4	21	0	3	9
		0%	16%	84%	0%	25%	75%
15	How batteries form electricity	1	10	14	2	2	8
		4%	40%	56%	17%	16%	67%
16	The properties of light	0	7	18	1	5	6
		0%	28%	72%	8%	41%	51%

3.1. Gender comparisons of the perceptions of physics and science in general amongst junior students

In table 1, we see a strong relationship between the student's life and chemistry for both genders (item 3, 96% for males and 92% for females) of this study. As a result of this, everything that unfolds from this research is an inclination for chemistry related topics. This is reflected in item 2 of the questionnaire where the perceptions of both genders are given (item 2, 59% for males and 51% for females). Of note is that male students show a stronger inclination for mathematics as a subject than physics.

In table 2, a similar trend unfolds for both males and females in that they show stronger preference for chemistry related topics. In this regard, males have a stronger preference for topics such as the "parts of an atom" (item 1, 82%) and a sound foundational understanding of the differences between "organic and inorganic chemistry" (item 9, 77%). By comparison, to the females, they also have a strong preference for the latter topic (item 9, 84%) and for a sound understanding of the different states of matter in chemistry (item 11, 84%). Both genders appear to have a moderate understanding of the relationships between magnetism and electricity (item 10, 45% for males and 49% for females) in physics. Of particular interest, for some reason males appear to have a good understanding of the topic "inertia" in physics (item 4, 82%). It is also not surprising to see students (both genders) preference for acids and bases (item 13, 70% for males and 76% for females) when their field of study is not in chemistry. For the female students, it is observed that they have a moderate preference for topics in physics, and in particular of for how electricity is obtained from battery power (item 15, 22%) and the properties of light (16, 35%).

3.2. Gender comparisons of the perceptions of physics and science in general amongst senior students

The results of table 3 indicates that senior students have a good association of chemistry and find meaning of it in their lives (item 2, 100% for males and 92% for females). They also realize that mathematics is crucial for their understanding of science (item 3, 84% for males and 72% for females). Their low preference for physics (item 1, 33% for males and 28% for females) is in keeping of their preferred choice of chemistry for their studies. In this instance, physics is regarded as an auxiliary (pre-requisite subject) subject (even at the 2nd year level). For these students doing physics is just to understand some related concepts in chemistry better.

From table 4, we see that female students have a strong affinity for chemistry related topics compared to the males. In particular, they have a good knowledge of "parts of an atom" (item 1, 80%) and how atoms are used to form compounds (item 3, 84%), what happens to iron when it combines with oxygen (rusting) (item 5, 80%) and the various states of matter (item 11, 92%). They also have a good understanding of how atoms forms ions (item 7, 84%). As far as the males students are concerned, their preference for these topics is quite average (item 1, 67%), item 3 (67%), item 5 (67%) and item 7 (67%). One of the items for which both males and females have exactly the same level of preference is item 9 (males 92% and females 92%). For this item, these students appear to have an excellent understanding of the differences between organic and inorganic chemistry, which is very much in keeping with their field of study. With a good background in chemistry, they also show a strong preference for acids and bases (item 13, 92% for males and 84% for females). These topics are also done at junior and senior grades at high school. A topic in the questionnaire, which is well covered in basic or general science is the topic "heat transfer" and for this topic their knowledge appears to be good (item 14, 84% for females). Correspondingly, the male student's preference for items 13 (92%) and 14 (75%) appears to be good as well.

3.3. Comparisons of the perceptions for physics and science in general between the juniors and seniors

The seniors, because of their field of study, show a higher preference for chemistry related topics than the juniors. In particular, senior females have a high affinity for chemistry compared to the males. In contrast to the juniors, the males have a greater preference for chemistry than the junior females. Whilst the seniors show limited interest in physics, the juniors appear to show a slightly better interest to physics related topics. In particular, the junior males have a slightly higher preference for science related topics than the females.

4. Conclusion

This study was undertaken to determine the students' perception about physics and science in general between the genders amongst junior and senior students at a South African university. Results reveals that both juniors and seniors have a high preference for chemistry, even though the juniors are not specializing in chemistry. In addition, the senior female students have the highest preference for chemistry than both the senior male and junior students. The preference for physics by both cohorts of students is limited and is a cause for concern. Results of this study might be different if students who are pursuing a physics major are tested.

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QUESTIONS AND SCIENCE CONTENTS PREFERRED BY EARLY CHILDHOOD EDUCATION TEACHERS IN TRAINING

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Abstract

In scientific education, the inquiry approach through questions is a key tool that allows establishing relationships between the facts or phenomena under study to involve students. It fosters self-learning through problem solving, dialogue, discussion, reasoned argumentation, free thought, prediction, experimentation, explanation, reflection, and evaluation. In the teaching of sciences in early childhood education, it is important to establish links between internships in schools and structure of university lectures, fostering the transition to school research. Learning of future teachers must be diverse and reflexive. The role of evaluation as a regulator of the teaching-learning process should be considered, as well as to address topics that provide resources and knowledge to future teachers, including to use such scientific knowledge in everyday contexts and provide them with a critical vision on certain topics of interest.

In this research, we have considered to know which questions and contents arouse curiosity among Early Childhood Education teachers in training and what kind of questions and contents they would propose to work in the classroom for the learning of sciences. Reasons (convictions, motivations) of their preferences have been investigated, as far as possible, to focus their development as teachers. Ad hoc questionnaires for this study have been carried out in the last two courses (2017-18, 2018-19), and filled each of them in by around 58 students of "The Nature Sciences in Early Childhood Education" of the Degree in Teaching. Most of the students considered as interesting content to work in the classroom objects and materials of the environment and water and air, and less than half considered living beings. The human body and living beings stand out as the preferred topics. The presence of chosen contents or not in the curriculum seems to be an important factor in the decision of students. Almost all of the students considered that they need to learn scientific contents together with strategies and teaching techniques on how to teach, both to be able to put them into practice and to teach students well satisfying curiosity that may arise in the classroom. And to acquire a greater conceptual base of its own as well.

In many cases, preferences as students include more complex issues than those chosen to deal with children. In relation to the questions that they considered they would make children, based on their own experience, including school practices, the most mentioned ones were about the water cycle and water states, physical phenomena and living beings.

Keywords: *Questions, school research, teaching of sciences, early childhood education.*

1. Introduction

Teachers need a minimum knowledge and acquired competences to engage children in science practices. That is the reason why they should learn to teach sciences by developing an evidence-based framework including discussion, reasoned argumentation, free thought, prediction, experimentation, explanation, reflection, and evaluation (Crawford and Capps, 2016; Rivero, Solís, Martín, Azcárate, and Porlán, 2017). Learning of future teachers must be diverse and reflexive, representing a certain degree of approximation to knowledge that you want to promote, but without matching it (Rivero et al, 2017). Topics that provide resources and knowledge to future teachers to help them to understand the role of the teacher as a mediator between students and science, the role of scientific education in citizen education, and ensuring the maximum interrelation between theory and practice, should be addressed among other issues (Bonil and Márquez, 2011). Therefore, the role of Didactics of Experimental Sciences in teacher training should consist of to encourage so much argumentation as the transfer of facts and events of everyday life to the classroom, as an essential part of said training. We should have into account that it is

necessary to stimulate our students the skills of reasoning and critical thinking, to give account of the multitude of situations that surround them in which sciences have a fundamental role (Cantó, Pro y Solves, 2017). To investigate the reasons of their preferences to work sciences in the classroom constitute a key point to focus their development as teachers.

Amos (2002) points out that a fifth of what a teacher says in a classroom can be in the form of questions. If they ask open-ended questions, they allow their students to think freely and flexibly, to express their own ideas and thoughts, without worrying that they have to give a correct answer and, on the other hand, they promote successful discussions that stimulate student participation (Harlen, 1999). Several authors suggest identifying researchable questions as a first step to guide the research work (Ben David and Zohar 2009; Caamaño 2012; Windschitl, Thompson and Braaten 2008). Questions can encourage students to move from mere affirmations to the development of prediction, experimentation and explanation, since they favour the generation of a cascade of cognitive activities, which allow them to build through pieces their knowledge or resolving comprehension conflicts (Chin and Brown, 2002).

2. Objectives

This research aims to improve the skills of students of the Teaching Degree in Early Childhood Education, necessary for them to address in the future, as teachers, the teaching of scientific content in this educational stage. First goal consisted on to know which science questions and contents arouse curiosity among Early Childhood Education teachers in training and what kind of questions and contents they would propose to work in the classroom for the learning of sciences. Then, from the evaluation results, including the convictions and motivations of the students preferences, some conclusions can be drawn. They can be of reflection and interest for the teaching staff of other subjects and for the own managers of the degrees, such as the components of the Commissions of the qualifications of Teaching.

3. Methods

First, the type and amount of tests to be carried out was decided. Two ad hoc questionnaires were created in Google Forms, as the course progresses, advertising them in the same classes of the subject and through Moodle as well. Possibilities of data handling and diversity of type of issues were considered. The errors or difficulties in the realization of the tests were corrected quickly.

One of the questionnaires was focussed to which questions arouse curiosity among Early Childhood Education teachers in training and what kind of questions they would propose to work in the classroom for the learning of sciences. It was filled in by 59 students.

The other was focussed to which contents arouse curiosity among Early Childhood Education teachers in training and what kind of contents they would propose to work in the classroom for the learning of sciences. It was filled in by 57 students.

Open-ended and closed questions were raised in both questionnaires, such as:

- What contents of Experimental Sciences should be taught in the stage of Early Childhood Education?
- What content should the university teach Teaching students of that degree?
- The contents that the university must teach to the teaching students must be exactly the same as those of the children in the school? Why?
- Do you think that the university should not teach any kind of scientific content together with teaching strategies and didactic techniques on how to teach these contents to children? Why?
- As a future teacher of children, what is the topic or scientific content that you would most like to work with your students, regardless of whether or not they are in the curriculum?
- What question would you like to ask personally to satisfy your curiosity about the content or scientific phenomenon that most attracts your attention?
- Write an example question, about a science content that you think a student could make when you are their teacher. What have you relied on to do it?
- Encourage the students of Children to ask questions about natural phenomena, do you think it is important for them to acquire scientific knowledge?
- What is the best time to generate questions in the students?

If you did not get any student to ask you a question about the phenomenon you want them to learn, what would you do to achieve your goal (what kind of activity or pedagogical technique would you use, etc.)?

Collected data were compiled in excel sheets to be evaluated.

4. Results

About what contents of Experimental Sciences should be taught in the stage of Early Childhood Education, most mentioned ones were matter and materials (for 70% of students), water and air, and living beings (for 30% of the students). To the question “Would you change the choice of contents that you have made in the two previous questions”, about 40% answered affirmatively. Then, it could be interpreted that the presence of the content or not in the curriculum is an important factor in the decision of students.

Only 21% of students think that contents that teachers in training have to acquire at the university must be exactly equal to those of the children. Some reasons given by students who disagree with this affirmation were:

- “Our duty is to teach, for which we must learn more knowledge in order to better teach.”
- “Because they have to add content referring to teaching and pedagogy.”
- “Because at the university they should teach us teaching methods.”
- “Children of Childhood Education do not have why to know all the contents that we know since they will not be able to understand some concepts.”
- “We should adapt contents to the evolutionary development of the students.”
- “Students must learn how to teach these contents, in addition to the fact that the university must provide many transversal contents on these subjects.”
- “Because teachers must be better trained and also continue learning daily”.
- “To know more about what is being done.”
- “To know how to interpret children results.”

About a 95% believe that university should teach scientific contents together with strategies and teaching techniques on how to teach. Main reasons given by students were based on the need to learn content before teaching them, both to be able to put them into practice and to be able to teach the students well and satisfy curiosity that may arise in the classroom. And to acquire a greater conceptual base of its own as well. To the specific question of what type of content should be taught at the university to the students of the Teaching degree of Childhood education, students mentioned some strategies and teaching techniques, among others:

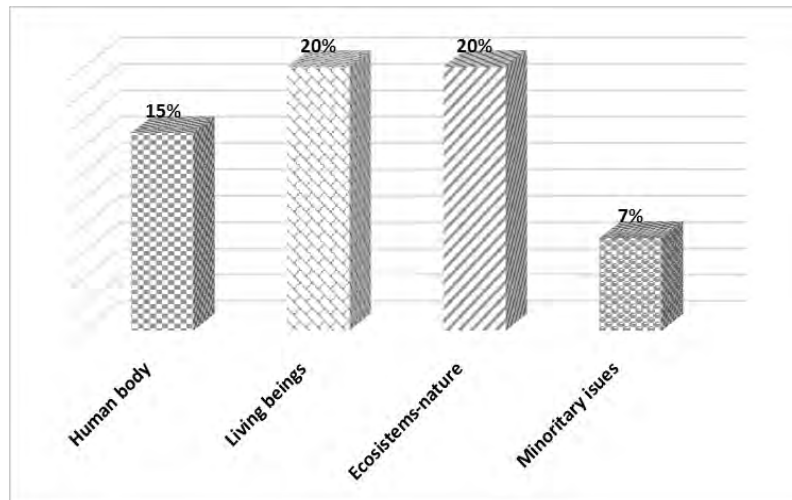
- “The construction of the knowledge of the natural environment in the contexts of Infantile Education.” “Implications of the investigation in Didactics of the Sciences in the design, development and evaluation of learning activities in Early Childhood Education.”
- “Difficulties and communication strategies in the context of the Early Childhood classroom.”
- “Creation of contexts for the observation and posing of problematic situations.”
- “Experimentation in science classes.”
- “Skills for the elaboration of conclusions.”
- “Skills for the communication and discussion of the built knowledge.”
- “Teaching resources for the teaching of the physical-natural environment.”
- “Theories of Education (Pedagogy) applied to the Didactics of the Sciences.”
- “Educational psychology applied to the Teaching of the Sciences, among others contents.”

Preferred topics and scientific contents by students to work with children were human body, living beings and animals, and ecosystems-nature. Other minority topics were universe, Day-Night, water cycle, or fungi. In their preferences as students, they include some more complex issues such as the Big-bang, Earth, Astronomy, or Cells. Some results are included in Figure 1.

The totality of the students agreed that to animate children of Infantile to make questions about natural phenomena it is important so that they acquire scientific knowledge. More than 90% agree that the questions should be posed by the children themselves and not by teachers. Most of the students (almost 60%) affirmed that questions should be generated in children at any time of the school day. The others think that the best time to generate questions in the students is just beginning the school day (20%) to encourage curiosity during the day, or at the end (20%) as closure and reflection of the day. From their experience including school practices students affirmed that questions which children would ask are about water cycle and water changes (30%), physical phenomena such as flotation or gravity (14%), and animals and vegetables (14%). Another 7% propose other topics like day and night, flotation or rainbow formation. Only a 9% would to know more about didactic methodologies and experimentation and applicability in infancy. Data confirms that they do not give enough importance to acquire didactic methods neither to the content of the contents of the children nor to applied research. Still there is a 17% who do not have interest to satisfy their curiosity about any content or scientific phenomenon.

About activities or pedagogical technique to get children to ask questions about an specific phenomenon, students proposed experiments, manipulative models, videos, contact with environment, games and inquiry.

Figure 1. Preferred topics and scientific contents to work with children.



5. Discussion and conclusion

Following the order of exposition of results, to answer the question “what contents of Experimental Sciences should be taught in the stage of Early Childhood Education”, the presence of the content or not in the curriculum seems to be an important factor in the decision of students. About a 95% of teachers in training believe that university should teach scientific contents together with strategies and teaching techniques on how to teach. Students think that it is needed to improve the knowledge of teachers both in science and their didactics. They highlighted the construction of the knowledge, implications and designs of research, teaching resources, and skills in communication, experimentation, pedagogy, psychology all applied to the Teaching of the Sciences, among others contents. Initial scientific training influences the attitude of future teachers, being more positive in aspects such as their confidence in teaching subjects and their knowledge about the resources to work with children (Mazas and Brazo, 2018). Future teachers agree that their training needs should be addressed and these are also of didactic type. For this it would be necessary to provide them throughout its training with both resources and practical experiences, not only to acquire the necessary knowledge, but also to know how to use them in the professional and personal field (Cantó, de Pro and Solves, 2017). Contents of the area of self-knowledge and knowledge of the environment (human body, living beings, animals, ecosystems, nature) are those with greater presence in the answers, with shows that students considered its importance in Childhood Education stage, agreeing with research results of Cantó, de Pro and Solves (2016).

It is worth to say that students proposed experiments, manipulative models, videos, outings to the environment, games and inquiry activities or pedagogical technique to get children to ask questions about an specific phenomenon. They give importance to work sciences at the classroom in a practical way as it was already as stated by some authors (Mazas and Bravo, 2018) unlike that shows in other research (Cantó, de Pro and Solves Matarredona, 2017).

Students agreed that to encourage children to ask themselves questions on the natural phenomena it is important for them to acquire scientific knowledge. Most of the students affirmed that questions should be generated in children at any time of the school day. In accordance with what has been stated in previous works (Ponz and Carrasquer, 2018), it is fundamental for the meaningful learning of the scientific contents, in spite of not having carried out any type of educational activity in their previous training in which they were asked to ask questions in relation to a phenomenon. Despite showing great interest in using this methodology, however, they do not take much it into practice. About questions which students affirmed that children would ask are not inquiry questions. Only 3% proposed questions from which it is possible to design a methodology to obtain data. This idea has already been presented in other works in which the great challenge of raising questions that give rise to investigations (Ponz and Carrasquer, 2018; Ferrés-Gurt, 2017).

The experience can be implemented in any area of knowledge and with different uses, although, in this case, it has been applied in a scientific area. Results and conclusions will be of interest to the

students themselves, the development of the subject and undoubtedly also to bodies managing these degrees and others of the University of Zaragoza. Data confirms that there is still a lack of teachers in training interest not only to acquire didactic methods but also to applied research. There is an important percentage who do not have interest to satisfy their curiosity about any content or scientific phenomenon. The innovation lies in the detection and acceptance by the students of the acquisition of competencies that, at present do not believe necessary, mainly because they are not objectively aware of their own deficiencies. It requires effort on the part of the student and acceptance of the same to conclude with the satisfaction of learning. It is necessary to take some decision and execute institutional actions in various areas that lead to the improvement in the training of the teaching students. We think that results obtained in this research can help in it.

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GENDER DIFFERENCES IN PHYSICS ANXIETY AT A SOUTH AFRICAN UNIVERSITY

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Abstract

From literature, it is known that anxiety for physics amongst female students appears to be higher than for male students. This study is carried out to determine the role that gender plays in their preference to physics and the anxiety they experience in the subject. To measure the anxiety that students experience in physics, use is made of a modified physics anxiety questionnaire, which was comprised of fifteen questions. This questionnaire has a rating scale from +1 (minimal anxiety) to + 5 (very high anxiety). A total of 64 students participated in this study. Results for this study is presented both in numeric and in percentage form. From this study, it was revealed that female students have a significantly higher level of physics anxiety compared to their male counterparts. Besides the females having a higher level of anxiety in the thought of seeing their physics assessment marks, both males and females have a similar level of anxiety for the item relating to fear of failing their physics tests or examinations. Further, females appear to cringe in their behavior when they have to go to their physics classes. The anxiety experienced by male students is their desire to excel in the subject and thus they are more focused in their physics studies, while female students are overcome by the high cognitive demand of the subject and present a higher level of anxiety in the subject.

Keywords: *Physics, gender, questionnaire and anxiety.*

1. Introduction

Physics is feared as a difficult subject but how both males and females perceive it might be different. If the emotions of fear are not properly checked then this could lead to anxiety in physics amongst the students (Manilito et al, 2016). The net effect of all this is a lack of success and a perceived fear for the subject. Gender could be a factor in determining students' anxiety levels in physics (Manilito et al, 2016). This concept "anxiety" has a variety of meanings. According to Sapir & Aronson (1990), Scovel (1991) and Sahin et al. (2015), anxiety is defined "as an unpleasant emotional state of uncertainty, fear, worry, discomfort, loss of control, and expectation that something bad will happen". In this context, anxiety is perceived as a feeling of fear or worry that something will happen. Such a variable could be responsible for their underperformance in the subject. In a sense anxiety could be their fear or discomfort in attending something challenging such as a test or an examination. Most of the time anxiety reveals itself as a positive or a negative construct. In a positive sense, anxiety can lead to an enhancement in learning (positive stress), while on the other hand, it can impede one's learning process (negative stress) (Sahin et al., 2015).

It is generally accepted, from literature, that male students significantly outperform their female counterparts in physics (Agra et al., 2017). However, some research points towards both males and females having similar anxiety levels in physics (Brownlow et al., 2000). A subject such as mathematics, which is the backbone of physics, is responsible for higher levels of anxiety amongst female students and can be regarded as a good predictor for gender prescriptor of anxiety levels (Devine et al., 2012; Agra et al., 2017). It is of interest to note that female students outperform their male counterparts in physics in the lower grades of school but that reverses itself in high school (Labudde et al., 2000; Sahin, 2015). Accordingly, this is reflected as lesser levels of physics anxiety for male students. Female students generally show avoidance for science-related subjects and indicative of a disregard or disinterest they have for the subject.

According to literature, there is much research on mathematics anxiety and few researches on science anxiety and lesser research on physics anxiety (Agra et al., 2017), hence the aim of this paper is to shed more light on this topic with specific reference to the impact of physics anxiety as a function of gender.

2. Research question

What are the gender differences in physics anxiety amongst South African students?

3. Methodology

To measure students' anxiety levels in physics, use is made of a questionnaire called the "Physics Anxiety Questionnaire", downloaded from the website, which was uploaded by Jamie Bagundol on the 8th September 2016 and retrieved from SCRIBD on the 2nd May 2019. This questionnaire is comprised of fifteen items and scored on a Likert-type scale ranging from +5 (very high anxiety) to +1 (minimal anxiety). The participants in this study have enrolled for a six-month semester module (basic science in physics) in Emergency Medical Care and Podiatry at the University of Johannesburg in South Africa. With slight modifications to the original questionnaire, this questionnaire was then administered to 27 males (42%) and 37 females (58%). Thus, a total of 64 students participated in this study. The questionnaire itself consisted of some anxiety questions such as: "I sweated a lot whenever I took my physics exams/tests" and "I feared failing my physics exams/tests". Besides the questionnaire being given to elicit students' anxiety levels in physics, students' anxiety levels as a function of gender is also gathered. Before administrating the questionnaire, permission was sought from the students and an explanation as to why this research is done. Results are presented in both the numeric and percentage form. A higher percentage is reflective of a higher response and a greater anxiety towards physics.

4. Results and discussions

The results between the genders on the issue of anxiety levels in physics is shown in table 1 below.

Table 1. Differences in the anxiety levels between male and female students. Note that the categories very high anxiety and high anxiety levels have been combined, as well as partial and minimal anxiety. There is a total of 27 males and 37 females.

No	Physics anxiety	Men			Females		
		Number: Very high anxiety to high anxiety	Number: Moderate anxiety	Number: Partial to minimal anxiety	Number: Very high anxiety to high anxiety	Number: Moderate anxiety	Number: Partial to minimal anxiety
1	I was worried when I was informed that physics was a requirement for my course	5	6	16	8	7	22
		19%	22%	59%	22%	19%	59%
2	I felt a lot of pressure/stress/burden in my physics subject	3	7	17	8	11	18
		11%	26%	63%	22%	30%	49%
3	I felt my heartbeat faster whenever I went to my physics class	1	1	25	3	6	28
		4%	4%	92%	8%	16%	76%
4	I was worried about being called in my physics class	2	4	21	7	3	27
		7%	15%	78%	19%	8%	73%
5	I cringed when I had to go to my physics class	4	1	22	8	4	25
		15%	4%	81%	46%	11%	67%

6	I felt uneasy when asked to recite in my physics class	2	6	19	6	10	21
		7%	22%	70%	16%	27%	57%
7	I could hardly concentrate in my physics class	2	3	22	3	6	28
		7%	11%	82%	8%	16%	76%
8	I could not do my physics assignment alone	2	2	23	4	7	26
		7%	7%	86%	10%	19%	71%
9	I had difficulty understanding physics concepts	1	2	24	7	4	26
		4%	7%	89%	19%	11%	70%
10	I could not sleep well before every physics test/exam	1	6	20	11	2	24
		4%	22%	74%	30%	5%	65%
11	I feared failing my physics tests/exams	10	3	14	14	8	15
		38%	11%	52%	38%	22%	41%
12	I sweated a lot whenever I took my physics exams/tests	3	5	19	6	7	24
		11%	19%	71%	16%	19%	65%
13	My mind seems to go blank during physics assessments	3	1	26	6	5	26
		11%	4%	85%	16%	14%	71%
14	I fear to see my assessment marks	3	6	18	13	4	20
		11%	22%	67%	35%	11%	54%
15	My fear of physics makes me unable to focus in class	3	3	22	4	4	29
		11%	11%	78%	11%	11%	79%

This study was undertaken to determine students' anxiety levels in physics as a function of gender. Analysis of the results reveals that there are gender differences in anxiety between males and females for the subject of physics. Females have a higher level of anxiety compared to the males. This concurs with the research undertaken by Anzi (2005), Mallow (1994), Udo et al. (2001) and Sahin et al. (2015). It is generally observed that male students have displayed minimal anxiety for most items of the questionnaire, except for item 11 (38%) and below a moderate level for item 2 (26%) in their anxiety levels for physics. For the females there appears to be a significantly higher levels of anxiety experienced by them in comparison to their male counterparts. In this respect, a relatively high level of anxiety was observed for items 5, 10, 11 and 14 in the questionnaire.

According to the males, their greatest fear is the fear of failing their physics tests or examinations. To a smaller extent, they appeared to worry about being informed that physics (non-major) was a requirement for their course curriculum. On a positive note, they have experienced partial to minimal anxiety for items in the questionnaire relating to their excitement in attending their physics classes (such as item 3, 92%). For the female students, a similar but to a lesser level of anxiety was experienced (item 3, 76%). Male students appear to be devoid of a cringe in their behavior when they must attend a physics class (item 5, 81%). Their physical appearance appears to be one of excitement and not walking around with drooping heads. Such a behavior is not observed amongst the female students, where high levels of anxiety or stress was observed (item 5, 46%) when they walked to their physics classes. Despite their differences in anxiety, both males and females display a high level of concentration when they are in a physics class (item 7, males 82% and females 76%). On the aspect of understanding of physics concepts, the males take a lead in this regard and have a minimal anxiety (item 9, 89%) while the females appear to lag slightly behind with a minimal anxiety level of 70% in this aspect. In terms of working independently, male students aim to work more independently than the females and this is reflected in their comparative anxieties for this item in the questionnaire (item 8, males 86% and females

71%). A similar level of anxiety was observed for item 13, where students appear to be more focused and alert in class during physics assessments (males 85% and females 71%). Likewise, both males and female students have little anxiety when it comes to being focused in class and thus have little fear for the subject and this is a little surprising for the female students (item 15: males 79% and females 78%).

A relatively large number of female students (item 10, 30%) have sleepless nights before their physics assessments. In comparison with their male counterparts, it is observed that at least 74% of them are relatively more relaxed before such assessments. These anxiety levels amongst the females could be accountable for their underperformance in the subject. This item correlates well with item 11 for the females, in their fear of failing such assessments (38%). A relatively small number of females appear to have minimal anxiety before such assessments (41%). In this instance, at least half the male students also appear to have minimal anxiety levels before such tests and assessments (52%). Another item, item 12 indicates that both genders appear to have sweated less when they took their physics tests or examinations (males 71% and females 65%). In this respect, it means that they have experienced minimal anxiety during such assessments. A lack of sleep can be a positive or a negative factor in terms of test preparation. Some may be stressed to do well, or some may be stressed due to under preparation in the subject. In tandem to this item is item 14, where 35% of the females appear to have a lot fear in seeing their assessments marks compared to the males where only 11% of them have such a fear. Of interest to this item is that 67% of the males have a minimal fear for observing their marks compared to 54% for the females.

Further analysis of the results reveals that females have particularly minimal levels of anxiety for three items of the questionnaire and they are items 3, 7 and 15. In comparison to the males, they have a relatively much higher percentage for most of these items except for item 15, meaning lesser anxiety levels. Item 3 when compared with item 2 reveals that despite the female students having a minimal fear of being in a physics class, they still have a moderate to high anxiety of the burden and stress of being in a physics class (about 50%) compared to the males that have a minimal anxiety (63%) of being in those classes. Surprisingly, both males and females have a similar level of anxiety (78% for the males and 79% for the females) in the fear of the subject, which results in them being unable to focus. Despite all this, both males and females are always alert in class without their minds going blank during physics lessons (item 13: males 85 % and females 71%) and thereby experience minimal levels of anxiety. In terms of their confidence in the physics class, both genders appear to have great confidence in class, and this is reflected from the minimal anxiety scores between them for item 4 (item 4: males 78% and females 73%).

However, if the students were required to recite in a physics class, the males would take the lead (item 6: males 70%) and would have experienced a minimal amount of anxiety for this item compared to the females who would have rather experienced a little more stress (item 6: 57%).

5. Conclusion

In this study, it is revealed that female students have a high level of physics anxiety than males and this inhibits their performance in physics. Physics anxiety is a complex construct (Sahin et al., 2015) and some of the factors such as learning skills (examination preparation) and their fear of failing or seeing their assessments appears to raise the anxiety levels of female students, while for the male students it is the fear of failing their physics tests or examination is which that raises their anxiety levels. The results of this study will contribute to a better understanding of anxiety amongst genders, which is important for physics practitioners.

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TEACHER CHALLENGES AND CHOICE OF PROGRAMMING TOOLS FOR TEACHING K-12 TECHNOLOGY AND MATHEMATICS

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Abstract

A current ongoing process in many countries today is to implement programming in K-12 education. With this comes challenges for the involved teachers on how to best teach and integrate programming in their subjects. On the other hand, the introduction of programming could also open opportunities for programming as a new and improved way of learning and understanding technology and mathematics. For Swedish K-12 teachers this should be rapidly implemented, but without any concrete guidelines for how or for which tools to use. The aim of this study was to explore teachers' perceptions of learning and integrating programming in technology and mathematics, and their preferences of programming tools.

The overall research strategy was a case study approach, with two instances of a programming course as the case study units. In both course instances the main choice has been between block programming with Scratch, and textual programming with Python. Data was collected in a combination of submitted essays, programming assignments and workshop observations. Findings from a content analysis of the submitted essays have been compared to workshop observations, and to the analysis of programming assignments.

Results suggests that the main challenge in learning and integrating programming is the perceived time trouble. In parallel, many teachers highlight the potential benefits of renewing their teaching and learning sessions with programming-based problem solving. Considering the choice between block programming and textual programming several teachers brings up the idea of combining the two rather than excluding one of them. Furthermore, there seems to be minor differences in the preferences of programming tools between teachers with different subjects and different age groups of students. Finally, the most positive finding is the improved self confidence that many teachers show, when their own ability to manage programming in their classrooms increase after learning the fundamentals of programming.

Keywords: *Programming tools, block programming, textual programming, teachers professional development.*

1. Introduction

The integration of programming in K-12 education has been and is a worldwide trend (Balanskat & Engelhardt, 2015). The hopes in this integration are that it will help students develop computational thinking and skills useful for other subjects, such as self-efficacy, problem solving and reasoning skills in mathematics (Duncan & Bell, 2015; Psycharis & Kallia, 2017). However, with this integration challenges follows in a number of field, such as: access-limitations to computers and the internet, lack of students' motivation and technical skills, coping with time-issues of learning programming, and providing motivating high-quality professional development courses for the teachers that will lead this integration (Tundjungsari, 2016; Jawawi, Mamat, Ridzuan, Khatibsyarbini & Zaki, 2015; Mannila et al., 2014). On the other hand, if done successfully the integration of programming could bring with it opportunities, not only to computer science but to other subjects; for example, as an expressive tool for knowledge construction and supporting the users growth from passive consumer to active creator (Feurzeig, 2010; Papert, 1993:142; Tundjungsari, 2016; Psycharis & Kallia, 2017).

In mars 2017 the Swedish government approved a new curriculum for K-9 education to be implemented by the latest in the fall 2018; where digital competence and programming was introduced as interdisciplinary traits and with explicit mentions of programming, algorithms and problem solving in the subject of mathematics and controlling physical artefacts in the subject of technology (Heintz, Mannila, Nordén, Parnes & Regnell, 2017). Despite this rapid implementation, teachers perceive a lack of concrete guidelines and expectations of the integration (Humble & Mozelius, in press).

The aim of this study was to explore teachers' perceptions of learning and integrating programming in technology and mathematics, and their preferences of programming tools. The two research questions to answer were: 1) What are teachers' perceptions of main challenges and opportunities in learning and integrating programming in K-12 technology and mathematics? 2) Which preferences do K-12 teachers have in the choice of programming tools and how might this be related to subjects and student age?

2. Extended background

The very first attempts to program a computer were carried out in the 1840s, in the collaboration between Ada Lovelace and Charles Babbage (Kim & Toole, 1999). A hundred years later, Alan Turing built the foundation of modern computer programming by designing computational instructions that could be stored in an electronic memory (Morris & Jones, 1984). Modern computers can only execute programs that are written in machine language with binary instructions. Writing such programs is both difficult and time consuming for a human. To address this issue the first assembly language was developed at Cambridge University in the 1940s, with the idea of replacing binary instructions with mnemonics. Computer programs are sometimes still written in assembly languages, but more common is to write programs in high-level languages where an instruction can correspond to a large number of machine instructions. (Gaddis, 2011)

2.1. Textual programming in Python

Since the first high-level programming language FORTRAN was constructed by IBM in the 1950s, textual programming has been the standard mode of programming. In textual programming statements, selection, iteration and all other standard constructions are built up by combinations of textual code that later are syntactically checked by a compiler or an interpreter (Erwig & Meyer, 1995). Reading and analysing code can be hard in traditional programming languages such as FORTRAN, C and Perl. In the 1990s new programming languages like Java and Python strived to have a higher readability (Lutz, 2001).

Python is a multi-paradigm programming language designed by Guido Van Rossum in the late 1980s. The language is multi-paradigm in the sense that it fully supports imperative as well as object-oriented programming and implements several features that supports functional and aspect-oriented programming (Lutz, 2001; Van Rossum, 2007). Python has, like other dynamic and interpreted languages a high writability and unlike other dynamic and interpreted languages also a high readability.

High writability means that quite complex features such as file handling just needs a few lines of code, and high readability in the sense that Python code is relatively easy to understand and analyse. A combination that places Python on a bit higher level than other high-level languages, and makes Python an interesting candidate for textual programming in primary and secondary education.

2.2. Block programming in Scratch

Block programming, which is a type of visual programming, can be understood by taking a closer look at the hierarchy of visual aids for programming (Singh & Chignell, 1992). In this hierarchy visual programming is presented as a sub-group consisting of graphical interaction systems and visual language systems, containing in its turn of flow diagrams, icons, tables and forms (Singh & Chignell, 1992; Lavonen, Meisalo, Lattu & Sutinen, 2003). In other words, visual programming is a graphical or visual representation of the code in a program (Lavonen et al., 2003).

The development that led to block programming tools can be said to start with the programming language LISP-LOGO. The language was developed to have an easier syntax than its predecessor LISP, with graphical commands such as Forward and Right to make it easier to learn and use (Jehng & Chan, 1998). These visual elements have a connection to later developed programming tools and even purely visual programming languages where variables, functions, flow control, user interactions etc. are represented in graphical expressions or icons (Lavonen et al., 2003).

One of the most widespread visual programming tools in K-12 education is Scratch, developed at MIT Media Lab by the Lifelong Kindergarten research group, where the user can build their programs by putting together block of code in the same way as one might use LEGO bricks (Resnick et al., 2009; Brennan & Resnick, 2012). A strength mentioned about Scratch as an educational programming tool is its low threshold with a potential for larger and more complex projects (Shute, Sun & Asbell-Clarke, 2017; Resnick et al., 2009). The steadily growing Scratch-community that interact with and learn from each other through shared project and instructional videos is another valuable resource for both teachers and students (Brennan, Valverde, Prempeh, Roque & Chung, 2011; Brennan & Resnick, 2012). Further, Scratch combines programming with art, music and storytelling (Maloney, Resnick, Rusk, Silverman & Eastmond, 2010), which are some of the key factors to broadening the participation in programming and engineering among both girls and boys (Rusk, Resnick, Berg & Pezalla-Granlund, 2008).

3. Methodology

The study was conducted with a case study approach where a combination of data sources was used to generate a deeper understanding of the analysed phenomenon (Yin, 2009:4; Creswell, 2009; Remenyi, 2012; Denscombe, 2007). This study was based on two instances of a programming course on fundamental programming for teachers in K-12 mathematics and technology. The first course instance had 60 participating teachers and the second instance had 32. Data was collected through an essay assignment, workshop observations and code submissions during each of the course instances.

Content analysis was used to analyse the submitted essays and identifying topics of interests (Drisko & Maschi, 2015:25-26; Bryman, 2016:283). The codes were developed during the analysis process through inductive coding (Drisko & Maschi, 2015:43) and later compared to the workshop observations and analysis of the code submissions to find additional common or differential topics. In total the analysed material consists of 49 submitted essays (31 from the first course instance and 18 from the second), 16 workshop observations (from 8 campus meetings in each course instance), and 209 code submissions (146 from the first course instance from 51 different participants and 63 from the second course instance from 31 different participants).

4. Findings and discussion

In this section the findings from the analysed data is presented and discussed. The findings have been separated into two sub-sections where the first presents and discuss findings relating to the first research question and the second presents and discuss the findings related to the second research question.

4.1. Challenges and opportunities

Concerning the question of teachers' perceptions of main challenges and opportunities in learning and integrating programming in K-12 technology and mathematics there was a greater consensus in their answers about challenges than in opportunities. The vast majority of the essays mentioned that a challenge in learning and integrating programming is that programming takes a lot of time, commitment, continuity and discussion. Especially if you want to get to the level of proficiency where programming becomes useful for other subjects. About half of the essays also mentioned that a challenge in learning and integrating programming is that it is hard to learn, both that there are new things to learn (concepts, structures, logic and so forth) and that much of the learning requires knowledge in the English language.

Regarding opportunities in learning and integrating programming the answers were not as coherent as about the obstacles. But what did stand out was that about a quarter of the essays mentioned that an opportunity with learning and integrating programming is that it is fun. About a quarter also mentioned that an opportunity in learning and integrating programming is that there is a lot of learning material available on the internet and in books that can be used to further develop one's knowledge.

4.2. Choice of programming tools

Concerning the question of which preferences K-12 teachers have in the choice of programming tools there is a general consensus across all teachers in their choice of programming tool to solve their own code assignments. The vast majority of code submissions was done with Python, regardless to what subject or student age the teacher taught. This is quite interesting since the majority of the essays mentioned that they perceived Scratch as easier and more fun. However, more than half of the essays also mentioned that they could see a greater potential for using Python in education.

Some smaller difference in the attitudes towards the two programming tools can be spotted in the essays, with an alignment towards technology and younger students for Scratch and an alignment towards mathematics and older students for Python. This is also supported by the workshop observations in the two courses where many teachers declare that they perceive Python as being more "programming" than Scratch and that it is more suitable for older students that needs freedom in their programming (for example in doing complex calculations in mathematics). However, many teachers also declare that they probably will start off with introducing Scratch to their students due to its lower threshold; and the fact that the event handling with Tkinter in Python is perceived as complicated. Other factors in the Python programming language that might contribute to the higher threshold could be functions and function calls, the handling of local variables and the fact that indentation affects semantics in the language.

5. Conclusions

Regarding the first research question the obvious finding is that teachers perceive a lack of time to learn and integrate programming properly. In the answering of the second research question findings indicate that teachers' choice of programming tool is dependent on the perceived suitability for the context in which it should be used. Authors' recommendation is that teachers learn a textual programming tool and a block programming tool in a context where they have time and opportunity to discuss learning and integration with their peers. This will probably better prepare them for the versatility of challenges and opportunities that programming will bring to the classroom.

6. Future research

This study compared textual programming to block programming in K-12 settings. An interesting next step would be to explore the potential of unplugged programming as a complementary tool in this context. Another idea would be to compare the results from this small case study with findings from other types of research in this area. What is similar and what is specific for the Swedish context?

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PROMOTING LEARNER ENGAGEMENT: MEASURING AND CHARACTERIZING LEARNER ENGAGEMENT USING A COLLABORATIVE ONLINE LEARNING TOOL

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Abstract

Promoting learner engagement in large cohorts is a well-documented problem. One solution adopted in the lecture space is ‘backchannel’ software, which in its simplest form, provides an online chat facility that operates alongside lecture delivery. This provides an opportunity for learners to interact and ask questions without the fear of speaking out in front of a large group. Similarly, backchannel software can be used outside the lecture space to enhance engagement; however, this use has not been fully explored. Accordingly, the aim of this work is to evaluate the benefits of backchannel software to promote engagement inside and outside of the lecture space. This was achieved using the TodaysMeet backchannel service to collect 2,022 messages from 185 learners undertaking a second semester, first year programming module at Queens University Belfast. Subsequently, the findings support continued use of backchannels for promoting learner engagement inside and outside the lecture space.

Keywords: *Backchannel, student engagement, TEL, blended learning.*

1. Introduction

As education becomes more accessible across the globe, large learner cohorts are increasingly synonymous with teaching in higher education (Gibbs & Jenkins, 2014). While the increased uptake of education around the world is undoubtedly positive, the size of the resulting cohorts and corresponding reductions in staff-student ratios poses a number of challenges, many of them centered on promoting and maintaining learner engagement. From an educator’s perspective, key challenges include building an understanding of class diversity to meet individual learning needs, overcoming the inability to work with individual learners for a meaningful amount of time, and difficulty engaging individual learners with relevant teaching and learning activities (Fortes & Tchantchane, 2010). The ‘large class’ problem is certainly not new, with numerous approaches to mitigate the reported issues having been investigated. Many of these are from the domain of Technology Enhanced Learning (TEL) and of particular interest to this work, is the use of ‘backchannel’ software as a method to facilitate communication between learners and teaching staff.

A backchannel may be described as a complementary interaction that takes place alongside another activity or event. In an educational context, these typically take the form of chatroom-like software that allows learners to communicate with each other and the teaching staff while other activities are taking place (Baron, Bestbier, Case, & Colier-Reed, 2016). Accordingly, this promotes interaction between learners and lecturer, but importantly between learners who may not normally interact with each other outside the backchannel. This leads to an increased number of questions and comments from the class and promotes the development of a learning community (Bry, Gehlen-Baum, & Pohl, 2011; Fortes & Tchantchane, 2010; Yong-Su Pohl & Gehlen-Baum, 2011).

Focusing on the use of a backchannel, these often operate throughout the duration of a specific activity such as a lecture, however, learning within a taught module extends beyond scheduled timetabled sessions. Subsequently, it may be postulated that the learning community supported by a backchannel has a role beyond scheduled contact sessions. Accordingly, this work will consider how backchannels may promote engagement inside and outside the traditional lecture space.

2. Methodology

For this work, a cohort of 185 learners undertaking a second semester, first year computer programming module at Queen's University Belfast were offered the opportunity to anonymously use the online backchannel service Today'sMeet (TM), formerly available at www.Today'sMeet.com. Accordingly, the TM service operated throughout the semester inside and outside of scheduled contact sessions (3 x 1Hr Lectures, 1 x 2Hr Lab), including holiday periods such as Easter. At the conclusion of the module the TM service was closed, at which point the messages posed throughout the semester were exported to a Microsoft SQL Server database for analysis as described in Sections 3 and 4 below.

3. Results

During the data acquisition period, a total of 2,022 messages were posted to TM service, 1,677 (83%) by students and 345 (17%) by the module lecturer. As illustrated in Table 1, each message consisted of the message text, the timestamp of the message and the message author. It is important to note that author names were anonymously set by students on TM, accordingly, one student may post under several pseudonyms and likewise, many students may pose as the same pseudonym. For this reason it is impossible to state the exact number of students who directly interacted with the backchannel platform, however, in total 399 unique student pseudonyms were used.

Table 1. Sample of three messages posted to the TM backchannel.

Message Text	Timestamp	Author
So... you would use the Try and Catch functions, if you are uncertain of the result?	13/02/2017 14:23	Peter
Can you use try and catch with user input	13/02/2017 14:24	Dm
What does .getMessage() do?	13/02/2017 14:33	eb

In order to measure the engagement of students with the TM service inside and outside of scheduled contact sessions, the distribution of messages was evaluated from two different perspectives as illustrated in Figures 1 and 2. Specifically, Figure 1 shows the number of messages posted during each week of module delivery, including the Easter break, while Figure 2 shows the distribution of all messages across a 24-hour period.

Figure 1. Number of messages posted to TM grouped by week number.

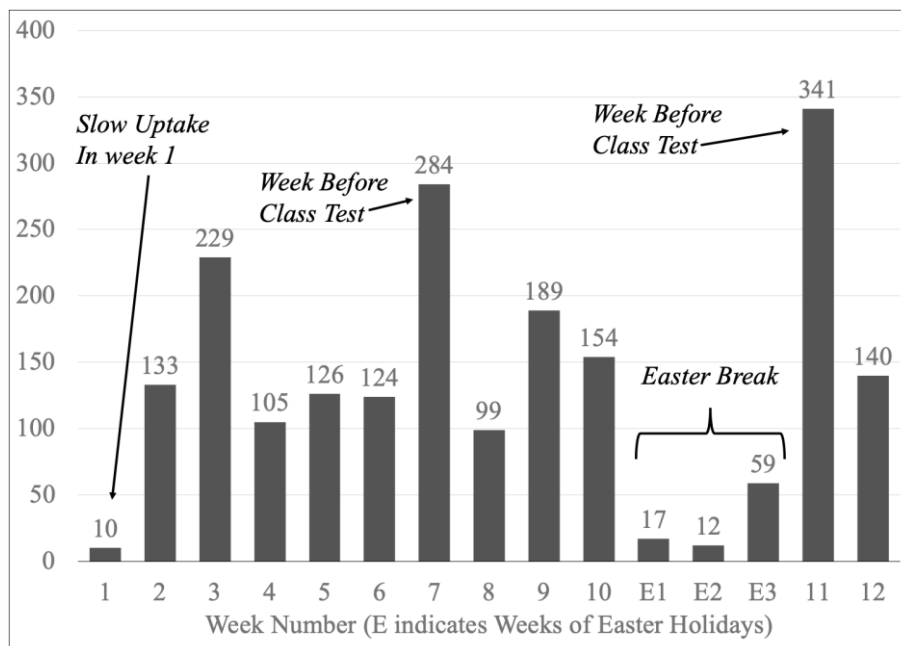
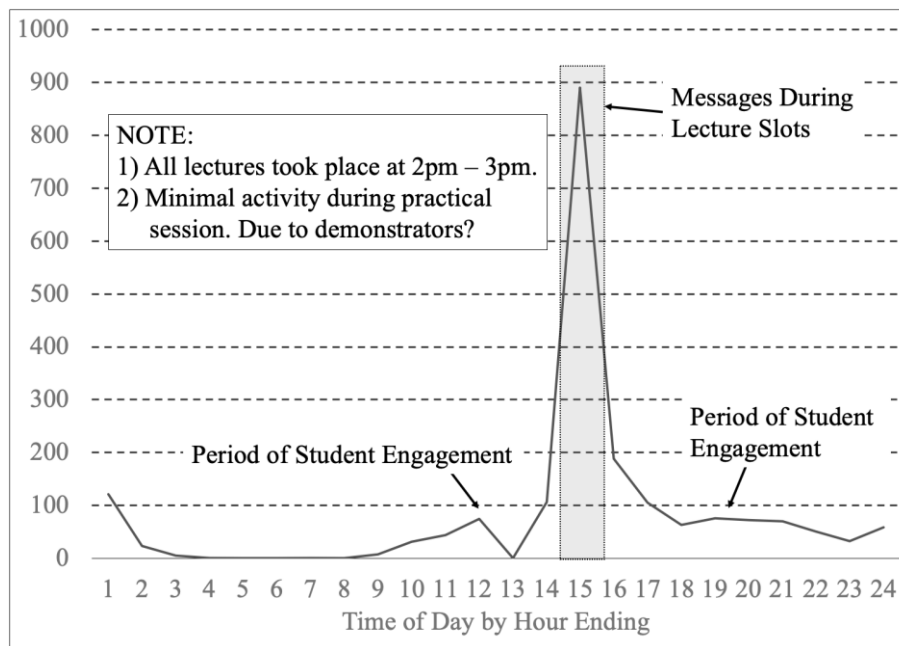


Figure 2. Number of messages posted to TM grouped by hour of day.



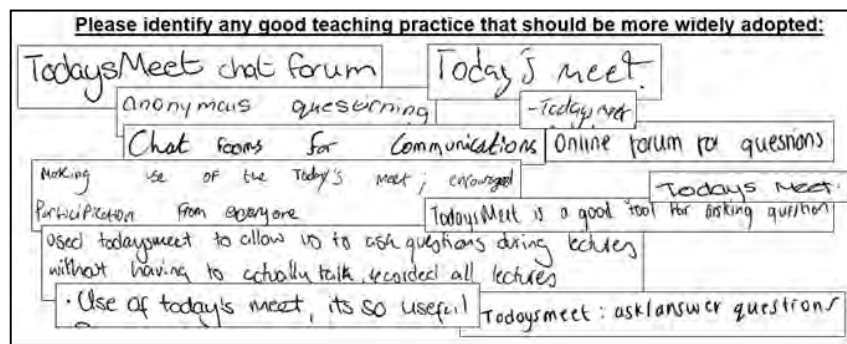
4. Discussion

Before considering the impact of backchannels on student engagement with this cohort, it is useful to outline the typical profile of student engagement prior to the introduction of TM. For cohorts such as the one described above, without TM, interaction in the lecture space was sparse with normally, no questions being posed during a session, despite attempts to encourage dialog from the lecturer. Conversely, at the end of a session, there was often a queue of students waiting to ask questions on the material covered, followed by a number of related email queries.

Following the introduction of TM, a significant increase in student interaction was observed as evidenced by the 1,677 messages posted by students. Some 890 (53%) of these messages were posted during the lecture session indicating that more students were engaging with the material in real-time and getting answers to queries immediately, rather than having to wait until the end of the lecture. Correspondingly, there was a significant reduction in the number of student queries and emails at the end of each session. Considering the general profile of engagement throughout module delivery, Figure 1 shows that after an initial uptake period, students consistently engaged with TM. Interestingly, this includes 89 messages posted during the Easter period and a further 70 messages at weekends providing evidence that this backchannel tool promoted student interaction outside traditional contact hours. Overall, as illustrated in Figure 2, a total of 1,119 (55%) messages were posted outside scheduled contact time indicating TM does promote engagement outside the lecture space. For example, evaluating message timings revealed that 401 (20%) messages were posted in the hour preceding a lecture or in the two hours following. This may indicate that learners used TM to help prepare for and/or follow-up on lecture material. Similarly, another elevated period of activity is observable from 6pm into the evening.

In addition to measuring the quantity of activity on TM, the nature of how students interacted with the backchannel was of interest. For example, after acclimatizing to TM, it was also observed that learners began to answer each other's questions. This was highlighted by learners use of the '@' symbol 116 times to tag classmates when answering their queries. Moderation aside, this behaviour produced significant benefits including a reduced workload for the lecturer, the building of relationships between learners and the cultivation of a very positive collaborative learning environment. Furthermore, as illustrated in Figure 3, this opinion was seemingly shared by the student cohort based on their responses to the Teaching Evaluation Questionnaire issued to all students at the conclusion of each module.

Figure 3. Sample of 12 student responses to the 'good practice' question of the Teaching Evaluation Questionnaire for the student cohort described in Section 2.



5. Conclusion

This paper aimed to explore the benefits of backchannel software to promote engagement inside and outside of the lecture space. Accordingly, based on this sample of one cohort as described in Section 2, three key observations have been made. (1) There has been a distinct increase in the volume of discussions and questions during lecture sessions. (2) Students were engaging with the backchannel service outside scheduled contact time, including weekend and holiday periods. (3) Student-student interactions along with the positive feedback received around the use of TM indicate that a learning community is being formed via the backchannel.

While the cursory nature of the analysis presented here along with the comparatively small sample size used must be acknowledged, there remains sufficient evidence to support the continued investigation of backchannel software for promoting communication and learner engagement both inside and outside the lecture space. To this end, future works will strive to increase the scope of the data available and focus on developing a better understanding of the ways students perceive and interact with backchannels to generate the greatest learning benefit.

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THE EFFECTS OF INTERNET USE BY PEOPLE WITH AND WITHOUT INTELLECTUAL DISABILITY: STUDENT TEACHERS' PERSPECTIVES

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Abstract

The Internet is a tool that has multiple benefits for individuals and for the society as a whole, while some dangers can also be identified. The perceptions that we have about the Internet may be modulating our use of this technology and especially that of some groups that have been traditionally excluded from the digital arena, such as people with intellectual disability (ID). In order to promote the digital inclusion of people with ID, we need to explore the point of view of the general population about the advantages and disadvantages of Internet use by this group. Special attention should be paid to those professionals that will be providing support soon to people with ID in different settings (e.g. schools, sheltered workshops). The purpose of this study was to explore the perceptions that student teachers have about the benefits and risks of Internet use. The study also aimed to determine whether these perceptions differ when rating them for people with or without ID. A cross-sectional study was conducted using an online questionnaire to collect data. A convenience sample of 182 undergraduate students of Education was recruited into the study. Students had an average age of 21.42 ($SD = 4.34$) and the majority of the participants were female (84.1%). Only 17.6% of the students had regular contact with people with ID. Results show that student teachers perceive more risks than benefits of going online for both people with and without ID. Moreover, dangers of using the Internet are perceived significantly greater for people with ID than for the general population ($p < .001$). Female participants were more likely to report greater online risks when compared with male participants ($p < .05$). No significant differences on student teachers' perceptions were found with regard the frequency of contact with people with ID. Findings from this study reveal that despite the possibilities that the Internet can offer to the individuals, there are still some worries about its use. This perception is even greater when referring to people with ID who are usually seen as more vulnerable to abuse. We must be aware of and address these perceptions since they may be hindering the participation of people with ID in the digital arena and, therefore, limiting their opportunities of social and personal development. In addition, positive risk management approaches that avoid digital overprotection of people with ID should be provided to student teachers.

Keywords: *Intellectual disability, Internet, benefits, risks, student teachers.*

1. Introduction

In recent years, the digital divide has been a focus of attention given the importance in our society of the Internet and the use of technology. The digital divide has been defined as 'the gap between individuals, households, businesses and geographic areas at different socio-economic levels with respect to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities' (Organization for Economic Co-operation and Development, 2001, p. 5). In this regard, the *Convention on the Rights of Persons with Disabilities* (UNESCO, 2006) indicates the need to 'promote the access of persons with disabilities to new information and communication systems and technologies, including the Internet' (p. 10). In like manner, the *World Report on Disability* (WHO, 2011) noted the need to eliminate the barriers that limit the use and access to information and technology, favoring universal design. Likewise, the United Nations highlighted in the *Agenda 2030 for Sustainable Development* (United Nations, 2015) the importance of 'significantly increasing access to information and communication technology and striving to provide universal and affordable access to the Internet [...]' (p. 24). Finally, the *European Disability Strategy 2010-2020* remarked the objective of achieving 'accessibility to goods, services including public services and assistive devices for people with disabilities', which include ICTs (European Commission, 2010).

The inclusion of people with disabilities in various areas of society (e.g. education, employment) is a key objective in Western countries. However, there are still barriers that limit such inclusion, especially for people with intellectual disabilities (ID) (e.g. educational segregation, low employment rate, use of technology). These barriers may have their origin in sources such as legislation, accessibility, quality of education, or prejudices (Abbott and McConkey, 2006). Prejudices are the ideas that people in the environment have about the capabilities and characteristics of, in this case, individuals with ID (e.g. not being able to do so, getting into trouble, being abused). Prejudices become psychological barriers that can hinder the development of their potential, especially when it is considered that the benefits are significantly lower than the risks. This can favor attitudes of infantilization and overprotection towards these people. In this sense, it is key to identify such prejudices, especially those of people that are closer to the individual with ID (Chadwick and Wesson, 2016; Seale and Chadwick, 2017), in order to implement strategies (e.g. training, information) that limit or eliminate these prejudices (Morin, Rivard, Crocker, Boursier, and Caron, 2013; Scior, 2011).

Research has shown that access to the Internet entails both benefits and potential risks for people with ID. The benefits include the promotion of self-determination, social identity and participation (Bannon, McGlynn, McKenzie, and Quayle, 2015; Molin, Sorbring, and Löfgren-Martenson, 2015), social interaction (Darragh, Reynolds, Ellison, and Bellon, 2017), participating in recreational activities (Chiner, Gómez-Puerta, and Cardona-Moltó, 2017b; Jenaro, Flores, Cruz, et al., 2018), and developing digital literacy skills (Salmerón, Gómez, and Fajardo, 2016). Some of the risks identified, especially in minors with ID, are excessive Internet use (Jenaro, Flores, Cruz, et al., 2018), exposure to inappropriate content (e.g. violence, pornography) (Chiner, Gómez-Puerta, and Cardona-Moltó, 2017a; Löfgren-Martenson, Sorbring, and Molin, 2015), online sexual solicitation (Buijs, Boot, Shugar, Fung, and Bassett, 2017; Wells and Mitchell, 2014), or cyberbullying (Didden et al., 2009; Jenaro, Flores, Vega, et al., 2018), among others.

Despite the potential benefits, available studies show that people in the environment (e.g. family, teachers) tend to modulate the Internet access if they perceive that people with ID will encounter online risks that they will not be able to manage (Seale, 2014). This control occurs in two ways. First, caregivers tend to limit or reduce access to the Internet (Chadwick and Wesson, 2016). Second, caregivers exert greater control, and even censorship, on the online content that people with ID can access (Seale and Chadwick, 2017). This trend is relevant because people without disabilities tend to think, on the one hand, that the benefits and risks of Internet access are greater for people with ID than without ID and, on the other hand, that the Internet is an unsafe environment for children and young people with ID (Chiner et al., 2017a, 2017b).

2. Objectives

The purpose of this study was to explore the perspectives of student teachers about the use of the Internet. Specifically, the study aimed (1) to know student teachers' perceptions about the online benefits and risks for people with and without ID; and (2) to compare student teachers' perceptions with regard (a) the population (individuals with and without ID), (b) the frequency of contact with people with ID, and (c) the gender.

3. Methods

3.1. Participants

A convenience sample of 182 student teachers of a university in southeastern Spain participated in the study. The majority of the participants were female (84.1%) and their mean age was 21.42 ($SD = 4.34$, range = 18 – 44). Only 17.6% of the students had regular contact with people with ID ($n = 32$), 8.8% had contact monthly ($n = 16$), and the majority never had contact with individuals with ID (73.6%, $n = 134$).

3.2. Instruments

An online questionnaire was designed for this study and included a list of 29 benefits and 30 risks relating to the use of the Internet and some sociodemographic items (e.g. age, gender, frequency of contact with people with ID). The list of benefits comprised items such as 'keeping in contact with friends and family', 'developing social skills', 'dating online' or 'giving opportunities to participate in advocacy groups'. The online risks included statements such as 'being bullied or harassed', 'being exposed to inappropriate or offensive adult pornographic content', 'becoming involved in bullying others' or 'becoming addicted to using social networking sites'. Students had to rate each benefit and risk twice, once for each group (individuals with and without ID). Ratings were based on a five-point Likert-type

scale ranging from 1 = No benefit / risk to 5 = Very high benefit / risk. The scales showed good internal consistency. The Cronbach's alphas for the benefit scales were .93 for the perceptions of people without ID and .96 for the perceptions of people with ID. The Cronbach's alphas for the risk scales were .95 for the perceptions of people without ID and .96 for the perceptions of individuals without ID.

3.3. Procedures

The study counted with the approval of the Ethics Committee of the researchers' university (procedure UA-2017-11-15). A cross-sectional survey was conducted. Participants were asked to respond during class time to the online questionnaire, which had been previously shared with students via the university online portal. Participants could use any electronic device to complete the questionnaire (e.g. cell phone, laptop) and the time taken to respond it was 10 – 15 minutes.

Paired-sample t-tests were conducted to compare student teachers' ratings of the benefits and risks of the Internet for people with and without ID. To compare participants' perceptions with the frequency of contact with people with ID, a series of one-way between-groups analysis of variance were used. Finally, differences between male and female student teachers' perceptions were explored using independent samples t-tests.

4. Results

Overall, findings show greater concerns than benefits of Internet use for both the general population and for people with ID (Table 1). Among the highest benefits of gaining online access, we find keeping in contact with friends and family, developing technological skills, learning about other cultures, and learning about work and further educational opportunities.

Table 1. Differences of student teachers' perceptions of the Internet for people with and without intellectual disability.

Scale	People with ID		People without ID		<i>t</i> (181)	<i>p</i>	<i>Cohen's d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Benefits	3.66	0.79	3.68	0.58	-0.364	.716	0.036
Risks	4.35	0.54	4.08	0.58	7.874	.000*	0.592

*Significant difference at $p < .001$ level

Concerning online risks, ratings were very high in all instances. However, the greatest perceived risks of being online were being bullied or harassed, communicating with strangers, being exposed to inappropriate or offensive adult pornographic content, being threatened, being susceptible to marketing scams and having difficulty to differentiate the trustworthiness of online information.

The paired-sample t-tests showed significant differences between student teachers' perceptions of online risks for people with ID ($M = 4.35$, $SD = 0.54$) when compared to individuals without ID ($M = 4.08$, $SD = 0.58$, $t(181) = 7.874$, $p < .001$). These significant differences were also found in 25 out of the 30 online risks.

Student teachers' perceptions of the benefits and risks of the Internet for people with ID did not differ depending on the frequency of contact with this group ($p > .05$). Neither did the perceptions of male and female participants with regard to the online benefits. However, significant differences were found concerning the gender and online risks. Female student teachers perceive greater online risks for people with ID ($M = 4.39$, $SD = 0.53$) when compared to male students ($M = 4.16$, $SD = 0.54$, $t(180) = 2.023$, $p < .05$).

5. Discussion and conclusions

This study aimed to analyze and to compare student teachers' perceptions on the benefits and risks of the Internet for people with and without ID. Results show, first, that student teachers believe that accessing the Internet involves more risks than benefits for both people with and without ID. However,

they tend to think that it is an even more dangerous environment for people with ID. These data are convergent with previous studies carried out by Chiner, Gómez-Puerta and Cardona (2017a, 2017b). Second, the frequency of contact of student teachers with people with ID is not a variable that affects their perceptions. Therefore, it can be deduced that the prejudices of the student teachers are resistant to knowledge and contact with people with ID, since their perceptions do not vary. Third, the results confirm that women show a greater perception of online risks for people with ID. The tendency in women to a greater perception of risk compared to men is a fact widely established in the scientific literature (Hitchcock, 2001) and it seems to be also confirmed regarding the risks of Internet use.

We can conclude that student teachers perceive the Internet as a dangerous environment, where risks prevail to benefits, especially in the case of people with ID. Likewise, the presence of prejudices towards people with ID is confirmed. Finally, the need to develop strategies for training based on scientific evidence for student teachers is highlighted. These training programs should address prejudice modification in both men and women, but taking into consideration the differences shown by women.

This research presents several limitations. In the first place, the cross-sectional nature of this study, as well as the size of the sample, do not allow causal inferences or generalization of the results to the population of student teachers, not even in our country. This study only reflects the perceptions of a group of student teachers and may not coincide with those of other populations. Future studies in various faculties and universities to broaden the knowledge of this phenomenon are advisable. Secondly, the responses of the participants may not reflect their beliefs fully, since they may have indicated biased or socially desirable responses.

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INTEGRATING NEW LITERACIES IN AN ONLINE LEARNING COMMUNITY

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Abstract

The current developments in information technology have revolutionized the learning practices in education. There have been numerous discussions of how to integrate the new literacies in the online learning community. As technology continues to enhance, it is expected that learning institutions will adopt new scholarship making the traditional ones obsolete. People have drastically adjusted to the modern lifestyle; whereby new forms of communication and information continue to expand. For instance, the use of presentation software, video editors, and social networks has become a key aspect of the disclosure. To this end, learners have to be prepared and proficient enough to embrace these changes. On the contrary, opponents of this ideology argue that the deictic feature of the internet and information communication technology (ICT) might end up impeding learning. Despite these criticisms, there is abundant literature supporting the adoption of digital literacies in the online learning community since it facilitates the expansion of critical thinking and social interaction skills. Numerous advantages have been linked with digital literacies in the modern world. Nonetheless, the existing gap between the new literacies and traditional literacies has led to a slow transition in the learning practices. Instructors are not confident enough that students will adjust effectively to the modern scholarship with the total abolition of the traditional learning practices. What is the efficiency of digital literacies in an online community learning? How will instructors incorporate these procedures in the online classes?

Keywords: *New literacies, information communication technology (ICT), digital literacies, online learning, and social network.*

1. Introduction

The internet has become the primary definition of technology for both literacy and learning, whereby the majority of the people are expected to be online in the next two decades. Getting engaged in the new literacies of technology is very crucial for successful engagement in the learning-teaching process. As new ways of communication continue to emerge, learning and teaching strategies are also changing. It is no longer the traditional literacy of paper, chalk, and pencil, but rather learning is taking place through videos, editors' presentations, Skype, blogs, bulletin boards, social networking sites, and Google, among others. Many people are now required to keep at pace with the successive literacies that are necessary to engage with the current technologies effectively.

2. New literacies in higher education

Despite the urgency of a new literacy, traditional educational practices have remained in higher education. Very few courses integrate new literacy or technology, such as learning through various social networking sites. The importance of the new literacy is not realized, yet the courses with literacy and ICTs are going to be essential factors in engaging in online age education in higher learning. This study aims to evaluate the importance of integrating new literacies in higher education (Collins & Halverson, 2018).

3. Advanced technology

Advanced technology has extended the notions of literacy that goes beyond the print-based texts to digital texts and the practices related to using them. The innovations have made learning, reading, and writing only in higher education. Unfortunately, most higher learning classrooms are not necessarily

responsive to the new ways of literacies. According to Coffey (2017), because of many reasons, like not having enough access to technology; understanding and adapting technology has become a barrier to integrating the new literacies. Understanding and integration of technology is required in the lecture halls, like having hands-on experience with technology and applying their learning in teaching. The new literacies consist of new skills as well as methods of literacy that have been made easy and possible by the technological innovations (Miller, 2015).

Tyner (2014) investigated how teachers in the graduate course were supported to use technology and apply new literacies in the classroom as part of their course. They taught student teachers who had enrolled in summer writing camp, and they were observed if they applied technology in their teaching during their teaching practice. Miller (2015) asserts that most of the teachers used technology in teaching reading and writing skills. However, it was noted that some teachers integrated technology in the final years of their course and that was one of the reasons why most of the educators do not emphasize the integration of new literacies. Baran (2014) advocates the expansion and integration of new literacies, which acknowledges advances in technology to make teaching-learning easy and exciting. The new literacies should be used as the new framework to broaden the understanding of literacy in higher learning.

The new literacies are also known as the 21st-century literacies that consist of proficiency with digital tools and ability to collaborate, design, navigate, evaluate, and create multimedia texts (Gallardo-Echenique et al., 2015). These new literacies focus on the way literacy has been transformed with the help of computers and the internet. In the modern digital world, people can create texts with sounds, movement, as well as images. Besides, they control design elements by shaping the size, appearance, as well as the functions and make writing publicly available when one clicks the button. This means that being part of the digital literature involves being able to use digital tools for different reasons. The new literacies are now used in forums like webpages, blogs, and Facebook, among others (Leu et al., 2015).

4. Collaborate, critical thinking, and problem solving

New literacies emphasize the ability to collaborate, think critically, as well as solve a problem. Therefore, the lectures should go beyond the traditional technology but focus on enhancing their literacy instruction in higher learning so that the teachers can transfer the same in the lower learning levels. The students should be taught how to access, evaluate, synthesize, make decisions, apply, and contribute information taught in class (Coffey, 2017).

Traditional academic practices have led to slow development and integration of new literacies as well as digital technologies in higher education. Kist and Pytash (2015) assert that new literacies are transformative for learning, teaching, as well as researching in the higher level of education faculties. Leu et al. (2017) suggests that all college students should use technology in class, but this has been limited due to convenience or control, but they have not become a context for substantive learning. Integration of new literacies is still a complex endeavor as the students continue to diverge their familiarity with the skills using digital tools. Ford et al. (2015) proposes that integration of ICTs in the learning process in the universities needs intentional differentiation. However, students still have an interest in using greater integration of technologies in their learning, such as through blogging, messaging, social networking, presentations, and RSS feeds. The researchers warn that the students will not move smoothly from the social entertainment technology to learning technologies. Therefore, a lot of emphasis should be placed on the integration of new literacies while they start their courses in higher education (Mohammadyari & Singh, 2015).

5. Social media

Most researchers have focused on the use of Twitter in learning to increase interaction among students and motivate them to support collaborative learning as well as expand the depth of understanding among learners. Twitter also has important applications in higher education, for instance, Collins and Halverson (2018) noted that there are various ways in which Twitter could be used to give instant feedback during teaching and learning processes. They identified that as students tweet the applications in class, they enhance their attention and listening skills to gather enough information that supports the learning process (Kist & Pytash, 2015). It can also be used to enhance communication between the learner and the instructor. Students at the university can carry out their group discussion through Twitter groups that consist of students from the same class. This saves on time and improves interaction among learners (Mohammadyari & Singh, 2015). Also noted was that Twitter inspires students to continue discussing the class content after the classes and strengthens their relationship and communication skills. This can help them compare their notes and answer with different groups.

6. Conclusion

Moreover, Miller (2015) reported that Twitter increases the students' critical thinking and enhances a good learning environment for the students. Digital literacies enable students to communicate or carry out their assignments wherever they are without having to go to class. They can discuss the important topic online, read education materials online, and the assignments are marked as well as comments made by their teachers virtually. Miller (2015) emphasizes that new literacies be integrated with the higher education to enhance the teaching-learning process.

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STRATEGOI: A SPOC TO TEACH ANCIENT GREEK¹

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Abstract

We present the *SPOC* (Small Private Online Course) ‘*STRATEGOI*’. *The Wars between Greeks and Persians*. This course, created on the *UAMX* platform for the subject *Greek I* (first semester of the second year of the Degrees in *Sciences and Languages of Antiquity* and *Art History and Sciences and Languages of Antiquity*) has been implemented for the first time in the current academic year (2018/2019) following the *Flipped Classroom* methodology. The final results of the experience are also shown.

Keywords: *Ancient Greek, ‘spoc’, flipped classroom, greco-persian wars.*

1. Introduction

Throughout the 2017/2018 academic year, a group of professors from the Departments of Classics and Ancient History of the Autonomous University of Madrid² worked on the development of an *SPOC* (Small Private Online Course) on the *UAMX* platform. The *SPOC*, called *STRATEGOI. The wars between Greeks and Persians* (*STRATEGOI* hereinafter) was created to meet the needs of the students enrolled in the subject *Greek I* (first semester of the second year of the Degrees in *Sciences and Languages of Antiquity* and *Art History and Sciences and Languages of Antiquity*)³. Students access both Degrees having a very unequal level of knowledge of Ancient Greek (there are even those who have never studied Greek before). For this reason, from the first academic year (in the subject *Fundamentals of the Greek Language*⁴), students are divided into two groups: A (for those who learnt Ancient Greek in High School) and B (aimed at those students who do not know Greek or show significant knowledge gaps). This split disappears in the third academic year, hence it is essential that group B students reach, during their second academic year, a level as close as possible to those of group A.

For this purpose, the final exam of *Greek I* is common and identical for both groups. This means that both teachers and students must make a considerable effort for all students to acquire – at the end of the course – the necessary skills to successfully face the translation of the same texts and the completion of the same exercises (grammar and syntax).

Our main objective is, therefore, that *STRATEGOI* becomes a useful tool to ensure that group B students optimize their performance and consolidate their knowledge in a novel and motivational way. In addition to this, when our project began we thought that the *SPOC* could be useful also for students in group A, since they would have a very complete resource to reinforce their weak points and to review several contents. As it will be explained later in this paper, our purposes have been fulfilled.

2. Design: the SPOC on the platform UAMX

According to the topic of the subject *Greek I*, the *SPOC* is about the Greco-Persian Wars, a series of armed conflicts between the Greek City-States and the Achaemenid Empire (5th century BC). Therefore, *STRATEGOI*, based on videos, interactive infographics and exercises, begins with an

¹ This work has been developed within the framework of two Teaching Innovation projects funded by the Teaching Innovation program of the Autonomous University of Madrid: *Strategoi. The Wars between Greeks and Persians* (FYL_001.17_INN) and *Application of Flipped Classroom to Greek I: SPOC STRATEGOI* (FyL_016.18_IMP).

² The six members of the work are Luz Conti, Raquel Fornieles (both coordinators), Claudia Alonso, Helena González, Alberto Pardal and Jesús Robles.

³ The students of both Degrees attend this course together.

⁴ In fact, *STRATEGOI* was conceived as the continuation of another *SPOC* aimed specifically at the students of the group B of this subject. This previous course, called *Kybernetes. Course 0 of Classical Greek*, was implemented throughout the 2016/2017 academic year with excellent results. On *Kybernetes*, see Fornieles (2017) and González (2018).

introduction to those wars (background, chronology, Herodotus and his dialect). Afterwards, contents are organized in four modules, each one named as one of the main battles of the Greco-Persian Wars:

1. Marathon
2. Salamis
3. Thermopylae
4. Plataea

In turn, each module is divided into seven different sections: 'Presentation', 'Historical Context', 'The *Stratēgoi*', 'Texts', 'Morphology', 'Syntax' and 'Lexicon'.

A fifth block, called 'And Then ...' closes the course and serves to reflect on the consequences of the Greco-Persian Wars.

The design phase of the *SPOC* ended on June 30th, 2018. In this first stage 17 texts from the *Histories* of Herodotus (all of them are accompanied by an audio track) were adapted to the level of our students. 46 videos were recorded and 79 interactive infographics were created. Schemes and paradigms were also made, as well as a significant number of exercises through the *UAMX* platform itself. The following figures show some of those materials:

Figure 1. Adapted text from the *Histories* of Herodotus with audio track.



Figure 2. Video⁵ of the Historical Context of the Salamis module and Interactive Infographic of a lexical family.

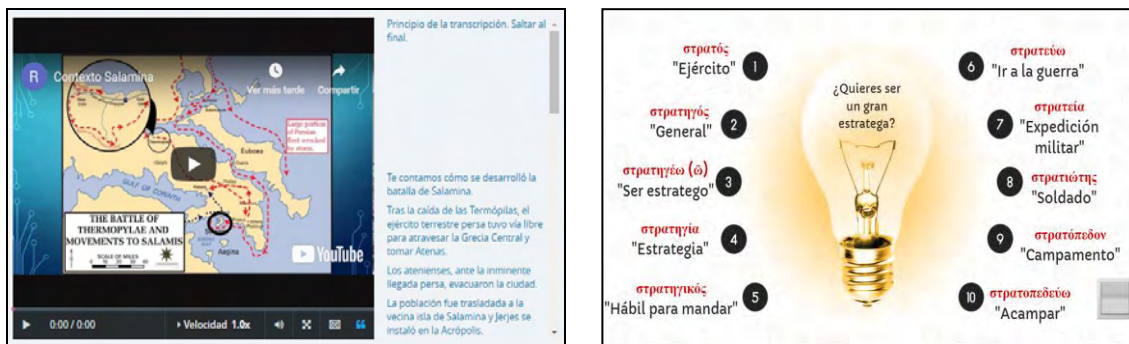


Figure 3. Example of a Multiple Choice exercise correctly solved with explanation⁶.



⁵ Each video has its corresponding subtitles which can be downloaded by the students.

⁶ The platform allows us to create different types of exercises: Multiple Choice, Blank Common Problem, Checkboxes, Dropdown, Numerical Input and Text Input. In all of them an option with Hints and Feedback can be activated.

3. Implementation and methodology: The *Flipped Classroom*

The subject *Greek I* has been taught in the first semester of the current academic year. This means that the *SPOC* has been put into practice for the first time between the months of September 2018 and January 2019.

To achieve our goals we have implemented the *Flipped Classroom* methodology, a *Blended Learning* modality which reverses the traditional learning environment by combining face-to-face teaching with the autonomous work carried out by the students outside the classroom. There is no unique and universal definition of *Flipped Classroom*⁷. The model was popularized by two teachers in the University of Colorado, Jonathan Bergmann and Aaron Sams. Concerned with students who often missed their lessons, and after accessing a software that allowed them to record *PowerPoint* presentations, began to record slides, complete lectures, *etc.* Once the recording tasks were finished, they posted the materials on *YouTube*. Students were expected then to view the videos and so the class was ‘inverted’: the so-called homework was done in the classroom and those teachers encouraged active and collaborative learning.

Taking this proposal as a starting point, we have ‘flipped’ the classroom of *Greek I*. According to a schedule previously provided by the teacher, students (group B) have followed – progressively and successfully – the course and the proposed objectives have been fulfilled. The completion and monitoring of the *SPOC* has been combined with the translation and commentary of texts in the classroom (different from those texts included in the *SPOC*). Mid-term exams (morphology, syntax and vocabulary) have been made to verify the progress of the students and to check the viability of the methodology.

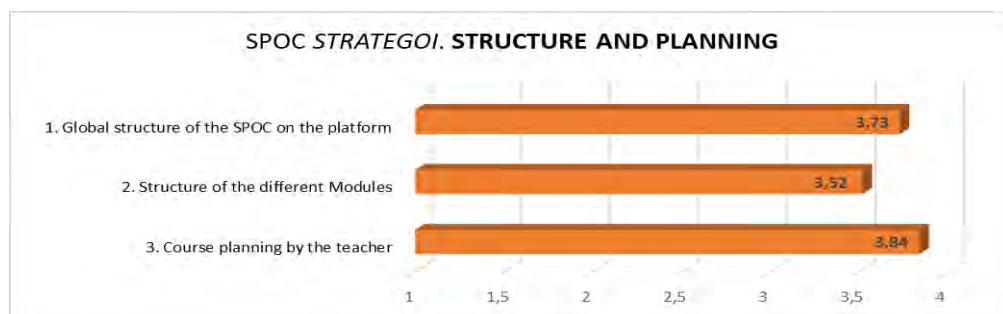
4. Results and conclusions

At the end of the semester all the data offered by the platform were analyzed in detail and the general results obtained with the implementation of the *SPOC*. The total number of students enrolled in *Greek I* was 33: 22 in group A and 11 in group B. The course was included in the Teaching Guide of the subject. The follow-up of the course and the execution of the activities were mandatory for group B (up to 20% of the final grade) and optional for group A. The monitoring of the individual progress of each student was carried out through the platform itself, since it allows the teacher to obtain specific data through the tool called ‘Student’s progress page’.

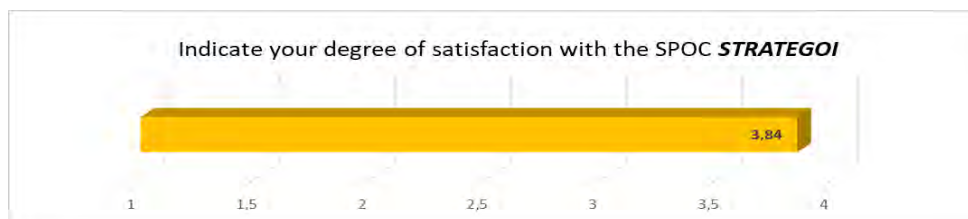
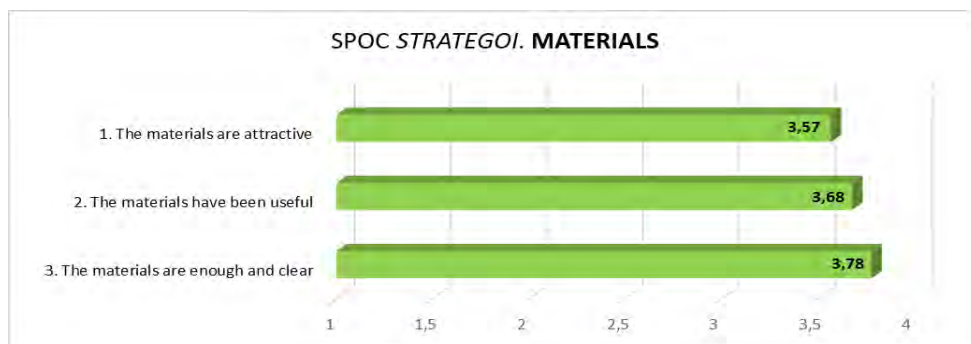
The final results were highly satisfactory and one aspect caught our attention: although the follow-up of the *SPOC* was not mandatory for group A, more than 70 percent of the students in that group decided to follow and complete it at the same pace as their peers.

We also wanted to take into account the opinions of the students themselves in order to draw definitive conclusions. We designed a survey to be filled out (anonymously) on the last day of the course. Students were expected to give their opinion on several aspects on a scale of 1 to 4 (1 lowest, 4 highest). The following figure reflects the results, really rewarding:

Figure 4. Data of the survey conducted on the *SPOC*.



⁷ See Wolff & Chan (2016: 9). They conclude: “However it appears that academics agree that a *flipped classroom* generally provides pre-recorded lectures (video or audio) followed by in-class activities”. For additional information about *Flipped Classroom* see References list.



In addition to the questions shown in the graphics the survey included four open answer questions:

1. What materials have you found most useful?
2. What aspect(s) would you highlight?
3. What aspect(s) would you change?
4. Do you have suggestions to improve the SPOC? Please, indicate them.

With regard to the materials, most of the students highlighted their preference for interactive infographics (they considered them really useful to study in a more enjoyable and effective way). The attractive presentation of the course on the platform and the implemented methodology (“highly motivating”) are the most outstanding aspects in their opinion. Finally, their suggestions and comments will be considered in order to make an improvement plan for the next academic year.

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CHILDREN LEARNING A FOREIGN LANGUAGE BY DOING AND PLAYING

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Abstract

Since the last part of XX century there has been a great interest on Foreign Language (FL) acquisition. A lot of research has been done on Second Language Classrooms (Chaudron, 1988) and on how English learning can be improved (Ellis and Sinclair, 1989) big efforts have been made on making lessons more meaningful to students (Long & Doughty, 2009). Special attention was given to learner's uptake (Bailey, 1991) although most of the studies have been carried out studying teacher's performance in class.

This research pretends to investigate the teaching learning context itself. Although taking into account all participants in class, the main focus is on learners. Taking discourse analysis as an essential tool (Sinclair & Coulthard, 1992; Tsui, 1994; Poyatos, 1998; Velasco 2012) we study English classes for Spanish young learners aged 10-12.

We are interested in analyzing learners' oral output after using a different methodology. Believing that motivation, affect and students' emotional intelligence play an exceptional role on L2 learning (Arnold, 2006) as well as Cooperative Learning (Kagan, 2009; Slavin, 2014), our methodology has focused on promoting and helping students to create a game to play in and out of class, in big and small groups in order to improve their FL acquisition. We have studied students' participation and interaction level as well as their English acquisition level.

Results show very relevant information that could greatly help teachers and students from all educative levels.

Keywords: *Cooperative Learning, gamification, classroom interaction, foreign language learning, didactics.*

1. Introduction

Nowadays, it is extremely important to understand the teaching-learning process in the Foreign Language (FL) class at Primary level in order to improve FL acquisition. In Spain, children start to learn English as a foreign language at three in many schools but it is amazing the quantity of students that do not feel confident enough to speak in English when they leave Secondary school after 13 years studying a Foreign language. In contrast, in many European countries children start to learn a foreign language when they are older (12 years old), have less number of L2 tuition and are able to speak in English better when they leave Secondary schools. Teachers should reflect on the teaching-learning process and use effective methodologies for students in the changing world in which they are living.

2. Objectives

In spite of the great number of teaching aspects that need further research, we have opted for focusing on one of the most difficult grammar points to teach at schools: affirmative, negative and interrogative sentences in present tense with verbs to be, to have got, can and action verbs. After three decades teaching English as a foreign language to Primary school students, we have observed that Spanish students have great difficulties in learning and using properly simple present with usual action verbs and also with *to be, to have got and can*. It seems to be especially difficult for students to use the third person in singular (he/she/it/) in simple present.

Our main objective in this study is to analyze learners' oral output after using a different methodology when learning *Simple present*. We would like to know if using the new educative tool that we are going to name *30Q mini-book* helps students to learn better L2 and we also would like to know how they use it and what they think about it.

3. Design

In order to help our students, we decided to create a new educative tool, the 30 Q mini book, and use it with a different methodology in the foreign Language class. Believing that motivation, affect and students' emotional intelligence play an exceptional role on L2 learning (Arnold, 2011) as well as Cooperative Learning (Kagan, 2009; Slavin, 2014), our methodology has focused on promoting and helping students to create a game to play in and out of class, in big and small groups in order to improve their FL acquisition. We have studied students' participation and interaction level as well as their English acquisition level.

Fifty Spanish students aged 11-13 years old have participated in this study. They study English in Year 6 in the same school, located in a medium size city in Spain. 26 students belong to group A (experimental group) and 24 students to group B (control group). The same English teacher has taught them for last three years. There is only one new student.

In both groups, students have studied Simple Present paying special attention to third person in singular but with different methodologies: in group B, using the communicative language teaching and doing activities from the text book and in group A, the teacher (T) has used a new tool to learn a foreign language: *the 30 Q mini-book*.

After two weeks playing 30-Q game to guess the animal where one student stood in front of the class and answered his/her classmates' questions, we audio recorded students playing and analyzed data with a discourse analysis model (Velasco 2012), based on Sinclair & Coulthard, 1992; Tsui, 1994; Poyatos, 1998. Relevant conclusions can be drawn from results.

4. Method

In order to motivate students in class, we propose a game in which students have to guess the animal one person has in his/her mind. One student is in front of the class, facing the group of students. She/He writes the name of one animal in a piece of paper and gives it to the teacher. Then, this student answers all questions made by the rest of students. The person who guesses the animal comes to the front of the class and do the same. Learners have played the same game in both classes for two weeks.

In class B, teacher explained how to make questions in English with verbs *to be*, *to have got*, *can* and action verbs with the same examples that students in class A included in their mini-book and all possible answers. Both had to study them. Methodology used in the experimental group had two different stages: In stage 1, students had to make the mini-book and in stage 2, play using it. Mini-books were not given to the students, they had to make them in class based on learning by doing theory (Williams, 2017).

To make a mini-book students only need a sheet of paper. After folding it three times and cutting it in the middle, opening it and closing it students get a little book with eight pages on it. We used it to write useful sentences that we need to play a game to guess an animal.

The teacher played an essential part because she was in the blackboard delimiting 8 parts and writing the title in the first page: *My 30-Q mini game* and each student had to write his/her name, level and class. The reason why that title was chosen is because there are 26 students in class and being 30 questions the maximum, there is a possibility for all students to ask, at least, one question. Teacher and students are working at the same pace and all students complete the mini game at the same time. Teacher is asking questions like *What would you like to ask?* If students make a question in Spanish, teachers asks *how would you say that in English?* to students Then, learners have to say the possible answer to the yes/no question previously written. As there are seven pages plus the front page, teacher tries to make sure that there are questions containing *is it? Has it got? Can it ...? or does it ...?*

In each page of our 30 Q Mini game appeared the following sentences:

- 2.- Has it got four legs? = ¿Tiene 4 patas? Yes, it has= sí / No, it hasn't= No
- 3.- Has it got feathers? = ¿Tiene plumas? Yes, it has= Sí / No, it hasn't= No
- 4.- Has it got a tail? = ¿Tiene cola? Yes, it has= Sí / No, it hasn't= No
- 5.- Is it green? = ¿es verde? Yes, it is= Sí/ No, it isn't= No
- 6.- Does it eat meat? = ¿Come carne? Yes, it does= Sí/ No, it doesn't= No
- 7.- Does it live in the jungle? = ¿vive en la selva? Yes, it does= Sí/ No, it doesn't= No
- 8.- Can it fly? = ¿Puede volar? Yes, I can= Sí/ No, it can= No

During the following two weeks, students in both classes played the game to guess an animal, using the 30 Q mini game in class A and vocabulary and grammar points learnt in class in class B. After that time, learners where audio recorded. In class A, students were distributed in cooperative teams of 4 or 5 members and in class B learners played as usual, one student in front of all his/her classmates answered their questions. There is a maximum of 30 questions to guess the animal. Once who guesses it, student thinks of an animal and answer the questions.

Data reveals relevant information. Table 1 and table show the amount of questions made by learners during five minutes audio recording in each class and the quantity of animals that students guessed in each class.

Table 1. *Quantity of questions and animals guessed in class B.*

N. animals	N. of questions
3	39

Table 2. *Quantity of questions and animals guessed in class A.*

Class A	G1	G2	G3	G4	G5	Total
N. questions	48	40	46	41	50	225
N. animals	3	3	2	2	9	19

Differences are clear. There is a higher interaction level in class A. In the same amount of time (5 minutes) students in class A made more than five times more questions than in class B. Furthermore, students from each cooperative team in class A participated actively. Within each group, students made more questions than the whole class of 6th B. Taking into account that teams were formed by 4 or 5 members we can observe that each student had more opportunities to speak, asking or answering questions than in class B where only the highest achievers prompt to talk in public. On the other hand, we have analyzed discourse produced by team members as shown on table 3.

Table 3. *Data analysis group 4, class A.*

line	<i>Student's discourse</i>	<i>Communicative acts</i>
1	S3.- It is big?	I3(elic:confirm)
2	S2.-Yes, it is	R2(confirmation)
3	S1.- Has it got four legs?	I1(elic:confirm)
4	S5.- Is it tiger?	I5(elic:confirmation)
5	S2.-No, it isn't	R2(confirmation)
6	S4.- Has a... has it got a ...(he touches his hair)	I4(elic:confirmation)
7	S1.- hair?	I1(elic:conf)
8	S4.- (nods) hair?	NVR(confirmation)R4(repetition)
9	S2.-Yes, it has	R2(confirmation)
10	S3.- long hair or short hair?	I3(elic:inf)
11	S2.-Short	R2(give inf)
12	S5.- Does it meat?	I5(elic:conf)
13	S1.- Does it eat meat?	I1(elic:repetition)
14	S5.- Does it eat meat?	R5(repetition)
15	S2.-Yes	R2(confirmation)
16	S4.-Is it a Wolf?	I(elic:confirm)

G4 students' discourse. Own resource

In the first column, it is the order of sentences. In the second one, students' communicative discourse. S1 refers to student 1, S2 to student number 2 and so on. In the third column, we have analyzed each fragment of student's output into communicative acts according to the illocutionary force. As we can see, most of students' communicative acts belong to the Initiation Move that elicit confirmation and S2 always responds with a confirmation or a no confirmation act. Students use what they have learnt to do with their 30Q mini game, using the same sentences that appear in their little book but, surprisingly, on line 6, S4 tries to use a different sentence although he is not able to complete it and we can see how S1 tries to help. It is a clear case of scaffolding between students. Working in a cooperative team has taught them to be helpful with others. Again, on line 13, S1 helps another student (S5) when he understand what he tries to say and becomes a model for him.

On the other hand, S3 feels ready to make his own question: *long hair or short hair?* In that case, S3 instead of eliciting confirmation, elicits information.

Nevertheless, some grammar mistakes are observed on lines 1 and 4 but, in spite of not being perfect, communication is clear and they keep on playing. As Kagan (2009) states *It's all about engagement* and we could observe engagement in all cooperative teams but there is no engagement on 6th B class where some students are not paying attention, talking to their classmates in Spanish instead than in English. Only volunteer students take part in the game in class B. On the contrary, all students in class A participated as they were in small teams and they know that all team members have to participate.

According to mistakes, we have observed that some students in both classes got confused when making questions in third person with verb *to be*. E.g: It is big? Also some students forgot to include 'a' in questions like: *Is it _ tiger?* In class B, besides those mistakes, students got confused with *Can I fly? Instead that Can it fly? Or Do you live in the jungle? instead of Does it live in the jungle?*

On the other hand, to obtain learners' feedback on their mini game, they had to complete the following questionnaire where they had to fill, at least, one answer.

Question number one was: Have you ever made a 30-Q mini game? And, obviously a 100% answered yes because they all had to do it in class. The second question was *What is it useful for?* With four answers: *a) to play; b) to read ; c) to study and d) to write* . Students could mark more than one answer and the result was: 100% used the little book to study it; 79% stated that they used it to play; 29% considered that they read it and 25% said that it was useful to write it.

Question number 3 was *Do you read your 30Q Mini game at home?* The highest percentage (62.5%) went to sometimes; 29% said that they never read it at home; 2 students said that they read it everyday and 2 students affirmed that they use it when a classmate comes to his/her house to play.

Nearly the whole class (91.6%) answered *Yes* to question number 4: *Do you think it is useful to learn English?* Moreover, most students were conscious that they had learnt a lot with this new tool 83.3% answered yes to the question *Have you learnt with 30Q Mini game?*

Question number 6 was *What have you learnt?* with different possibilities; *a) to speak; b) to answer; c) to ask; d) to listen and e) to write*. Most students (83.3%) answered that they had learnt to ask and answer in English. 62.5% stated that they had learnt to speak in English and 58.3% considered that they had learnt to write in English.

Our final question, *How did you learn more: making the mini game or playing with it?*, showed very interesting results as 66.6% considered that playing, 25% making it and 8.4% chose both answers.

5. Discussion

We believe that observing how students learn is probably the best way to learn about the teaching-learning process. Teachers occupy the most relevant part in this task because they cannot only observe but also act and observe results when implementing different methodologies. Action research is needed in our schools because students need to get in contact with new ways to learn a foreign language. Most Spanish students are not eager to learn a foreign language and teachers have to motivate them. New methodologies always attract learners' attention. Games are always welcome in the FL class but they need language support to use L2 language as a vehicle for playing. Despite most learners are not conscious of how useful is to do their own made 30 Q mini game, in doing it they have thought about useful sentences and learnt how to build them which helps them to create similar sentences.

6. Conclusions

This study has shown great differences in the FL class depending on the methodology used. Cooperative learning gives students more opportunities to participate and interact in the foreign language. The new tool, 30Q mini game, has been a great asset for students. First of all, they have made their own sentences using their thinking skills. Now, they are prepared to make many more questions and are able to answer them. They do not have to keep on asking the teacher: how do you say...? On the contrary, they start using sentences from the mini book fluently and very soon, they make new questions because they have learnt how to do it.

Our first conclusion is that children are eager to use new learning tools and welcome any active methodology pursuing learners' interaction. Not only better results were observed when using the mini game, but also more students' output in English, less grammar mistakes, more fluency in the foreign language, more engagement and what is more important, we could see students coaching their classmates, learning cooperatively.

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DEVELOPMENT OF “CONTENT-FOCUSED ACCESSIBILITY” E-LEARNING MATERIAL FOR ENGLISH LEARNING TARGETING VISUALLY IMPAIRED UNIVERSITY STUDENTS

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Abstract

Students with visual impairment use media conversion (e.g., enlarged characters and braille) and ICT environments (e.g., sounds and PC screen magnification) to learn English. However, there are very few English learning materials in braille, and magnification-capable and digital materials for higher education are not commercially available. Although many publishers produce online English learning materials, many do not allow screen magnification and text-to-speech function. Therefore, students with visual impairment need to create braille versions of and/or text data for such materials. However, satisfying such requests is time consuming, which may cause students to lose important opportunities or motivation. A self-learning environment for students with visual impairment to study English has not been completely developed.

The author found that, in many cases, only these “technical accessibility” of learning materials is insufficient for students with visual impairment to respond to questions depending on question patterns. Due to the absence of useable learning materials, the English skills of many visually impaired students are surprisingly low. Nonetheless, university students require basic English skills. Hence, this study presents original attempts to modify the organization of questions for self-learning English grammar books. The author refers to this material as original e-learning “content-focused accessibility” material.

The author’s students with visual impairment studied this material and provided feedback from the following perspectives: 1) effectiveness of the material, 2) suggestions to improve the material, and 3) improvement of activeness for learning English after studying the material. Further, the author analyzed the students’ grades before and after studying the material.

The study revealed four interesting results: 1) Approximately 90% of the students with severe visual impairment found “content-focused accessibility” material very useful. 2) Those with severe visual impairment provided both positive feedback on and suggestions for improvement of the material. 3) Approximately 90% of the students with severe visual impairment significantly improved their autonomy for English learning after studying this material. 4) Finally, 80% of the students with severe visual impairment who studied this material improved their grades. Furthermore, 100% of them answered that their autonomy improved after studying the material. These results demonstrate the effectiveness of “content-focused” accessibility material in the self-learning of students with severe visual impairment.

Keywords: *Visual impairment, “content-focused accessibility”, e-learning, students’ engagement in English self-learning.*

1. Introduction

Students with visual impairment use media conversion (e.g., enlarged characters and Braille) and information and communications technology (ICT) environments (e.g., sounds and personal computer (PC) screen magnification) to learn English. However, there are very few English learning materials in braille, and magnification-capable and digital materials for higher education are not commercially available. Although many publishers produce online English learning materials, many do not allow screen magnification and text-to-speech function. Therefore, students with visual impairment need to create braille versions of and/or text data for such materials. However, satisfying such requests is time consuming, which may cause students to lose important opportunities or motivation. A self-learning environment for students with visual impairment to study English has not been completely developed.

In addition, some students are at a loss due to the absence of learning materials, and others have difficulty keeping up with classes due to their lack of skills in English. This occurs because students’ visual impairment varies a lot, and their English learning backgrounds also vary a lot depending on when they were first impacted by visual impairment. In this aspect, the author believes it is critical to provide conducive English learning environments for visually impaired students.

In this study, the author calls media conversion learning materials as well as ICT environments “technical accessibility to information”. In many cases, it is remarkably difficult for students with visual impairment to utilize only “technical accessibility to information” in English learning, depending on the pattern of question (e.g., multiple choice, fill-in-the-blanks, etc.) as shown in previous studies. Nonetheless, a number of students require foundations to be established for a basic knowledge of general English. In addition, as some students aspire to enter graduate school, teacher-training courses of other universities, or take English certification examinations (STEP Test, TOEIC, etc.) for gaining employment, there is a substantial demand for the acquisition of basic English skills.

This study presents pioneering attempts to modify original learning materials regarding the various patterns of questions. This is what the author calls “content-focused accessibility to information”, which enables visually impaired students to study English more efficiently.

2. Design of the Study

2.1. General modification attempts

Attempts for Students with Severe Visual Impairments (blindness, almost complete blindness / severe low vision, extremely narrowed vision field)

As the system could not be designed for mouse users, it uses processes to operate buttons using sounds and select choices from the provided answers through keyboard operation. In addition, both sound and braille character outputs were used concurrently.

Attempts for the Rest of the Students (low vision, narrowed vision field, central scotoma, arcuate scotoma, night blindness, light aversion, and other types of visual impairment)

The system enabled changes in character sizes, layouts, background colors, character colors, and similar features.

2.2. Attempts to modify the learning Material

This study uses Moodle, the open-source software package, as the basis of the e-learning system to create of web pages on the Internet. Various methods were added to “technical accessibility to information” and learning materials to ensure ease of use by students with visual impairment.

The textbooks provide the foundation of basic English grammar for junior high school and high school students. Questions were roughly divided into three types: (i) fill-in-the-blanks, (ii) multiple choice, and (iii) writing tasks.

(i) Fill-in-the-blank Questions

■Original Question

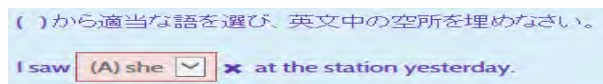
“Fill in the blanks in English sentences with a suitable word from among the choices within the parentheses.”

I saw ____ at the station yesterday. (she, her, hers)

The original format showed entire sentences, including the blanks, followed by the answer choices. Students had to memorize all the choices, before returning to the blank space to provide an answer from the options. If students could not remember even a single word, they would have to go back to view the choices again. This system was inefficient.

■Situation after Improvement via the System

Figure 1. Screen for Fill-in-the-blank.



A pull-down menu was provided to indicate choices for the blank space. In this system, students can answer and fill in the blank when they read or listen to the sentence, without having to return to the options after reading or listening to the entire sentence. Using a PC-Talker, students can listen to questions and answer choices in English and explanations in Japanese.

(ii) Multiple Choice Questions

■Original Question

“Choose the correct usage of present tense from ①～③ and answer the number.”

[①present status ②present repetitive motion ③general fact or truth]

- 1) Mr. Smith understands Japanese. ()
- 2) Water boils at 100°C. ()
- 3) My brother plays soccer with his friends on Sundays. ()
- 4) Lisa often talks to her Japanese friend on the phone. ()

5) Mary resembles her mother very much. ()

In the original format, students had to go back and forth between the question and answer choices. Alternatively, they had to remember all the answer choices. This system was inefficient.

■Situation after Improvement via the System

The format was changed into one which showed all the choices for each question. The format also adopted a new method to answer questions by pushing a radio button. In addition, the underlines were changed into a readable symbol “【】” so that students with severe visual impairment could listen via the text-to-speech screen reader function.

“Choose the correct usage of present tense from ①～③ and answer the number.”

- | | |
|---|---|
| 1) Mr. Smith【understands】Japanese. | 2) Water【boils】at 100°C. |
| <input type="radio"/> present status | <input type="radio"/> present status |
| <input type="radio"/> present repetitive motion | <input type="radio"/> present repetitive motion |
| <input type="radio"/> general fact or truth | <input type="radio"/> general fact or truth |

(iii) Writing Task Questions

■Original Question

“Encircle the modifier in the underlined portion.”

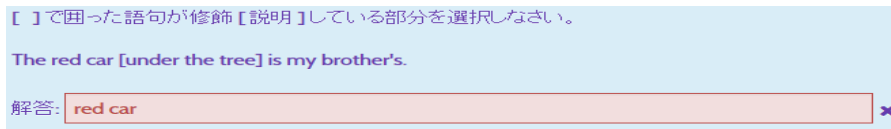
The red car parked under that tree belongs to my brother.

■Situation after Improvement via the System

Students with severe visual impairments who were unable to use a mouse could not encircle specific words or phrases on a PC. Therefore, the word “underlined” was changed into a readable symbol “【】”, and the phrase “underlined portion” was altered to “portion enclosed in ‘【】’.” The old format was changed into one in which the modifier related to the underlined portion was described by learners as follows:

The red car【parked under that tree】belongs to my brother.

Figure 2. Screen for Writing Task Questions.



3. Discussion

3.1. Assessment for “content-focused accessibility” e-learning materials

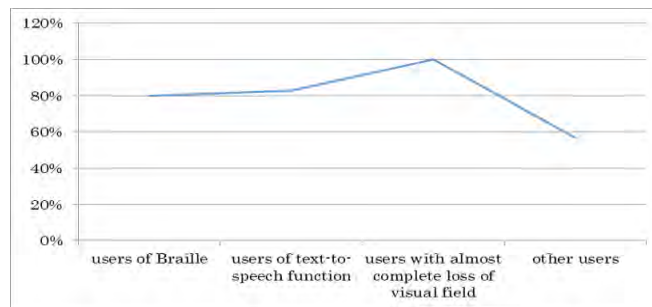
The author conducted an assessment of “content-focused accessibility” of e-learning materials to confirm the educational effect of the materials for visually impaired students. The author gave 25 first-year students with visual impairment an assignment to study using “content-focused accessibility” material, and obtained their feedback from the following perspectives: 1) effectiveness of the material, 2) suggestions to improve/revise the material, and 3) development of autonomy for learning English after studying the material. Further, the author analyzed the students’ grades before (a placement test) and after (the final examination) studying the material.

Students can be classified into five categories as follows (total number respectively):

- 1) users of braille (6 students: 5 males and 1 female, ages from 18-24, all Japanese native speakers)
- 2) users of text-to-speech function (6 students: 5 males and 1 female, ages from 18-24, all Japanese native speakers)
- 3) users with almost complete loss of visual field (4 students: 3 males and 1 female, ages from 18-38, all Japanese native speakers)
- 4) other users (low vision, narrowed visual field, central scotoma, night blindness, light aversion) (18 students: 16 males and 2 females, ages from 18-38, all Japanese native speakers)
- 5) users who can read printed learning material without major difficulties (5 students: 3 males and 2 females, ages from 18-19, all Japanese native speakers)

The students’ feedback reported above revealed four interesting results:

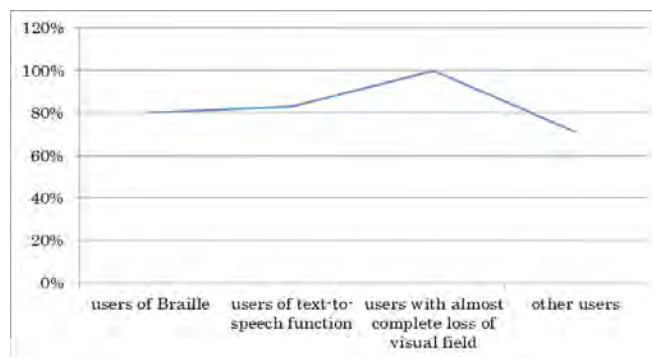
Figure 3. Effectiveness of “Content-Focused Accessibility” Material.



1) Approximately 92% (12 /13 students) students with severe visual impairments (blindness, almost complete blindness, users of text-to-speech functions and/or braille, almost complete loss of visual field) found “content-focused accessibility” material very useful (Figure 3).

2) Those with severe visual impairment provided both positive feedback and more detailed suggestions for improvement/revision of the material.

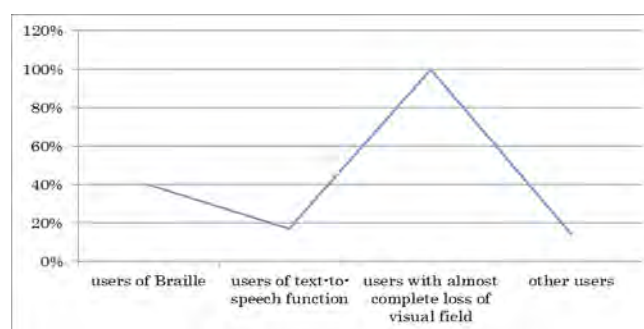
Figure 4. Development of Autonomy for Learning English after Studying “Content-Focused Accessibility” Material.



3) Approximately 92% (12/13 students) of the students with severe visual impairment significantly developed their autonomy for English learning after studying material developed by this system (Figure 4).

Furthermore, 100% (9/9 students) answered that their autonomy developed after studying the material.

Figure 5. Improvement of Students’ Grades After Studying the “Content-Focused Accessibility” Material.



4) About 32% (8/25 students) of the entire group and about 73% (8/11 students) of those with severe visual impairment improved their grades at the final examination of the first semester (Figure 5). Finally, about 44% (4/9 students) students with severe visual impairment at low-to-middle English proficiency levels improved their grades at the end of the first semester after studying material developed by this system. 100% (13/13 students) of those with severe visual impairment answered that their autonomy improved after studying the material.

3.2. Students’ engaged learning

Based on students’ feedback, the author finds that most visually impaired students are actively engaged in self-learning based on their self-analysis. This finding is significant as it provides new insights that will help facilitate visually impaired students’ self-learning.

Students with visual impairment tend not to have opportunities to review their present English skills since they have to make a lot of efforts to keep up with daily tasks (e.g., required English classes). The author found it significant that visually impaired students themselves analyzed their present English skills and decided which “content-focused accessibility” material they needed, without guidance, help, or suggestions from anyone else. Some students consulted the author regarding which “content-focused accessibility” material to choose based on their English skills. They analyzed their weak points and future needs very precisely. Finally, one student chose “content-focused accessibility” material that was different from the ones recommended by the author. Hence, the author regards it meaningful to develop “content-focused accessibility” as this might inspire students with visual impairment to engage in self-learning, something that is often said to be difficult.

4. Conclusion

These results demonstrate the effectiveness of “content-focused accessibility” material in the self-learning activities of students, especially those with severe visual impairment. The findings are convincing, since students with severe visual impairment need more accessibility to information than those with relatively lighter visual impairment. An additional important factor to consider in students’ learning environments is whether their visual impairment is congenital or acquired. Students whose visual impairment is both severe and acquired recently have the biggest difficulty (2 students). Their feedback had a significant importance in this study.

Those with severe visual impairment provided both a lot of positive feedback together with more detailed suggestions for improvement/revision of the material. This is also convincing since they experienced the effectiveness of “content-focused accessibility” material more and showed significant improvement in autonomy for learning English after studying material developed by this system.

5. Proposals for further studies

As indicated by the students’ comments, this system suffers from some issues that impede accessibility for students with all kinds of visual impairment. These issues are as follows:

1) As some students could not grasp the whole screen and navigation on the edge of it when it was widened, they occasionally could not understand which question they were working on.

2) Some students with visual impairment face difficulty in seeing ordinal color contrast. Most of them typically use a black-white inverted screen.

3) In Writing Task questions, it is difficult for users of text-to-speech function and those with severe low vision to notice half-width space. Some questions request this space as the correct answer, which becomes a factor influencing learning motivation.

The author is currently working on addressing the problems mentioned above. Points 2) and 3) can easily be dealt with by the author, by changing the system. Furthermore, these improvements/revisions would meet the needs of both those with severe visual impairment as well as those with low vision conditions, which means that the improved/revised material applies to all kinds of visual impairments. As for point 1), careful improvement/revision would be required to address all kinds of visual impairment.

In the near future,

1) Work will continue on the development of a new version of the present system using “content-focused accessibility to information” for all kinds of visual impairment that will address the problems found in the present system.

2) This e-learning material is limited to the university due to the licensing agreement. It is hoped that possibilities will be provided that allow students with visual impairment who are learning at institutions of higher education throughout Japan to independently undertake English studies in response to reasonably accommodate all disabled students.

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PRE SERVICE TEACHER ATTITUDES AND SELF EFFICACY TOWARD INCLUSION IN KOSOVA

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Abstract

Inclusive education is a relatively new philosophy and practice in Kosova. There is increasing recognition that successful implementation of inclusive education practices depends largely by teacher' positive attitudes and high self-efficacy toward these practices.

The purpose of this study is to examine attitude toward inclusive education and self-efficacy for inclusive practice among pre-service teachers in Kosova. Moreover, it will examine the relationships between pre-service attitude and self-efficacy and other demographic variables such as gender, age, study years, previous professional trainings in inclusive education, experience in working with children with disabilities and significant relationship with a person with disabilities.

This study will include 180 BA and MA pre service teachers (primary and preschool) from two universities in Kosova.

The findings of this study are discussed within the framework of the importance of pre service teachers' personal variables in successful implementation of inclusion in education.

Keywords: *Pre service teacher, inclusive education, attitudes, self-efficacy.*

1. Introduction

Although inclusive education as a relatively new philosophy in Kosova, during the two last decades there has been a lot of efforts to build and reform the educational system based on inclusion principles. However the literature confirms that teachers' personal variables such as positive attitudes and high self-efficacy toward inclusive practices play a crucial role in implementing successful inclusive education (Avramidis & Norwich, 2002; Forlin, 2010^a; Sharma, Folin & Loreman, 2006). While internationally there are a considerable number of studies that examined these two variables among pre service teachers in the context of inclusion, in Kosova there is no single study in this field. This study is the first attempt to fill the gap in the existing literature. Moreover the importance of this study relies on the fact that pre service education years have a fundamental importance in acquiring appropriate attitude and skills to implement inclusive education more successfully (Sharma et al., 2006).

1.1. Teachers' attitudes, concerns and sentiments towards inclusive education

The term attitude as defined by Eagly and Chaiken (1993, p.1) means "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor". There are two types of teachers' attitudes toward inclusion. Positive attitudes are those that make teachers use appropriate teaching strategies for inclusion of children with special needs in their classrooms and negative attitudes that contribute to teacher's failure to implement such strategies and create rather exclusive than inclusive learning environment (Campbell, Gilmore, Cuskelly, 2003; Forlin, 2010a).

Many studies have confirmed that there is a relationship between teacher's attitudes, concerns and sentiments toward children's with special needs. Agbenyega (2007) in his study confirms that except attitudes also concerns are important factor in implementing inclusion. Changpinit, Greaves, and Frydenberg (2007) explored the attitudes and concerns of 702 in-service teachers of Thailand and found that teacher's positive attitudes towards children with disabilities and their concerns correlated negatively. In contrary, a comparative study that included 319 South African and 822 Finnish primary and secondary teachers found that teachers concerns were much higher although teachers from both countries expressed positive attitude and sentiment toward children with disabilities (Savolainen et al., 2012). Therefore, according to these findings we can conclude that there is a complex relationship between teachers' attitudes, sentiments and concerns towards the inclusion of children with disabilities.

1.2. Teachers' self-efficacy for inclusive practices

According to Bandura (1977), teacher self-efficacy has been defined as the “extent to which a teacher believes that she or he can influence students’ behavior and their academic achievement, especially of pupils with difficulties or those with particularly low learning motivation” (Friedman & Kass, 2002, p. 675). In addition, several empirical studies have confirmed that teachers with higher self-efficacy were more confident in using their own skills, abilities and knowledge during inclusive practices and showed more success in including children with disabilities in their classrooms (Friend & Bursuck, 2009; Sharma, Loreman, & Forlin 2012). The role of teacher’s self-efficacy in implementing inclusive practices to date has been examined mainly in two directions: how it relates with attitudes, concerns and sentiments toward inclusive education and how the degree of self-efficacy among in service and pre service teachers varies according to different countries around the world. Regarding the first direction, a growing body of literature confirms that there is a positive relationship between teacher’s self-efficacy and attitudes toward inclusive education. According to Meijer and Foster (1988) Dutch teachers with higher self-efficacy had more positive attitudes toward students with difficulties than those with lower self-efficacy. Furthermore, sense of efficacy was the only crucial factors that affected teacher’s attitude toward inclusive education among Israeli teachers (Weisel & Dror, 2006). Furthermore, the study of Malinen et al. (2012) found that Chinese teachers’ self-efficacy in collaboration was the single factor that predicted teachers’ attitudes towards inclusive education.

Internationally, many comparative studies have been conducted to assess differences in self-efficacy to use inclusive practices among teachers (pre service and in service) in different countries. For example, a study on 319 South African and 822 Finnish primary and secondary in-service teachers revealed a higher level of self-efficacy of teachers of both countries for IE (Savolainen, et al., 2012). Another international with 380 pre-service teachers in four teacher preparation institutions in Canada, Australia, Hong Kong, and Indonesia revealed that pre-service teachers in Hong Kong reported significantly lower levels of teaching self-efficacy with respect to inclusion while the Australians reported significantly higher responses than their counterparts in all other countries.

1.3. The relationships between demographic variables, attitudes and self efficacy for inclusive practices

Previous studies have confirmed that different demographic and background might predict the level of attitude and self-efficacy of pre service teachers to use inclusive practices. For example, age, gender, length of training, interaction with people with disabilities, confidence and knowledge about policies predicted teacher’s self-efficacy and attitudes toward inclusive practices (Ahsan, Sharma, & Deppeler, 2012a; Ahsan, Sharma, & Deppeler, 2014a; Forlin et al., 2009; Forlin et al., 2011; Loreman, Earle, Sharma, & Forlin, 2007; Sharma, Forlin, & Loreman, 2007). In line with these studies the current study will reveal how contextual and demographic factors influence pre service teacher’s attitude and self-efficacy in Kosova.

2. Methodology

The purpose of this study is to examine attitude toward inclusive education and self-efficacy for inclusive practice among pre-service teachers in Kosova. Moreover, it will examine the relationships between pre-service attitude and self-efficacy and other demographic variables such as gender, age, study years, previous professional trainings in inclusive education, experience in working with children with disabilities and significant relationship with a person with disabilities.

1. What is the level of attitudes, sentiment, concerns toward inclusive practices among pre service teachers in Kosova?
2. What is the level of self efficacy in general, and self efficacy in using inclusive instruction, use collaboration and managing classroom behavior among pre service teachers in Kosova
3. How pre service teachers background and demographic variables relate to their attitudes, concern and sentiments toward inclusive practices

2.1. Research Instruments

A demographic questionnaire was used to obtain information regarding age, gender, years of study previous professional trainings in inclusive education, experience in working with children with disabilities and significant relationship with a person with disabilities.

The second research instrument *Sentiments, Attitudes and Concerns about Inclusive Education* scale (SACIE) (Loreman, Earle, Sharma & Forlin, 2011) was used to assess pre service teacher attitudes toward inclusive practices Items on the *concerns* and *sentiments* subscales were reverse coded so that a higher mean score indicated more positive dispositions towards inclusion.

The *Teacher Efficacy for Inclusive Practice (TEIP)* Scale (Sharma, Loreman, & Forlin, submitted) measured teachers' perceptions of self-efficacy in three subscales: using inclusive instructions, managing behavior and in working collaboratively. The TEIP consisted of 18 items. The higher mean indicated higher self-efficacy.

The whole section of the instruments was originally written in English. The study author's with a licensed interpreter in English worked together on translation and back translation of all instruments.

2.2. Participants

This study included 180 MA and BA pre service teachers (preschool and primary) studying in at University of Prishtina and Gjakova in Kosova. The sample mean age is 23.17, $SD = 2.94$. Among the participants 74% were females and 26% male. Regarding study years 17.5 % of participants came from the first year, 18.2% from second year, 22.4% from third year, 26.5 % from fourth year and 15.4% from MA study in Inclusive education. 78.7 % have none training on inclusive education, 13.8% reported some while 7.5 % reported having above 20 hours of training. Having practicum individual experience with children with special needs 55.4% reported none, 33.7 % some and 10.9 % a lot. Lastly, having significant experience with a person with disabilities 36.5 % of participants said yeas and 63.5 % said no. Regarding group age 50.5% were included in 19-24 age, 39.5 included participants from 25 to 29 age and 10% were 30-37 age.

2.3. Data analysis

Analysis of variance (ANOVA) with eta squared was conducted to evaluate the significant relationships and potential influence of selected demographic variable and subscales of TEIP and SACIE-R. Statistical power was evaluated according to guidelines outlined by Ferguson (2009) where moderate effect is .25 and strong effect is .64.

3. Results

3.1. In the table 1 we have presented the mean score for overall of the pre service teacher's self-efficacy on the TEIP scale in total and for each of three subscales

Table 1. Descriptive statistics, mean standard deviation for SACIER.

Scales	Mean	SD	Cronbach alpha
Efficacy to use II	4.59	.41	.85
Efficacy in collaboration	4.59	.43	.86
Efficacy in MB	4.60	.42	.87
TEIP Total	4.59	.41	.94
Attitude	2.50	.26	.69
Sentiments	2.94	.36	.72
Concerns	2.52	.44	.70
SACIER-R total	2.52	.28	.74

Note: *II – inclusive Instructions; MB – Managing Behavior

3.2. Univariate analysis of variance of demographic variables against attitude, sentiments, concerns and SACIER R total mean scores

The ANOVA results in Table 2 shows that the relationships between the three age groups and attitude, sentiments, concerns and total SACIER-R were all statistically significant ($p = .000$). Tukey HDS post test revealed that the group age 19 to 24 means score was higher than two other groups in SACIE-R Total, whereas the second group age 25-29 scored higher for attitude, sentiments, and concerns.

Also study years showed significant relationships with SACIER-R in total, attitudes, sentiments and concerns ($p = .000$). Tukey HDS post test revealed that the MA students differed from four other groups with highest mean score.

Training level have significant relationships with attitude, sentiments and concern at ($p = .000$, $p = .05$) level of significance and small to moderate effect for attitude as eta square showed (.12). Tukey HDS post test revealed that the third year students have higher mean score than four other groups.

Experience with SEN children during practicum was another variable that showed to have significant relationships with attitude, sentiments and concern at ($p = .000$) level of significance but not with SACIE-R total. Tukey HDS post test revealed that students who scored "very Often" had the higher mean score across the subscale and SACIER –R Total.

Table 2. Univariate analysis of variance of demographic variables against SACIER R total mean score and three subscales.

Independent Variables	Attitude		Sentiments		Concernc		SACIE-R total	
	F	eta ²	F	Eta ²	F	Eta ²	F	Eta ²
Age	18.40***	.20	48.69***	.26	103.98***	.37	22.71***	.12
Study years	16.37***	.013	53.40***	.43	103.60***	.60	17.91***	.20
Training Level	19.02***	.012	4.34**	.03	14.22***	.09	2.50	.00
Experience with SEN	23.98***	.014	26.18***	.16	44.57***	.24	10.41	.07

Note: p*** = .000, p** = .01, p* = .05;

3.3. Univariate analysis of variance of demographic variables against TEIP total, self-efficacy to use inclusive instruction, use collaboration and managing behavior

The relationships between age and UII, UC, MB and Total TEIP were statistically significant at ($p = .000$) level of significance. Tukey HDS post test revealed that the group age 19 to 24 means score was higher than two other groups in TEIP Total, whereas the second group age 25-29 scored higher for attitude, sentiments, and concerns.

Study years had significant relationships with UII, UC, MB and Total TEIP ($p = .000$) level of significance. Tukey HDS post test revealed that the MA students differed from four other groups with highest mean score.

Training level have significant relationships only with attitude, sentiments and concern at ($p = .000$, $p = .004$) level of significant and small to moderate effect only for attitude as eta squares showed. Tukey HDS post test revealed that the students who had more than 20 hours of training different with higher mean score comparing with students of two other groups.

Experience with SEN children showed to have significant relationships with attitude, sentiments, concern and TEIP Total ($p = .000$) level of significance. Tukey HDS post test revealed that students who scored “very often” had the higher mean score across the subscale and TEIP Total.

Table 3. Univariate analysis of variance of demographic variables against TEIPS Total mean score and three factors.

Independent Variables	Use Inclusive Instruction (UII)		Use Collaboration (UC)		Managing Behavior (MB)		TEIP Total	
	F	Eta ²	F	Eta ²	F	Eta ²	F	Eta ²
Age	9.83***	.35	11.44***	.40	12.24***	.41	12.60***	.41
Study years	40.18**	.37	48.82***	.41	55.19***	.45	55.96***	.44
Training Level	18.55	.12	14.68	.10	16.89	.10	18.35***	.11
Experience with SEN during practicum	23.50**	.14	30.57***	.18	32.09***	.19	31.66***	.19

Note: p*** = .000, p** = .01, p* = .05

4. Discussion

Pre service teachers in Kosova are moderately positive to implement inclusive practices and are less concerned regarding use of inclusive practice comparing with their colleagues from other countries. This can be attributed to the satisfying level of implementing inclusive in the overall education system.

Pre-service teachers in Kosova have relatively high overall self-efficacy the same as they colleagues from Finland and South Africa (Savolainen, et al., 2012). They also showed to have higher self-efficacy in Managing Behavior comparing with Use Inclusive Instruction and Use Collaboration

Younger group age showed to have higher means on positive attitude and higher self-efficacy toward inclusive education that older age group. These might be because the younger generations were educated while our education system embraced the idea of inclusion so they had more opportunities to be educated on inclusion and work more with children with disabilities during their practicum.

Students of MA showed to have higher positive attitudes and self-efficacy and finally students who were more engaged with children with special needs during their practicum had more positive attitudes and higher self-efficacy toward these children. These results must raise the attention of mentoring in universities to encourage students to interact more with children with special needs during the practicum since it gives them a great opportunity to build more positive attitudes which further might help them to implement inclusive practices more successfully.

Finally, age and study years were the most influential factors of attitudes and self-efficacy to use inclusive practice among pre-service teachers in Kosova. It means that new generation of teachers hopefully will be able to contribute more in the successful implementation of inclusive education by creating a warm and welcomed learning environment for each child with different abilities.

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SELECTED ASPECTS IN EDUCATIONAL RELATIONSHIPS

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Abstract

The objective of the present paper supported by the Student Grant Competition at Palacký University Olomouc (Research on inclusion of pupils and students with special needs, IGA_PdF_2018_014) was to analyse, identify and determine the aspects of the relationships between educational professionals. The demand for the data resulted from a quantitative research study undertaken in 2017 in the framework of researching inclusion among persons with special needs.

The basic usable data were obtained by means of a qualitative research approach focusing on primary school educational staff and analysing professional relationships between two groups – teachers and assistant teachers. The research was based on semi-structured interviews and included 21 respondents in each category. The research was carried out from April 2018 to November 2018 and was based on the reflection of the two occupational groups consisting of the employees of Palacký University Olomouc. In the framework of these focus groups, the basic interview topics were defined that focused on mutual communication, personal relationships, administration, and teaching organization.

The results of the research suggested the importance of reflection in the relationship between educational professionals, which is based on the requirement for a clear definition of the competences of both target groups both in terms of teaching organization and job content, especially in the case of assistant teachers. This aspect is also crucial in terms of administration, where there is a discrepancy between the teachers' own needs and assigning administrative responsibility to their assistant teachers, who seldom fulfil these duties. Despite the great variability and complexity of the data collected, the needs of both groups were identified. Both groups assess their daily communication in a positive way, but the research also suggests that the system of education lacks sufficient time for a deeper analysis of the teaching process; and therefore, both groups use alternative means of communication, even after working hours. The structure of the educational process highlights a high degree of adaptability of the participants and significantly affects the feeling of own competency and indispensability in the educational process. Both groups prefer communication based on partnership, which requires specific favourable conditions and sufficient time.

The results indicate the need for a deeper analysis of the relationships in a broader context of the school environment, which would include both the attitude of the leading employees and other staff involved in the process of inclusive education.

Keywords: *Inclusion, assistant teacher, special education, primary school, relationships.*

1. Introduction

Inclusive education of pupils and students with special needs is the focus of many research studies. In previous years, some great developments have been achieved. In the Czech Republic, segregated education of learners with special educational needs is being transformed to achieve integration in mainstream education (Michalík et al., 2018). An example of a document that supports inclusion is the National Programme for the Development of Education in the Czech Republic (the so-called White Paper, 2001), the content of which provides for an equal access to education for all, including the effort to improve the position of educational staff. A previous research (Michalík et al. 2018) claims that there are different attitudes to the ongoing reform of inclusive education in the Czech Republic, especially on the part of special education teachers, whose opinion about inclusion is rather negative in comparison with other teachers.

In the Czech Republic, the position of an assistant teacher has developed since 1993 and can be considered a relatively new concept (Nová škola o.p.s., 2003). In terms of legislation, the job content of assistant teachers is stipulated by Section 5 Assistant teacher, Decree No. 27/2016 Coll. effective of 1 November 2018. It is necessary to focus not only on the job content but also on the aspects that affect it, and the influence of the interaction between the two actors of the educational process – assistant and teacher.

2. Aim of the study – research questions

The main objective of the research study was to identify, analyse and describe the current relationship between educational professionals. The main research question was as follows: What is the perception of educational staff of mutual professional relationships? The research study focused on the opinions and attitudes of assistant teachers and teachers in the area of mutual communication, professional relationships, administration, and teaching organization.

3. Methodology

The methodology is based on the results of a quantitative research study exploring the attitudes of educational staff to selected aspects of joint education (Michalík et al. 2018). To achieve the research objective, the qualitative research approach was chosen. The research used qualitative data collection methods by means of semi-structured interviews. This method of data collection involved a research sample of 21 teachers and 21 assistant teachers. The decision concerning the sample of respondents was based on a meeting of two focus groups, which was attended by primary school teachers as well as academic professionals. Based on several meetings of the focus groups, the inclusion criteria concerning the sample of respondents were specified as follows: primary school teachers and assistant teachers, joint teaching experience of at least 1 year. The teacher focus groups selected three themes for the semi-structured interviews: communication and personal relationships, administration, and teaching organization. For each theme, open-ended questions were formulated, the content of which was based on applicable norms and legislative documents. The researcher was defined as a visitor, the researcher's name was known to the participants, and the researcher visited the respondents on a regular basis in order to achieve the objective of the research (Švaříček et al., 2014).

The interviews were voice-recorded and transcribed. Data analysis was performed by means of open coding using the RQDA project (R Core Team, 2019). For a qualitative analysis, Majerová (2016) also recommends the RQDA project, which she combines in her paper with other approaches. Using a special software tool, the text was broken to units and each unit was assigned with a specific code. After that the codes were categorized. The data were classified and evaluated using a content analysis approach.

4. Data analysis and results

4.1. Mutual communication

The process of data analysis was based on the communication partners preferred by the actors involved – teachers and assistant teachers. The total number of codes for this category shows a higher number of communication partners of teachers (13 codes) compared with assistant teachers (9 codes). Both groups are dominated by communication with teachers (teachers communicating with colleague teachers). As far as other preferences in the process of communication are concerned, teachers communicate most frequently with the parents of children with special educational needs (referred to as SEN), followed by school management, and finally assistant teachers. From the perspective of assistant teachers (referred to as AT), the most frequent communication takes place with teachers, followed by parents of children with SEN, and other ATs. In addition to joint communication actors, who for both groups of the research sample include educational counsellors, special education teachers, psychologists, and prevention methodologists, teachers often communicate with employees of special education centres, educational and psychological counselling centres, universities, and the public.

The interview analyses below will only include the teacher-AT interaction. The three aspects that proved to be crucial for both groups were diversity, flexibility, and frequency of communication. All these attributes determine the quality of mutual communication. For teachers, the most important aspect is flexibility, followed by frequency, and diversity. From the perspective of assistant teachers, a crucial role is played by communication with teachers.

In the context of the frequency of communication, teachers prefer everyday communication (usual situations), communication once a week (learning content), communication once a month (thematic teaching units). From the perspective of assistant teachers, this area is significant and is mostly associated with situational matters throughout the whole day; a deeper analysis of a problem could take place once a week or once every two weeks. Communication flexibility is a crucial quality-affecting factor from the perspective of teachers; they mostly assess this aspect in a positive way, negative assessment is associated with the arrangement of ATs' working time as defined by the law.

The analysis further suggests that the need for communication correlates with the rigid assessment of mutual communication by teachers. In terms of content, teachers lack a deeper insight into

the system of education or specific subjects in the context of time arrangement of the school year. This need is more pronounced at the beginning of the school year.

As far as the content of communication is concerned, ATs prefer to communicate about the organization of the teaching process, while teachers of the same level emphasise communication about the organization of the teaching process and about learners with SEN. The results of a content analysis of the interviews suggests that ATs prefer verbal communication (oral, e-mail, phone, social networks). Teachers also prefer verbal communication (oral communication, text messages, Skype or WhatsApp). As far as communication mediators are concerned, the respondents would appreciate professionals from the Ministry of Education and counselling centres (educational and psychological counselling centres, special education centres), the teachers would also appreciate interventions by the headteacher, school psychologist/special education teacher, or a different experienced AT. For ATs the crucial person for establishing communication is the headteacher, prevention methodologist, or a different experienced AT.

4.2. Professional relationships

A crucial aspect in this area is the dominant position in the class. According to teachers, some ATs have a dominant position in the educational process, but this may be desirable in relation both to the teacher and the learners, provided that the boundaries between the teacher and AT were clearly defined at the beginning of their cooperation. In the event that AT was previously a teacher/headteacher and was mostly dominant, teachers assess this dominance as a negative aspect.

Some teachers emphasise a low degree of motivation on the part of ATs and define their desirable behaviour (ability to balance conflict situations, ability to temporarily substitute the teacher in the system of education, independence, empathy, tolerance, communicativeness, precision, inventiveness, creativity, flexibility, own initiative, and teamwork). Teachers would like to cooperate with ATs to maintain order in the classroom and to ensure the behavioural component in the system of education.

A positively evaluated aspect was mutual assessment of employees, which also includes the area of organizational matters and can be used as a prevention of problematic relationships in the workplace.

Teachers' definitions of a professional relationship differ. The analysis of the interviews suggest that a professional relationship can be problematic, friendly (trouble-free), or partnership-based (with a detachment) in both groups of respondents. In the case problematic relationships, teachers do not see any importance or contribution of ATs in the class, but not in terms of the system but rather in the context of ATs' qualities and behaviour. The presence of AT in the class is burdensome and is considered "extra work". All these teachers tried to change ATs' behaviour but gave up after repeated failure. They believe that a good relationship should be based on a clearly defined job content and adequate rules to be checked by leading employees. A relationship based on partnership (with a detachment) is defined as a balanced relationship with peer support, with no significant friendship tendencies, and of a highly professional nature. A friendly relationship is defined as one which is trouble-free, helpful, and respectful. According to some teachers (especially women), a major role is played by ATs' opinions and perspectives in life and their general attitude to life. A content analysis of the interviews with ATs suggests a dominant need for friendly professional relationships with teachers, which is considered a fundamental aspect of a quality relationship in the workplace. In the case of ATs, this relationship is highly appreciated especially because the personal/private aspect of communication is involved. Similarly to the group of teachers, one of the types is a partnership-based relationship (with a detachment), which is according to ATs enriching, respectful, intimate, but remains professional. The other type is a problematic professional relationship, which is based on a dominant position of the teacher, which ATs believe is associated with ATs' level of education. The desirable qualities and behaviour of teachers are based on directiveness in the teaching process, ability of good planning, optimistic tuning, openness, frankness, and ability to enrich both children and ATs. According to ATs, the dominant factor affecting the relationship is the degree of certainty in the context of leadership, rules and expectations on the part of teachers. This factor is significant at the beginning of the school year especially for beginning ATs.

4.3. Administration and teaching organization

A total of 13 teachers reported that ATs helped with administration, in all of these cases ATs' help was assessed in a positive way. In terms of content, this particularly included cooperation in the development/evaluation of individual education plans, adding information in relevant documents, and making records/questionnaires about the child. Some teachers appreciate when ATs are willing to help with correcting exercise books, copying materials, and producing the final assessment of learners with SEN. However, none of the teachers make ATs fully responsible for the assessment of learners with SEN. ATs' help in the area of administration is definitely not commonplace; 11 teachers state they are not helped with administration. If ATs keep records about children with SEN, teachers appreciate it, but some of them keep separate records for their own needs. Teachers' responses suggested a high degree of

responsibility for the educational process and assessment, with a certain reluctance to transfer the responsibility to ATs. ATs confirm the teachers' statement and state that they participate in learner assessment especially through discussion or presenting their opinions about the progress of learners with SEN, but the final assessment is the responsibility of the teacher. ATs keep assistant logs in order to keep important information about learners with SEN; at the same time these logs are used for communication between AT and the child's parents.

From the perspective of teachers, the crucial aspects affecting teaching organization include methodological guidance (especially methodological guidance of ATs), sharing of roles in the context of assigning responsibility, defining rules, AT job content, support provided by the management, preparation for classes and the educational process, and last but not least supervision. According to teachers, the distribution of roles in the classroom is rather unbalanced; ATs often appear to be in a submissive position. This factor is very closely related to the area of assigning responsibility. Those teachers who believe in evenly distributed responsibility for the educational process and organization have assigned a degree of responsibility for children with special educational needs to ATs. A balanced level of responsibility is reflected especially in the organizational structure of lessons but also outside the classroom. Those teachers who believe in balanced responsibility state that they can rely on ATs (this is the main attribute affecting the process of assigning responsibility to ATs). At the same time, this aspect is reflected in the structure of the educational process, where ATs are often identified as teachers (children address them as teachers). On the contrary, in cases where the degree of responsibility is assessed as unbalanced, ATs usually break the rules, but this is consistent with the dominant teacher position in the process of education. There is a certain degree of reluctance to assign responsibility to ATs in order to maintain the leading classroom position and a high degree of responsibility for all children (including those with special educational needs). The degree of responsibility is associated with a clear definition of boundaries, which according to teachers lies within their competence.

The assessment also focused on teachers' perspectives of ATs' job content. The responses suggest that in teaching organization ATs help with setting classroom rules in order to maintain discipline, prepare teaching aids, pay individual attention to a specific child/children, and exceptionally handle the whole class. However, there are also situations in which assistant teachers are called by school management to carry out different activities outside the classroom. Some teachers are not sure about ATs' job content. According to ATs, besides their own work they help teachers with scanning and copying of documents, make teaching aids, help with weaker students in the class, and exceptionally substitute teachers in their educational role. An analysis of ATs' responses suggests that although substituting the teacher role is acceptable, they would appreciate a clear definition of the roles and activities of assistant teachers.

ATs' support in lesson preparation is not provided to all teachers. Those teachers who ask ATs for help in lesson preparation are grateful and assess ATs' contribution in a positive way. In the event that ATs are not involved in lesson preparation, it is very often the teachers' decision, who often consider ATs unreliable, non-cooperating, and not obeying the rules. Regarding this fact, the researchers included a question on the preparation for the educational process in the context of the beginning of the school year. 11 teachers were actively involved at the time of the survey. Most of them also commented on the content and form of this preparation. The analysis suggests that this primarily includes the definition of organizational matters and setting of professional relationships (definition of expectations, familiarization). It is inopportune for teachers if ATs come on the first day of the school year. Such situation becomes difficult for teachers, including feelings of uncertainty. A suitable period for establishing teacher-AT cooperation seems to be the preparatory week; often more time is needed. At the same time, some teachers need to see ATs working with children during the previous school year. According to ATs, a convenient time for defining their role and job content is during the preparatory stage (i.e. at the beginning of the school year). This need is also based on concerns and insufficient readiness on the part of ATs for specific difficulties of learners with SEN, at this stage ATs would appreciate a meeting with the parents of the child with SEN together with the school management. The purpose of the preparatory stage should be to learn about the class and organizational structure of the school. Some also believe that the education of ATs (specialized courses) is insufficient in the Czech Republic, especially in the case of children with complicated diagnoses (e.g. autism spectrum disorders).

Feedback in the area of organization and education is a natural aspect for both teachers and ATs. There are only few areas where teachers and ATs show insufficiencies in terms of feedback (this includes especially reflection of positive feedback on the educational process). Teachers show a positive attitude to feedback, they consider it a natural part of their educational work. Both ATs and teachers prefer the verbal form of communication and e-mail communication. For both teachers and ATs, an appropriate frequency is after each lesson (if there are no serious problems). If there are no significant problems, both ATs and teachers agree that the frequency of feedback regarding a deeper analysis of teaching

organization, mutual self-reflection, and searching for new ways in education should be on average once a month. If there are difficulties, both groups prefer communication as needed – if possible immediately in order to find a solution to the problem.

5. Conclusion

A significant aspect in the context of educational relationships seems to be helping teachers with establishing initial communication. Also, the preparatory stage of the educational process is of great importance. There is a frequent requirement for a communication mediator from outside (for example from counselling centres or the Ministry of Education).

Both categories of respondents prefer the verbal form of communication (oral or e-mail).

The respondents prefer a professional relationship with a high degree of friendly personal ties; both groups consider this relationship the basis of high-quality cooperation.

The area of organization and administration suggests a degree of willingness on the part of ATs to cooperate with teachers. On the other hand, there is a concern about the dominant position of the teacher, who strictly controls the process of education. According to teachers, assigning the responsibility for education to ATs is closely associated with clearly defined qualities of assistant teachers. This reluctance to some extent correlates with a conscious need of teachers to maintain leadership in the class.

Some teachers and ATs suggest that they do not have a clear idea about ATs' job content including the definition of direct and indirect working time and its use.

Feedback related to the area of communication and teaching organization focuses rather on negative phenomena (problems in teaching organization or difficulties of children with SEN); positive feedback is not usual although it should be used; the respondents tend to prefer negative feedback. In the organization of the educational process, the preparatory stage is of special importance at the beginning of the school year; in the course of the school year and at the end the importance decreases.

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THE VALUE AND DIFFICULTIES OF LEARNING WITH DIGITAL TECHNOLOGIES AMONG HIGHER EDUCATION STUDENTS IN GHANA

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Abstract

Research to determine the relevance (role? importance? value? contribution?) of digital technologies for learning seldom target the students about the value that digital technologies hold for their learning, often disregarding the difficulties students encounter when they learn with these technologies. The Joint Information Systems Committee's (JISC) Higher Education Student Digital Experience insight survey was used to determine the digital experiences of 1,937 students who were enrolled at three dual-mode higher education institutions in Ghana. The results revealed that full-time students valued digital technologies during their learning more than distance learners did. The results further showed that distance learners have more difficulty in managing online information, in comparison to full-time students. The results show that dual-mode institutions in Ghana need to take additional measures to support distance learners with real time instructions to guide students on how to interact with course content. Course content and resource must be delivered in short burst to avoid information overload.

Keywords: *Digital technology, digital learning, higher education, attitude to technology, Ghana, online learning experiences.*

1. Introduction

The awareness of and the need for more critical, evaluative and reflective means of utilizing digital technologies for learning dates back in the 1960s. The concept has evolved through three phases - the mastery phase, application phase and the reflective phase. In the mid-1990s – which is the reflective phase – it was realized how ICT could be a force to transform educational pedagogies from passive to active learning. A phenomenon, which was championed during the 1960s in the US and the UK (Knobel, 2008). However, empirical evidence regarding students' value for digital technologies and difficulties of learning with them is sparse especially in sub-Saharan Africa.

Today the use of digital technologies in student learning is becoming an increasingly significant practice with varying claims being made as to how the employment of such technology affects teaching and learning, as well as questions relating to its value in students' lives. For instance, critics of digital technology claims that students are uncomfortable mixing learning with social life on a digital environment (Attia, Baig, Marzouk & Khan, 2017; Wang, Woo, Quek, Yang, & Liu, 2012). Contrary to this 21st century teachers and supporters of digital learning assert that new technologies allow students to acquire more knowledge and transfer their skill to different context (Barker & Gossman, 2013; Deveci, Dalton, Hassan, Amer, & Cubero, 2018; Dahlstrom, Brooks, Grajek, & Reeves, 2015; Hamid Waycott, Kurnia & Chang 2015; Saavedra & Opfer, 2012). In other words, technology enable students to fit learning into their life more easily (Newman & Beetham, 2017). In the middle of this argument are those who opine that digital technologies “create opportunities while posing difficulties for students” (Akbar, 2016). It is therefore imperative to investigate thoroughly for suitability of use before integrating any form of technology in a learning activity (Hamid, Waycott, Kurnia, and Chang, 2015). Following this debate, this article might help unravel students' perception on the value and difficulties of learning with the technologies in a Ghanaian higher education setting.

This study aims to explore the value of using digital technologies in teaching and learning as well as the difficulties students face in learning with the technologies particularly in a dual mode institution where the teaching and learning is a blend of face to face teaching with technology used inconsistently both at the distance and regular level. The study adopted JISC higher education students digital experience insight survey to collect data from students in different disciplines to ascertain the value of digital technologies in students learning life as well as the different ways that they struggle with the technologies in their learning. Next is Literature review, methodology use for the study, the results and discussions. Finally, the conclusion of the study will draw on the contributions and suggestion for future study.

2. Literature review

In the advanced countries, students' attitudes towards digital technologies are found to be generally positive (Jewitt, 2012). He alludes that students are enthusiastic about having technology to support learning. They value the convenience and flexibility that technology provides. Most students opine that digital on their course allows them to personalize their learning experience and fit learning into their lives more easily (Barker & Gossman 2013; Newman & Beetham, 2017). Others mention that they feel more connected with peers and lectures in a digital environment (Beetham & Newman, 2017). Students say that digital technologies allow them to experience the technologies as they use them in their everyday life/activities (Anagnostopoulou & Parmar, 2009). In other words, technology makes learning more relevant, better and understandable to them (Mueller & Strohmeier, 2010).

Critics of digital in the classroom claim that students' experiences with digital technologies in the classroom causes distractions (Attia, Baig, Marzouk & Khan, 2017). For instance, a report by ECAR stated that students complained that there has been an increased attempt by some faculty to impose rigid policies on smartphone and tablets use in class (Brooks & Pomerantz, 2017). "In some cases, faculty ban or discourage devices in classrooms on the basis of research that simply confirms their biases against those digital devices—that they are distracting, that student device usage implies disrespect or a lack of attention, or that students are not taking good notes. This approach can do real, if unintended, harm" (Galaneck, Gierdowski, & Brooks, 2018).

In Ghana digital technologies have invaluable advantages for students. A study by Armah and Westhuizen (2018) revealed that student in Ghana especially distance learners are more receptive to digital learning. Earlier studies however, indicated that Ghanaian students do not respond favorably to digital learning for example online discussion and ill-based activities (Asunka, 2008). Kotoua, Ilkan & Kilic (2015) emphasised that most of the students have negative perception about digital learning environment. He continued that they prefer face- to-face classroom teaching.

3. Methodology

The research question posed in this paper is: What are the values of digital technologies in the lives of student and the difficulties of learning with the technology in academic context. To answer this question, we conducted a quantitative study involving final year and postgraduate students in three Ghanaian Universities. University students totaling 1,937 students from different disciplines answered the questionnaire regarding their opinions on the matter. The respondents were made of 57.3% Male and 42% female students. Given that digital technology in higher education has become a truly global phenomenon, it is valuable to take a broad view and consider the views of students from different learning modes, 54.3% of the respondents were fulltime students and 45.7% were distance learners. Both the fulltime and distance learning students use digital technology to support their learning providing a rich setting in which to explore the phenomena. The students were asked self-reported questions, centered on two main topics: relevance of digital technology in context of their learning; and the difficulties they have learning with those technologies. The survey instrument used consisted of three-point Likert items and was analyzed using the Pearson Chi-square independent test.

4. Results

Students were asked how they feel when digital technologies are used in their course. Six positive statements were asked to determine the degree to which they agree with the statements. The percentage summary of their responses revealed that fulltime students (58,6%) and slightly less than half of distance learners (48,9%) agreed that technology allow them to fit learning into their life more easily. The students agreed that they feel more connected with their fellow students than lectures. Fulltime students (54,2%) are more connected to fellow students than distance learners (41,8%) when digital technology is used to enhance learning. However, the distance learners are more convinced that technology helps them to connect more with their teachers compared to fulltime students. Students also said they enjoy learning (fulltime students: 69% distance learners: 54,7%) and understand things better (fulltime students: 67,7%, distance learners, 57,9%) when technology is used on their course. Results of the further analysis is shown in Table 1.

Table 1. Difference between students positive response to digital on their course.

	mode of study	Disagree	Neutral	Agree	Pearson Chi-Square	sig
I understand things better	I am a full-time student	54	279	707	50.449 ^a	0,000
	I am a distance learner	127	242	512		
I enjoy learning more	I am a full-time student	51	269	720	59.043 ^a	0,000
	I am a distance learner	117	277	484		
I am more independent in my learning	I am a full-time student	99	357	581	22.846 ^a	0,000
	I am a distance learner	148	284	445		
I feel more connected with my lecturers	I am a full-time student	192	437	411	4.793 ^a	0,091
	I am a distance learner	185	328	366		
I feel more connected with other learners	I am a full-time student	119	382	537	16.938 ^a	0,000
	I am a distance learner	158	290	426		
I can fit learning into my life more easily	I am a full-time student	92	334	612	41.173 ^a	0,000
	I am a distance learner	162	276	433		

Further analysis using the Pearson-Chi-square of independent test revealed (see table 1) a significant difference in the value students attach to digital on course by fulltime students compared to distance learners. Fulltime students were more likely to understand things better $X^2(2, 1921) = 50.449$, $p = 0,000$, enjoy learning with technology $X^2(2, N= 1918) = 59.043$, $p = 0,000$, more independent in their learning $X^2(2, N=1914) = 22.846$, $p = 0,000$, feel more connected with other learners $X^2(2, N=1912) = 16.938$, $p = 0,000$ and are able to fit learning into their life more easily $X^2(2, N=1909) = 41.173$, $p=0,000$ compared to their distance learning counterparts

No statistically significant difference was found in mode of study and students-lecture connectedness when digital technology is used on course, $X^2(2, N= 1919) = 4.793$, $p = 0,091$.

Also, six negatives (difficulties of digital learning) statements were asked about the value of learning with technology. More than half of the students disagreed that: they are less likely to attend class when digital technology is used on their course (fulltime students: 56,3%, distance learners: 55,6%). Some 55.5% of fulltime students and 54% of distance learners disagreed that digital on their course made them more isolated. 52.2% of fulltime students and 52.7% of distance learners disagreed that they are more easily distracted with digital on their course. Only 16.5% of fulltime students and 15.1% of distance learners agreed that they are likely to skip classes when digital technology is fully integrated on their course.

The chi-square analysis (see table 2) revealed that students equally did not have difficulty learning with technology. Only distance learners are more likely to face slight problem with managing information when digital technology is used on their course compared to fulltime students, $X^2(2, N=1920) = 7.362$, $p = 0.025$. The Bonferroni adjustment test indicated that greater percentage of distance learners (51,1%, this is above the average percentage of 45,8%) however the proportion was not significant (adjusted residual = 2.1, $p=0,040$).

Table 2. Negative attitude toward digital technology on course.

	mode of study	Disagree	Neutral	Agree	Pearson Chi-Square	sig
I am more easily distracted	I am a full-time student	545	289	206	1.762 ^a	0,414
	I am a distance learner	466	260	155		
I find it harder to all information	I am a full-time student	517	369	154	5.677 ^a	0,059
	I am a distance learner	398	321	161		
I feel more isolated	I am a full-time student	579	322	136	4.703 ^a	0,095
	I am a distance learner	478	253	145		
I find it harder to motivation	I am a full-time student	588	316	136	7.362 ^a	0,025
	I am a distance learner	439	300	133		
I am less likely to attend lectures	I am a full-time student	588	278	172	1.033 ^a	0,597
	I am a distance learner	492	250	134		

5. Discussion

With regard to the value students have for digital learning, it was identified that more fulltime students value digital learning compared to distance learners. For example, significant proportion fulltime students opined that digital on course makes them more independent learners. They also agreed more that the enjoy learning, understand things better and are able to fit learning into their life when digital technology

is used on their course. This suggest that distance learners in Ghana do not respond favorably to digital learning. Wolcott (2003) blame distance learners' gray attitude to digital learning on lecturers. Some lectures in dual mode institutions who may have the pedagogical and technological skill to integrate the technology view the distance learning department as part of assignments and ultimate whilst the majority sit on the wall to watch. In other words, the distance sector lacks the qualified staff to integrated technology into the learning activities. Most institutions engage the services of instructors / tutors outside, sometimes compromising to instructors who may not have the skills of digital integration. Such situations put the effectiveness of distance learning in question for the promotion of equivalency (Wolcott & Betts, 2007).

It was also identified that slightly significant proportion of distance learners find it more difficult to manage all the information when digital technology is used on their course. They therefore prefer the institutions to continue to support them with face-to-face lectures. This finding confirms earlier study by Ofsted (2009) which stated the use of digital on course will not stop students from attending classes / lectures. It also contradicts with Boyles et al (2008) suggestion that digital on course are a danger and as well discourages and ceases students from attending lectures. The results show that the students', generally, value digital on their course. They (students) value the convenience and flexibility that technology provides and therefore are enthusiastic about having digital technology to support their learning as suggested by Barker and Gossman 2013; Beetham & Newman, 2017; Jewitt, 2012). The onus lies on instructors especially in the distance sector to effectively integrate the technology in the subject disciplines.

6. Conclusion

The study explored the value of digital technologies in students learning as well as the difficulties they face when learning with the technologies. Generally, both group of students are self-motivated and do not feel distracted or isolated when digital technology is integrated into their learning. However, fulltime students are more likely to find technology useful in their learning as compared to distance learners. These findings indicate that although students are technology inclined, fulltime students in Ghana value the use of technology to support learning compared to distance learners and are also less likely to find difficulty learning with technology. The results also indicate that dual mode institutions should continue to support distance learners with face-to-face session with the integration of technology. We also recommend the use real-time instruction (e.g. video conferencing) to support students' on how to interact with course content and resources. This will help the student students to feel connected with the course.

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BIBLIOMETRIC REVIEW ON THE EDUCATION OF PEOPLE WITH AUTISM SPECTRUM DISORDER WITHOUT ASSOCIATED DISABILITY

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Abstract

Throughout the last decades, the number of published studies addressing the schooling of students with autism spectrum disorder (ASD) has increased significantly. The aim of our study is to conduct a bibliometric review in the Scopus database on published and indexed research that addresses the schooling and training of students with ASD without associated intellectual disability. The selected studies in the field of education and psychology were 500. The results have shown an increase in productivity, decreasing notably in 2018. With respect to the computation of journals that publish content on ASD, *The Journal Research in ASD* is highlighted. In addition, a tendency to write in collaboration has been observed, being equal the number of publications by each of the authors. In conclusion, it has been pointed out that with regard to the subject, the perspective of the people with ASD is not taken into account, but rather that it is investigated from a professional and theoretical point of view. That is why we propose some future lines of research from the voice of the families and people with ASD.

Keywords: *Bibliometrics, Autism spectrum disorder, special education.*

1. Introduction

According to the American Psychiatric Association (APA, 2013), the Autism Spectrum Disorder (ASD) hinders the social relations of the individual with society, since it affects the way of seeing the world and as a consequence, it hinders the processing of information. It should be noted that there is a great heterogeneity in people with ASD. According to the DSM-V, the main characteristic of these people is the deficiency in the socio-emotional reciprocity (verbal and non-verbal) in any communicative situation. In turn, in most cases there are stereotypes, that is, repetitive patterns such as movement, inflexibility of routines, very fixed interests...

The panorama of research on students with ASD is very broad and diverse, since it has been studied from different approaches, although through a quantitative methodology in most cases (Rica, Rica, José, & Rica, 2007). As noted in the results section, most of the studies are from a medical and psychological perspective. In the educational area, several studies have been developed from a cognitive point of view, regarding the level of learning and adaptation to the environment. These studies collected data mainly from samples of teaching staff and family members (Villegas, Simon, & Echeita, 2014).

The main objective of the Salamanca Declaration was that its writing should serve as a reference for the planning of future actions on special education needs, and indicated that the framework for action was at the international level, since each country and region should adapt these guidelines to its concrete context (Declaration of Salamanca, 1994).

Recently, the voice of families and students with ASD is begin considered as valuable data, especially in studies related to transitions from compulsory education to the university or to employment. The main approach on these studies is qualitative which are focused on specific aspects such as changes and school anxiety (First, Cheak-Zamora, & Teti, 2016). Parallel to this, the number of people diagnosed with ASD has increased considerably in recent years (White et al., 2016).

While it is true that there are some bibliometric studies on scientific literature on ASD (eg. McDonald & Machalick, 2013), there are scarce studies on this topic which consider that ASD can be associated to other disabilities, mainly with intellectual disability. Those, the main objective of this study is to perform a bibliometric review on research publications on people with ASD without intellectual disability. In this review, it has been established as starting point 1995 since this year marks the entry into force of the Salamanca Declaration. This Declaration marked the beginning of an inclusive

era in schools. To achieve this goal, we will made a bibliometric in the Scopus database about ASD without associated disability to offer a global image of the current state of research. It is therefore, we will take into account the following variables: evolution over time, productivity of journals, documentary typology and number of authors in each publications.

2. Method

2.1. Participants

In this study, 500 documents indexed in the Scopus database were analyzed. These publications are located in a range of 24 years, from 1995 until 2018, both included.

2.2. Instruments

The instrument used is the Scopus database due to its large volume of data and its international and multidisciplinary prestige.

2.3. Process

The search strategy used was as follows: autism AND (school OR education) AND (adolescent * OR teen *) AND (PUBYEAR> 1995) AND NOT (handicap * OR disabilit *) AND LIMIT-TO (SUBJAREA, "PSYC") OR LIMIT-TO (SUBJAREA, "SOCI") OR LIMIT-TO (SUBJAREA, "COMP") OR LIMIT-TO (SUBJAREA, "MULT"). As can be seen, the search was limited from the first publication of the year 1995 until the last writing published in December 2018. Through this strategy a total of 733 articles were found. Nevertheless, 233 papers were not about the education field and so they were excluded of this review. The majority of these excluded studies were related to the medical field.

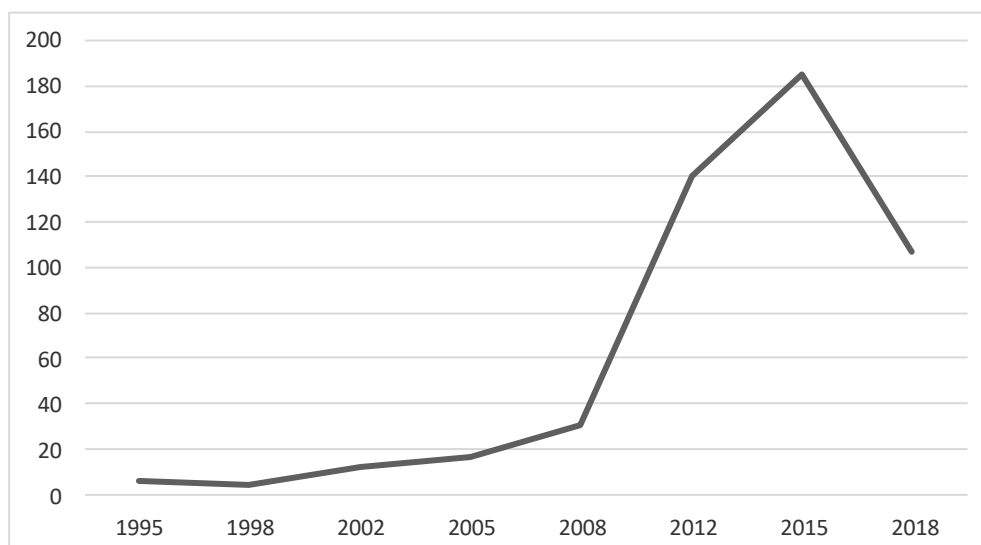
A content analysis was made for the selection of the sample, in order to discard those studies which were not related to the educational field. After this, the descriptive analysis was carried out based on the following variables: year of publication, number of authors, journal in which it was published and type of document published.

3. Results

3.1. Evolution over time

As we can see in figure 1, in this study we are analyzing documents from 1995 to 2018 both years included. That is why we emphasize that the range of publications per year ranges from 0 to 95 documents, with an average of 21.7 articles per year. It should be noted that in 1998 there was no publication on Autism and education, in addition, at 2008 more publications on this topic have begun to be published, with the maximum number of writings being published in 2013, despite the fact that in the last year there has been a decline, giving rise to writings in the medical field.

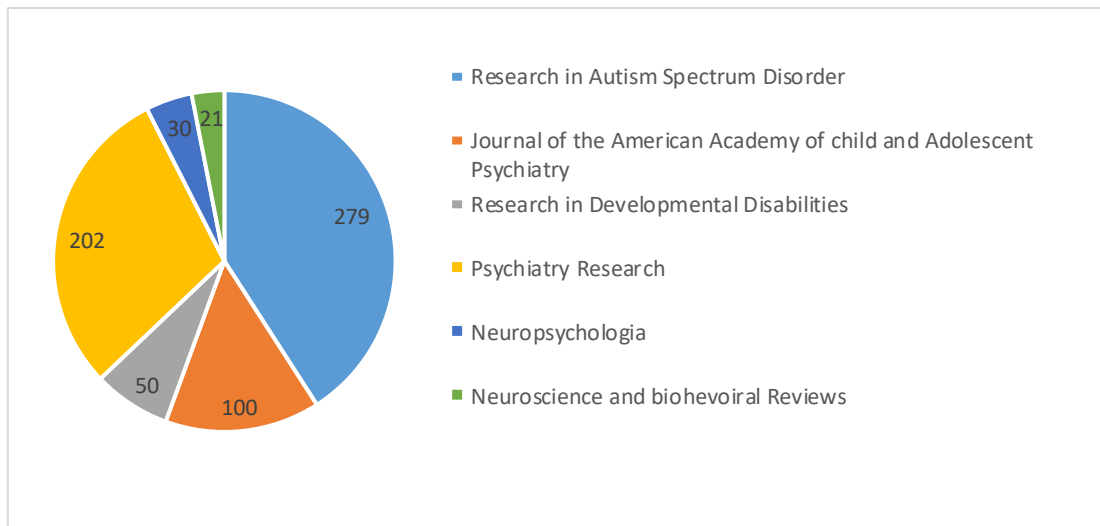
Figure 1. Temporal evolution of publications.



3.2. Magazine productivity

Figure 2 shows the journals with more publications on this subject in the Scopus database. As shown, the magazine "Research in Autism Spectrum Disorder" is that which has the most articles indexed being 55.8% of the total. In addition, we emphasize that those journals that are multidisciplinary such as "Neuropsychologia" have hardly any writings, since they belong more to the psychological and medical field.

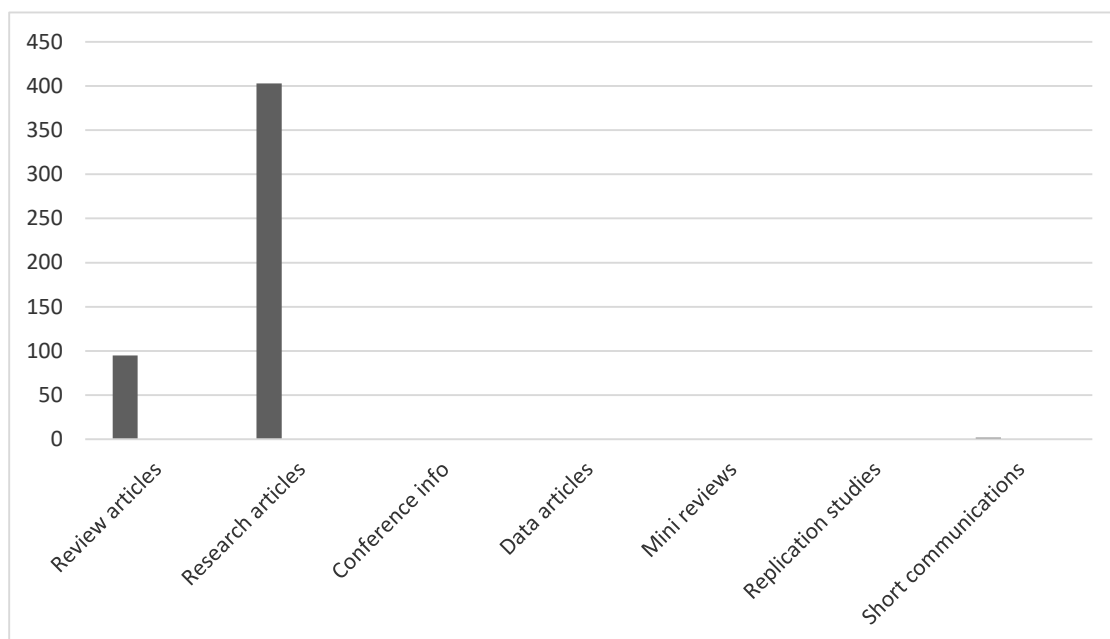
Figure 2. Number of publications per journal.



3.3. Type of document published

For our bibliometric study we have carried out the search of the following type of document: Review articles, research articles, conference info, data articles, mini reviews, replication studies and short communications, due to the typology of the writings. As can be seen in Figure 3, the largest number of indexed documents are research articles, in addition this type of publication has been increasing over the years, because it started publishing theoretical articles and, with the step of time, empirical studies and research itself have been carried out. On the other hand, we see how nothing has been published of different documents, an aspect that is worth highlighting.

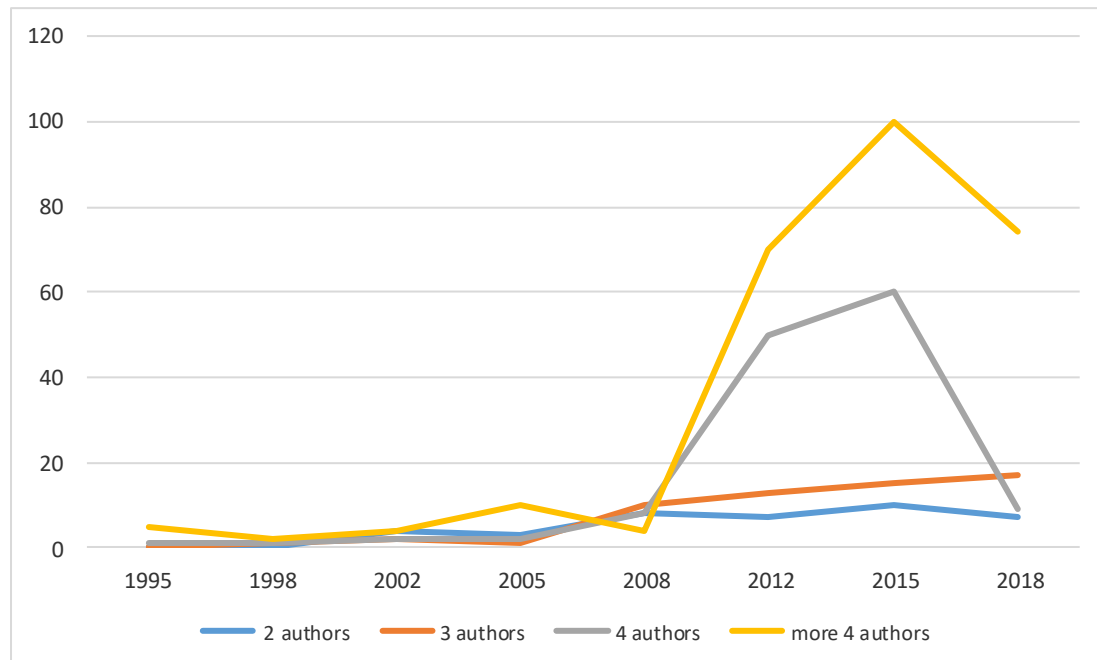
Figure 3. Typology of documents.



3.4. Number of authors per document

In Figure 4, we can see that co-authorship writing by more than four people predominates. In addition, we do not find any document that has been written individually. However, in recent years there has been an increase in writings made by three authors.

Figure 3. Evolution of the number of authors per work.



4. Conclusions

In the present study we have carried out a bibliometric review on the evolution of the production of articles on autism without an associated disability since the Declaration of Salamanca. Based on the data obtained, autism has had a great writing boom in the last ten years (2008-2018), highlighting that in the past year this scientific production has decreased without a justified cause. While it is true that we emphasize that since 2013 the number of children born with Autism increased, at present, it is a disability that is quite accepted in schools and in the world of research. In spite of this, at present, a great effort is being invested to discover the genetic causes of this syndrome and the reason of the great spectrum that we find, that is, of the great diversity of characteristics and affection.

Focusing attention on the journals analyzed in this database, we must emphasize that the largest production comes from journals specialized in the subject and that belong to the field of psychology and neuroscience. The results at the author level show that there is a great consonance with respect to co-authorship and that it is an outstanding aspect since the beginning of the 21st century, since as we have commented in the results, in the 90s there was not a great co-authorship of more than four authors.

The limitations that we have found in the course of the investigation should be highlighted in this study. On the one hand, not all the variables that can be reviewed in a bibliometric study have been analyzed due to their great variety and heterogeneity. On the other hand, we have encountered difficulties in obtaining the descriptive data from the web scopus, since it is in "renovation works" and, it was decided to make a general analysis of the subject. For future research, it could be considered to analyze other variables such as the professional scope of the authors or the specific theme of each article.

In summary, autism is a topic that has been much researched in recent years, as we have been able to deduce from what was previously reviewed. Despite the limitations found, this study offers a broad view of what has been published about autism without an associated disability since the declaration of Salamanca in the Scopus database.

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ROBOTICS IN THE TEACHING OF PHYSICS: A PROJECT BASED APPROACH

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Abstract

This paper aims to propose a procedure for the use of robotics in physics teaching based on a model of project-based learning (PBL). The procedure was applied during one semester to high school students of two public schools in Guaratinguetá, in the Valley of the Paraíba - SP. The methodological approach employed was Action Research, with the involvement of Physics teachers from the partner schools, working together with teachers and students from São Paulo State University (UNESP) – Guaratinguetá Campus. The motivation for the development of the project is the lack of both laboratories and materials for experimental activities observed in Brazilian public schools. In this context, considering the recommendation of the National Curricular Parameters for Secondary Education for the use of technology in the classroom, we have opted for the insertion of educational robotics through the development of a mobile robot in the form of a teaching project. Educational Robotics, besides being a current and relevant technology, allows the student to interact with the learning object, which contributes to the construction of his knowledge. The robot design was done using Arduino platform. Regarding the use of the PBL model, in the planning stage first we established the objective of designing an automated vehicle that would then be used to determine the physical quantities of its movement (displacement and average velocity). Then we established a road map for the development of the action in the form of activities carried out in workshops in the schools, with the participation of the students, teachers and the tutors of UNESP. The application of the procedure indicated as results, among other aspects, a greater motivation and also a greater involvement of the students in the activities developed in the classroom. The students participated in the development of the robot in all activities, acting both in the assembly of the circuits and in actions related to its programming.

Keywords: *Active learning, educational robotics, mobile robot, teaching physics, teaching projects.*

1. Introduction

This article aims to present a procedure used to work with Robotics in Physics Teaching, based on a Project Based Learning (PBL) model. The actions were carried out in two public high schools, and were developed in the context of a proposal that focused on the use of experimental activities as a means to assist in the understanding of Physics concepts. The motivation underlying the proposal is the lack, observed in Brazilian public secondary schools, of laboratories and resources for conducting experimental activities.

The main action in the schools was the development of a teaching project of a mobile robot, to be used in the demonstration and study of Physics concepts related to its movement. This action was initially discussed with the teachers, and the corresponding activities were developed by the students in the classroom, supervised in each of the schools by the Physics teacher and by teachers and students of the São Paulo State University (UNESP). One of the objectives was to investigate, among other aspects, strategies for using the PBL model in a traditional teaching context.

The paper is organized as follows. Section 2 presents a brief discussion of the main characteristics of the methods and model used in the joint work with the schools. Section 3 describes the development of the robot project in the schools. Some results of the action performed are presented in section 4. Section 5 is intended to present some conclusions from the work.

2. Methods

As the work should be developed in partnership with the teachers of the schools involved, the methodological focus of the research was based, fundamentally, on action research. The action research has as one of its characteristics the fact of being participative, differentiating itself in this way from routine practice (individual) and scientific research (team/collegiate) (Tripp, 2005). Thiollent (1997) emphasizes that this type of research is not only limited to a diagnosis and description of a situation, but also must be able, in certain cases, to generate transformations that allow evolution of the group or organization involved. Franco (2005), with respect to the use of this type of research in Brazil, presents a classification of action research in three modalities, one of them being the strategic action research, in which the need for transformation is planned previously by researchers without participation of the subjects of the group.

Project Based Learning is a teaching strategy in which problems are used to emphasize, among other aspects, critical thinking and the development of skills for its resolution, leading to a student-centered teaching and learning style in which students work collaboratively and teachers act more like mediators or facilitators in the process of knowledge construction (Sena, Fiscarelli, & Akamatsu, 2008). The PBL model adopted in the project was proposed by the BIE Institute (Buck Institute for Education, www.pblworks.org). This model emphasizes, among other aspects, a teaching method that involves investigations by students about authentic and complex issues related to the accomplishment of well-planned assignments and products (Mergendoller, Markham, Ravitz, & Larmer, 2005).

The model is focused on standards, which presuppose the organization of a project according to the principles described briefly in the sequel. *Begin with the end in mind*: definition, among other aspects, of content standards, of the key skills and mental habits that will constitute the project results. *Formulate the guiding question*: proposing a relevant and meaningful question that leads to the students' involvement with the project. *Plan the evaluation*: specification of the expected project outputs and how they will be evaluated. *Map the project*: it includes, among other aspects, the presentation of the project, the organization of the tasks and activities to be developed and the elaboration of a visual script (for example, a schedule). *Manage the process*: description of tools and strategies to assist in the management of the project development (Markham, Larmer, & Ravitz, 2008).

Markham et al. (2008) present several tools that can be used both in planning and during project development. This more pragmatic aspect of the model makes it easier to work with PBL in the classroom. Taking advantage of those tools, the use of the guidelines of the model aimed to subsidize the teacher in the insertion of experimental activities in his pedagogical practice, through the development of a teaching project, together with his students.

According to Zilli (2004), the use of Robotics in the classroom is a proposal that meets various educational theories such as, for example, Piaget's Constructivism and Papert's Constructionism. For Maxwell (2006), Papert and Piaget were adept of the idea that the child builds his knowledge from his interactions with the learning object. However, for Papert the learning process would be more effective if the student constructed a significant product after his interactions with the object.

In the literature one can find several works related to the use of Robotics in the teaching of Physics. For example, Souza and Duarte (2015) discuss strategies that can be used in Physics teaching (secondary education) through a Robotics show, which included, among other actions, demonstration of prototypes and Robotics projects. Kubínová and Šlégr (2015) discuss the possibility of using the Arduino board for demonstrations of values obtained from measuring instruments such as thermometers, manometers and voltmeters. Bouquet et al. (2016) describe a laboratory approach to physics, in the form of projects, carried out with university students, based on low cost and open source devices: Arduino and compatible sensors.

3. Development

The action in the schools aimed at the development of an automated vehicle and its use in determining the physical magnitudes of its movement. As mentioned, the development of the mobile robot project should be based on the guidelines of the PBL model of Institute BIE. In this sense, we initially worked on the project proposal according to the project planning form of the model. This tool contains sections for each project principle of the model. The most relevant aspects of the planning and accomplishment of the proposal are presented below.

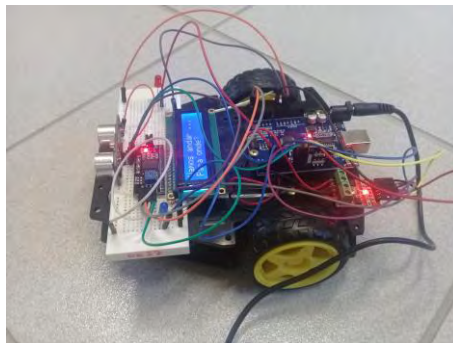
With regard to what was expected to achieve with the project, the form requires the specification of content standards, skills and mental habits. With respect to the content, concepts of mechanics related to URM (Uniform Rectilinear Motion) and some basic concepts of Electricity (voltage and current) were specified. In terms of skills, emphasis was placed on teamwork, adaptation to complex situations and

commitment. In relation to mental habits, the persistence and application of previous knowledge to new situations were emphasized.

In the following, one must specify a guiding question for the project. The following question was proposed: "How to build a mobile robot that can be used to demonstrate URM concepts?". The next stage of planning refers to the evaluation, where project products must be specified, which should be aligned with the expected results. The final product of the project was the automated vehicle, from which the values of physical quantities related to its movement should be determined. However, during project development, some intermediate "products" were generated, such as the assembly of a circuit for determining distances with the ultrasonic sensor. Teaching by projects generally involves a performance assessment, and the model provides specific tools that can be used for this purpose (Markham et al., 2008). For the application described here, it was up to the Physics teachers to evaluate the performance of the teams, which occurred at certain moments during project development, as well as at the end of the action.

The next step is project mapping, which involves pooling the required resources, organizing tasks and activities, and starting the project. In the project launching class, a mounted mobile robot was introduced to the students (Fig. 1 below), and a general explanation was given about what was expected from them in order to build and automate a robot as the one shown.

Figure 1. Mobile Robot.



The necessary materials, such as the car's structure with motors, electronic components and computing resources, would be provided by the University team for use during project development. As for the organization of the tasks, they were planned in the form of activities to be carried out in 8 workshops in each school, each corresponding to two Physics classes. In the workshops, the electronic components necessary for a basic understanding of Robotics with Arduino and the assembly of the mobile robot were presented. Thus, students could work, among other components, with resistors, LEDs, ultrasonic sensor, LCD display and remote control (RC). Parallel to the presentation of the components, some concepts and other elements related to their use were discussed, such as Arduino board, Arduino IDE, serial monitor, PWM input/output, voltage and current, among others.

With regard to the management of the process, the activities were organized in the form of scripts that included three sections: conceptualization, experimentation and challenges. In the first section were presented concepts related to the components that would be worked in the workshop. In the second, elements of both the assembly and the programming to be carried out by the group were presented. And in the third, it was proposed a task that corresponded to extensions of the accomplished work.

In the last two workshops, after both the assembly of the robot and the loading the program, tests were started to determine the magnitudes of its movement. As the goal was to study the URM, a straight track was mounted using PVC gutters. The robot should move from the actuation of its motors through a RC until approaching an obstacle at the end of the track, when it should stop automatically.

Each group moved the robot on the track, measuring the distance traveled and timing the time elapsed from the beginning of the movement to its stop. The group then recorded the measured values (distance and time) and those presented by the program on the LCD (distance, time and average speed). The groups were instructed to repeat the experiment several times, to calculate, from the measured amounts, the values of average velocity, and to compare the calculated and measured values with those provided by the program. The UNESP team accompanied the groups in this process, assisting them in the interpretation of the obtained results.

4. Results

At the end of the project development, an evaluation instrument (questionnaire) was applied, containing questions grouped into four parts:

- Part I: Content questions (on the content worked on the activities).
- Part II: Questions about the robot control program (regarding program commands and functionalities).
- Part III: Questions on the activity development (general statements about the expected results and expectations from the development of the activities, to assess students' degree of agreement with the statements, according to a 5-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree).
- Part IV: Open questions (for students to express their opinion on various aspects of the project).

It was possible to observe, from the analysis of the data, that the results of the action were very satisfactory. Following, a brief summary of some of the obtained results in each part is presented. The percentages were calculated considering the total number of students who answered the questions.

Part I consisted of questions of multiple choice and of association between elements in two columns. Those referred to the Robotics contents (components) worked on the activities, and to the areas of Physics emphasized in the action. The objective was to verify the students' perception regarding the elements involved in the mountings as well as the areas of Physics to which the activities were related. It could be verified that the students in both schools had a good perception regarding the elements used in the mountings, as well as with respect to the areas of Physics involved in the activities.

The questions in Part II referred to the code of the mobile robot control program. This part consisted of two sections, and in the first the students should identify in the code the connecting pins of some components. The questions in this section were relatively simple and the rate of correct answers, in terms of the average of those who responded, was 89%. In the second section, students should identify instructions for specific actions such as "verifying that the remote control key 1 was pressed", "calculating the distance from the ultrasonic sensor to an obstacle", among others. The students had more difficulties with the questions in this section because, due to time constraints for the development of the project, it was sought, with regard to the programming aspect, only give them an overview of its importance in the context of a Robotics application. Nevertheless, among the 10 questions proposed, 7 had percentages of accuracy ranging from 61% to 100%.

For Part III, 12 statements were listed for which the students' degree of agreement was checked. As exemplification, some of these statements are listed in the sequel: a) Robotics activities have made physics classes more creative, dynamic and motivating; b) The contact with Robotics contributed to increase my interest in Physics; and c) The contents worked in the practical classes were related with the theory given in the Physics classes.

It was observed that, in one of the schools, most of the students agreed with all the statements, with percentages varying between 84% and 100%. In this analysis the responses to the "agree" and "strongly agree" options were considered. At the other school, most students agreed with 11 of the statements, with percentages ranging from 63% to 100%. For operational reasons, there were more respondents in the first school, compared to the second. On the other hand, it was observed that there were students who disagreed with several of the statements. As exemplification, this fact occurred in one of the schools in 8 questions, with percentages of 5% for 6 questions and 16% for 2 questions. At this school, for instance, there was disagreement with respect to statements (a) and (c) above.

In relation to part IV, it included open questions, in which students could express themselves on various aspects like what they liked the most and what they liked the least during the development of the project, situations in which Robotics could be used on a daily basis, and the final goal of the activities developed, among others. Some points observed on the students' responses are presented in the following. With regard to what they liked most, most of the students expressed that they liked the mounting of the robot, but especially when they managed to put it on the move. Regarding what they least liked, what was highlighted by most of the students was the reduced number of didactic kits, considering the amount of students in the class. There were also manifestations regarding the insufficient time for the development of the activities and regarding difficulties with the programming part.

5. Conclusion

As it could be seen from the evaluation data, the results of the action in the schools were quite satisfactory in all the aspects emphasized in the evaluation. In particular, in the part regarding the evaluation of the degree of agreement of students with general statements about the expectations and expected results from the development of the activities, it could be observed that the majority answered

by agreeing to a greater or lesser degree with the assertions. The results were also good in relation to the students' perception of the contents presented, in particular with respect to the components and mountings of Robotics. Nevertheless, there were manifestations of disagreement, of some students regarding several of the affirmations. This fact meets one of the points raised in a meeting with the staff of one of the schools, that some students showed their preference for the traditional teaching model.

Several difficulties were observed during the development of the activities and some were pointed out by the students themselves in the final evaluation. One complaint from students was with respect to the reduced number of Robotics kits available. As the classes were relatively large, it was necessary to work with groups with an average of 6 students. Even though there was a division of tasks into the groups, there were times when some of the participants showed themselves scattered. Another difficulty pointed out and observed was related to the time required to carry out the activities. Thus the scripts had to be well planned and objectives and also it was not possible to give a detailed treatment to all the elements involved in an activity. In this particular aspect, the programming part was only intended to give an overview of its importance in the context of a Robotics application, without requiring students to learn in depth the basic structures used in the construction of programs. These difficulties should subsidize the realization of adjustments in the materials and methods prior to the implementation of new interventions in Brazilian public schools, with a view to improving the quality of Physics teaching.

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ROBOTS AND STUDENTS WITH AUTISM SPECTRUM DISORDER IN THE EDUCATIONAL CONTEXT

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Abstract

The development during the last decade of Information and Communication Technologies (ITC) has provided many mechanisms for the intervention of people with autism spectrum disorders (ASD). Currently, among these types of ICT, a growing intervention method based on Social Assistance Robots (SAR) is being developed. Robotic assisted therapy not only perfectly aligns with the methodological principles that should guide the teaching-learning process of these students (individualized intervention, sequence of activities, active experiences and predictive environments), but also with the educational needs of these students. This rapid advance in robotics, its good results, the complexity of the educational need and the increase in cases of ASD, make it necessary to include this type of intervention in educational contexts. In this sense, the main aim of the current research was to identify a state of arts of robots in an education context and to provide an overview of skills worked. The current bibliometric study has been carried out through the Web of Science (WOS). The results showed that the number of empirical applications in the educational context is limited. Only 5 studies were adjusted to the previously established criteria, such as age of the participants (between 2 and 16 years), purpose of articles (academic) or the years of publication (between the years 2005 and 2017). Overall, all the studies demonstrate the great potential of robots as support tools in the education of students with ASD. Nevertheless, the analysis emphasizes the methodological limitations of these studies that make it difficult to generalize the results from these studies to other contexts.

Keywords: *Autism spectrum disorder, robots, intervention, social and communication skills.*

1. Introduction

The prevalence of cases of people with autism spectrum disorders (ASD) has increased significantly over the past 40 years (Aresti-Bartolome & Garcia-Zapirain, 2014). According to the Diagnostic and Statistical Manual of Mental Disorders (SDM-5) (American Psychiatric Association, 2013) autism spectrum disorder (ASD) is a developmental disorder characterized by deficits in two areas: (1) social and communication interaction and (2) repetitive patterns of behaviors, interests or activities.

Currently, early intervention and different educational approaches improve the quality of life of people with ASD. In this sense, following Tárraga-Mínguez and Sanz-Cervera (2018), there are different types of educational interventions with students with ASD such as: Applied Behavioral Analysis (Makryianni, Gena, Katoudi & Galanis, 2018), TEACCH methodology (Sanz-Cervera, Fernández-Andrés, Pastor-Cerezuela & Tárraga-Mínguez, 2018), interventions based on social histories (McGill, Baker & Busse, 2014), child-based play therapy (Hillman, 2018) or intervention based on new technologies (Pinel, Aguiló & Adrover-Roig, 2018). In this sense, the intervention with people with ASD must be based on specific methodological principles, such as: to organizer space, time and sequences of events in the environment so that learning activities are clearer and easier to conducted; to use visual information to promote engagement in productive activities and to reduce the confusion; to use special interests of students to engage them; and to use symbols to promote communication (Mesibov y Shea, 2005). There is a growing demand for resources for children with ASD (Kim et al. 2018). In this regards, Information and Communication Technologies (ICTs) perfectly aligns with the methodological principles that should guide the teaching-learning process of these students. This type of technology can, in general terms, lead to more effective diagnoses (Liu, Wu, Zhao & Luo ,2017), and, on the other hand, act as a support tool for the intervention and education of these students (Aresti-Bartolomé & García-Zapirain, 2014). More specifically, ICTs have a number of characteristics, such as predictability, visual support and sequential presentation of information, which are aligned with the needs of people with ASD, making them ideal tools for working on social and communication skills with that student body (Grossard et al.

2018). In this sense, ICT in the intervention of students with ASD can be classified into three large groups according to their use (Grossard et al. 2018). First, the applications for Ipad and Ipad, secondly, educational games. And, finally, social assistive robotics (SAR). SARs are a young and developing field (Scasellati, Admoni and Mataric, 2012). This term is used to describe robots whose main task is to help through social interaction (Feil-Seifer and Mataric, 2005). Several reasons have been proposed for why the use of SAR could be beneficial for the intervention with children with ASD. Firstly, children with ASD have a great affinity with robots and their great interest may provide them a high level of motivation (Diehl, et al., 2012, Aresti-Bartolome, Garcia-Zapirain, 2014). Furthermore, robots could be used as tools to reduce impairments of children with ASD, due to robots produce controlled social situations where children with ASD can practice and learn. Because of that, children feel less anxious in these situations since robots are more predictable and simpler than humans (Huskens et al., 2013; Goodrich et al., 2012). According to Short, Deng, Feil-Seifer & Mataric (2017) this would entail the development of their social skills in a more comfortable way, since the SARs will not unexpectedly exhibit complex behaviors, which are natural of human interactions. Notably, the work of Short et al. (2017) showed great levels of attention when children interact with robots.

2. Search questions

To summarize, the research aims to show the current state of art in SAR as educational tool in the intervention with students with ASD. The present work has been conducted by the members of the IncluTIC Research group. To obtain this main purpose we have established the following research questions:

- How many researches involve interventions with ASD children using SAR as a tool of learning in an educational context?
- Which are the areas studied in these researches?
- What are the features of the participants used in the sample?
- Which are the most important results obtained in these researches?

3. Method

The research has been based on the descriptive-retrospective bibliometric design. This design allows the selection and organization of the documents involved in an area of study (Montero and León, 2002). Specifically, the steps to follow would be the following: search and selection of the information; secondly, classification according to the descriptors of the documents found and, finally, the analysis of the data (Rosa, Huertas and Blanco, 1996).

3.1. Participants

The sample consisted of 5 articles published between 2005 and 2017 in the Web of Science database. A search, selection and individual reading and analysis study of the data was conducted from September 2018 to November 2018. The units of analysis used were English articles aimed at studying robots as learning tools for intervention with students with Autistic Spectrum Disorder (ASD).

3.2. Design and process

The phases conducted in the search for information are listed below.

Phase 1. For the selection of the items included in the sample, the following code lines were used in a first phase: TS=("autism" AND "robots") OR TI=("autism" AND "robots") OR TS = ("autism" AND "robots" AND "Education") OR TI = ("autism" AND "robots" AND "Education") OR TS=("autism" AND "emotions" AND "robots") OR TI=("autism" AND "emotions" AND "robots") OR TS=("autism" AND "social skills" AND "robots") OR TI=("autism" AND "social skills" AND "robots") OR TS=("autism spectrum disorder" AND "social assistive robots") OR TI=("autism spectrum disorder" AND "social assistive robots") OR TS= ("case study" AND "autism spectrum disorder" AND "social assistive robots") OR TI= ("case study" AND "autism spectrum disorder" AND "social assistive robots"). Moreover, the language selected was English, because this language is the most used (Lorenzo, Lledó, Pomares and Roig, 2016). Furthermore, it has been chosen the period 2005-2017, because the majority of studies related to socially assistive robotics (SAR) has divulged over the last decade (Diehl, Schmitt, Villano, and Crowell. 2012) due to the rapid development of technology. Finally, all de indexes were selected (SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC). Searching results were 262 papers.

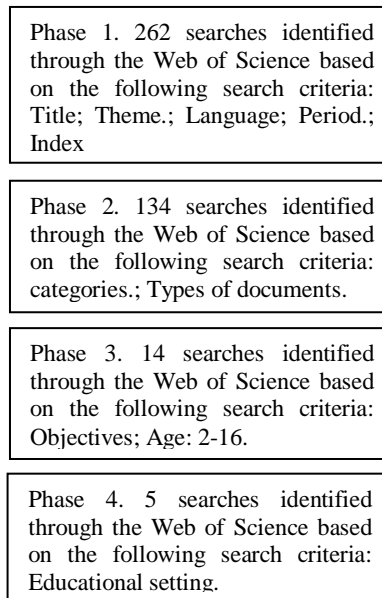
Phase 2. Then, for a second phase, the search was refined using 3 categories from the Web of science. These categories are directly related to the objective of the research: robotics (121 papers), education educational research (9 papers) and education special (5 papers). And, on the other hand, 3 types of documents were selected: proceedings paper (96), articles (37) and reviews (2). A sample of 134 was obtained.

Phase 3. Following Scasellati, Admoni and Mataric (2012), the field of robotics encompasses a multitude of studies based on different methods and objectives. However, research can be divided into three main groups: robot design, design of human-robot interaction and validation of robots in trials. In this sense, the studies that pursued this last objective were selected. In addition, the intervention with robots is carried out with children aged between 2 and 6 years. As a result, a sample of 14 papers was obtained.

Phase 4. And finally, the studies are conducted in educational settings. As a result, a sample of 5 papers was obtained.

In this way, the phases described are reflected in figure 1.

Figure 1. Procedure process.



4. Results

The results show five investigations. The research carried out by Robins, Dautenhahn, Te Boekhorts and Billard (2005) is from the year 2005. Second, Duquette, Michaud and Mercier's (2008) research is from 2008. And, the rest of the research (Wainer, Dautenhahn, Robins and Amirabdollahian, 2017; Bharatharaj, Huang, Al-Jumaily, Rajesh and Krägeloh, 2017; and, Boccanfuso et al., 2017) are from the year 2017.

In addition, the number of participants in all studies does not exceed 8. The research conducted by Boccanfuso et al. (2017) is the one with the most participants. On contrast, the minimum number of participants is 4 (Robins et al., 2005; Duquette et al., 2008).

The diagnosis of all ASD participants. Specifically, the study conducted by Duquette et al. (2008) specifies that participants have low functioning autism. The diagnosis of all ASD participants. Specifically, the study conducted by Duquette et al. (2008) specifies that participants have low functioning autism. In addition, in the study conducted by Boccafuso et al., (2017) children present speech deficiency.

Furthermore, the age of the sample ranges from 3 to 16 years. The study conducted by Boccafusso et al. (2017) includes 3-year-olds. On the other hand, the study that includes older adolescents is that conducted by Bharatharaj et al. (2017).

In terms of the area worked on, the most of studies were focused on subareas related to social skills. imitation and eye-contact (Robins et al., 2005), attention and engagement (Duquette et al., 2008), joint attention, imitation, eye-contact and positive affect (Wainer et al., 2017) and spontaneous speech and joint attention (Boccanfuso et al., 2017). And, on the other hand, there is one research focused on stress.

Finally, the results of Robins et al (2005) showed an improvement of basic social interaction skills in children with ASD after the repeated exposure to *Robota*. In a similar way, Duquette et al. (2008) showed an increase of joint attention when the child interacts with the robot *TITO*. Moreover, Wainer et al. (2017) the robot *KASPAR* acts as a mediator in the social interaction between the adult and the child. Furthermore, Bharatharaj et al. (2017) showed the effectiveness of their robot to low stress level of children with ASD that often characterize them. And, finally, as regards to spontaneous speech, social interaction and joint attention the investigation conducted by Boccanfuso et al. (2017) showed an increase of these after the interaction with the robot *CHARLIE*.

Table 1. Overview of researchers that use a robot as a tool.

References	Participants			ROBOT	Area	Conclusions
	No.	Diagn.	Age			
Robins et al., 2005	4	ASD	5-10	ROBOTA	Imitation and eye-contact.	An improvement of interaction skills after the interaction of children with Robota.
Duquette et al., 2008.	4	Low-functioning autism	5	TITO	Attention and engagement.	A greater interest in robot, but showed more imitation improvement on several variables when they interacted with the human.
Wainer et al., 2017	6	ASD	6-8	KASPAR	Join attention, imitation, eye-contact and positive affect	The results showed that children found the activity more entertaining.
Bharatharaj et al., 2017	7	ASD	6-16	KILIRO	Less stress	The results showed the efficacy and validity of Kiliro to low the stress level of children with ASD.
Boccanfuso et al., 2017	8	ASD and speech deficiency	3-6	CHARLIE	Spontaneous speech and joint attention.	An increase in spontaneous speech, social interaction, joint attention and requesting behaviors.

5. Conclusions

The following conclusions can be drawn from the proposed research questions and by answering them:

- We found 5 studies which used a robot as a tool to learning social skills in an educational context.
- The areas studied in these researches are related to social skills which include social initiation, social interaction rules, emotion production and recognition.
- All of participants had between 3 and 16 years old. They were all of school age.
- In line with previous studies, show that robots have been used in the intervention with children with ASD being more used and effective as a tool to promote communicative interaction while there is no evidence of intervention in curricular contents. As a consequence, a significant advance in this field could be to devote efforts to the study of the application of robots with a view to improving curricular aspects in this type of students.

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THE USE OF VIRTUAL LEARNING ENVIRONMENTS AND ACHIEVEMENT IN PHYSICS CONTENT TESTS

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Abstract

In the advent of industry 4.0, the use of Virtual Learning Environments (VLEs) has become increasingly valuable for mediating the teaching and learning of science concepts. These VLEs embedded with simulations of real scientific systems, processes and accompanying learning activities, have been used to simplify concepts and enhance visualisation for science students and teachers alike. In South Africa, Physics Education Technology (PhET) and other free online simulations have been commended by several science teachers as useful tools for science learning in virtual environments. This baseline study examined the effects of using virtual learning environments (VLEs) on students' achievement in physics content test. Sixty eight (n=68) third year physical sciences education students from a South African teacher training programme participated in the study. A sequential mixed method explanatory research methodology was followed in investigating the effects of using VLEs on students' achievement in physics content test. The initial phase of the study constituted a quasi-experimental phase where a Physics content test was given pre and post virtual learning interventions using PhET simulation laboratories and the associated activities. This phase was proceeded by follow-up semi-structured focus group interviews with all the participants to establish their perceptions of virtual learning environments engaged with. Data from quasi-experiment was analysed using SPSS 25 and transcribed textual data from focus group interviews was analysed using thematic content analysis assisted with Atlas.ti 8. Findings from the study revealed that, mean achievement scores in physics content tests improved significantly post intervention in VLEs. From follow-up focus group interviews five themes stood out where students revealed that; (1) within the VLEs, they were able to visualise scientific micro worlds (2) Embedded activities and tasks enhanced self-directed learning and assessment (3) the virtual classroom space enhanced collaboration with peers on learning tasks (4) the VLEs provided a convenient way to learn sciences (5) The VLEs did not promote authentic science learning. The implications of these findings are that virtual learning environments are a relevant learning enhancer for science and physics learning in the 21st century. We therefore recommend based on these findings that, larger scale studies be engaged to further investigate the affordances of VLEs in science education, including all the factors that affect how students learn in VLEs.

Keywords: *Virtual learning environments (VLEs), content tests, visualisation, physics.*

1. Introduction and background

In physics modules one of the prominent learning difficulties have been found to revolve around students' visualisation of concepts like forces, current, charges, magnetic fields, and other micro-scientific worlds (Aravind & Heard, 2010; Faour & Ayoubi, 2018). This study investigated the use of open access simulations and the associated learning activities in learning abstract physics concepts, within virtual learning environments (VLEs). Virtual learning has in recent times provided a platform for the extension of the traditional contact sessions in science teaching. Several researchers including De Jong (2017), Alhalabi (2016) and Pekrun (2016), postulate that, VLEs help students improve their visualisation of micro scientific phenomena and eventually conceptual understandings of abstract scientific concepts. Despite these accrued benefits of VLEs and the associated learning tasks embedded in them, not enough has been documented in the South African context on how they can be used effectively and the effects they have on students' achievements (Ramnarain & Moosa, 2017). Hence, this study set out to establish the possible effects that using VLEs could have on 3rd year physical sciences education students' achievement in physics content test at a South African university. We further interviewed the students using semi-structured interviews to establish their perceptions of the VLEs for learning physics concepts.

As the world increasingly transforms into a digital village, the use of available technological tools in science teaching and learning are inevitable for teachers and students alike. This is because the 21st century learners tend to rely on technology for the attainment of diverse goals (Merchant, Goetz, Cifuentes, Keeney-Kennicutt & Davis, 2014). For physics learning in particular learners find it difficult to relate to and visualise abstract concepts (Aravind & Heard, 2010; Merchant et al, 2014; Ramnarain & Moosa, 2017). This usually leads to the creation of several misconceptions in the minds of physics students which teachers must pay particular attention to, in order for new concepts to be grasped.

2. Aims and objectives

The main aim of the study was to investigate the effects of virtual learning environments on students' achievements in Physics content test. Based on this aim the following objectives were set

- To assess students' achievements in a semester Physics content test
- To provide virtual learning interventions on the assessed physics concepts
- To re-asses students' achievements by administering the same physics content test as a post-test.

3. Virtual learning environments

The use of virtual learning spaces have been widely endorsed in modern learning for enhancing students' interactions with content and making teaching and learning resources globally available (Merchant et al.,2014; Zacharia & Olympiou, 2011). This in essence implies that, students and teachers do not necessarily have to be at a physical location or classroom to have access to knowledge. For science learning, Virtual learning environments (VLEs) are learning spaces, usually online or off-line embedded with simulations, demonstrations and illustrations of scientific processes and system. What makes them unique is the addition of learning activities that implicitly scaffold a learner's use and interactions with the embedded content (Chamberlain, Lancaster, Parson & Perkins, 2014). In the South African context in particular, schools are provided with several Information Communication and Technology (ICT) tools, for teaching and learning, a strategy targeted by the Department of Basic Education to meet the 21st century imperatives for global education (Department of Education, 2004). In learning physics concepts this VLEs help learners to attain learning goals that may not even be feasible in a traditional physics laboratories. As indicated by some researchers, the simulations embedded in VLEs provide a platform where learners can "interact virtually with phenomena too dangerous to do in real time, and solve complex problems" (Krajcik & Mun, 2014, p. 356). With this notion in mind, science students should be able to use ICT effectively to enhance their learning while acquiring skills for the world of work beyond the classroom. The main problem that motivated this research is that even though the relevant ICT tools are available for learners and teachers in schools, not much been documented on their use and effectiveness in VLEs for South African students.

4. Theoretical underpinning

Although this study was underpinned by multiple learning theories, the main theoretical lens was Mayer's cognitive theory of multi-media learning. Mayer (2011), emphasises that, the use of multiple media (audio and visual) in representing concepts will have a positive impact on how students construct mental representations and eventually schemas. This points to the fact that hearing about a physics concept during traditional lectures is not sufficient for enabling long term retention and memory (Mayer, 2011; Mosotho & Mamontsi, 2014). The addition of visual 2-dimensional and 3-dimensional representations which mimic forces, charges, and electromagnetic fields help students to form a mental picture of abstract physics concepts. These mental pictures become engraved in their cognition and students are able to remember them even in the long term (Wang, Li, Yang, & Hao, 2013; Makransky, Terkildsen & Mayer, 2017). With this underpinning in mind, a virtual learning intervention for the study was designed using PhET interactive simulations, a project founded at the University of Colorado Boulder, which include many physics simulations and associated activities, available freely at <http://phet.colorado.edu>. A *google hangout* chat room was also introduced in the VLE, to ensure that difficulties could be shared with the instructor and peers.

5. The learning interventions

The students who participated in the study were 3rd year physical sciences education pre-service teachers. They were all enrolled for a physics module and conducted an anonymous online poll in which they selected the physics concepts that were most abstract and incomprehensible to them. We then obtained the results of the poll and established by simple counting that 82 of the students found Faraday's law of Electromagnetic Induction (EMI) to be quite abstract while another 72% of them indicated that Newton's third law on the conservation of momentum was incomprehensible and embedded with several

misconceptions. At the beginning of the learning interventions students further indicated that, Faraday's law of electromagnetic induction presented a complex relation between electricity and magnetism which was difficult to imagine merely looking at the drawings that are projected during lectures. They did not comprehend the time changes (dt) in a magnetic field and the several challenges associated to the flux rule. A learning intervention was then designed based on the presented challenges. Several PhET laboratories were introduced to all students in the first week of the learning intervention by the researchers. These activities included Faraday's law lab, collision lab, momentum lab and velocity labs activities all obtainable from the following sites; <https://phet.colorado.edu/en/simulation/collision-lab>, <https://phet.colorado.edu/en/simulation/faradays-law>, <https://phet.colorado.edu/en/simulation/momentum>, <https://phet.colorado.edu/en/simulation/velocity>. All the embedded activities in the Virtual learning environment were exploited and the learning was mostly done in groups as collaborative tasks with the research facilitating processes in the VLE using an embedded google hangout chatroom. At the end of five weeks the students were then task to re-write the physics content test assessing these concepts.

6. Methodology and design

The study employed a sequential explanatory mixed methodology. In the first phase of the study all students were asked to write a Physics content test based on their understandings of Electromagnetism and collision/momentum taught during lectures. Thereafter, virtual learning interventions commenced and proceeded for 5 weeks during tutorial sessions. At the end of the learning interventions, the same content test was administered as a post test. The second phase, a qualitative inquiry employed 10 focus group semi-structured interviews with all the participants in 9 groups of 6 participants and 1 group of 7 participants aimed at obtaining insights into students' experiences (Creswell & Creswell, 2017), with virtual physics learning.

6.1. The Sample

The sample selected for the study was the same as the population ($n=N$) whereby, all 3rd year physical sciences (a combination of chemistry and physics) education students volunteered to participate in the virtual learning intervention. A single lecture and two tutorial sessions were held for the physics module each week. Students could not be separated into control and experimental groups because of the inherent learning implications, hence we adopted of a quasi-experimental pre- and post-test design for the study. Also for physics module this was the first time a virtual learning intervention was going to be used during tutorials to support the content acquired from lectures. Students were curious to explore different learning space, besides lectures and traditional laboratory sessions.

6.2. Data collection and analysis

A Physics content test was administered pre and post learning experiences in VLEs. The test constituted several test items related to the conceptual, procedural and application knowledge of learned physics concepts. The content validity of the test was established by one of the researchers and two other Physics education specialists. For this validated test, the focus was on the intra-item reliability based on the consideration that a question on EMI and all its sub-sections will not be the same as a question on momentum/velocity/collision. Intra-item Cronbach's alpha was obtained to be $\alpha = .80$. All pre and post test scores were captured and analysed using SPSS version 25. Data for the qualitative phase was collected by means of focus group interviews using the following pre planned questions and prompts;

- How did you find the the use of virtual learning simulation laboratories and the activities? Provide a brief explanation.
- Which aspects of the VLEs were useful in facilitating your learning of the identified Physics concepts?
- What was your impression of the chatroom aid embedded in the VLEs?
- Did you find the VLEs and the associated learning activities useful in improving your conceptual understandings of the Identified physics concepts?
- Please elaborate on what you see to be the possible advantages and disadvantages of using VLEs in Physics learning.

The transcribe textual data form these focus group interviews were analysed using thematic content analysis with the aid of Atlas.ti version 8.

7. Results

7.1. Descriptive and inferential statistics

At the end of the learning intervention phase all participants' scores for the pre and post-test were captures and analysed using SPSS version 25. Table 1 below shows the mean scores and standard deviations obtained from pre and post interventions physics content tests.

Table 1. Descriptive statistics

	N	Mean (%)	S.D	Std. Error Mean
Pre-test scores	68	59.68	9.25	1.12
Post-test scores	68	72.47	10.22	1.24

As seen on table 1 the mean Post-test score was higher at $M = 72.47\%$, $SD = 10.22$ than the mean pre-test score at $M = 59.68\%$, $SD = 9.25$.

After establishing that the data was normally distributed, we further conducted a paired sample t-test to establish if the observed increase in the post-test mean score was statistically significant at 95% confidence interval. The result of the paired sample t-test is captured on table 2 below.

Table 2. Paired Sample t-test.

Pair 1	df	Mean (%)	S.D	Std. Error Mean	t	p
Post-test scores	67	12.79	8,70	1.06	12.12	P < .01
Pre-test scores						

As seen on table 2 above, Post-intervention physics content test scores were significantly higher than the pre- intervention test scores with $t(67) = 12.12$, $p < .01$ at 95% confidence interval. These results suggested that there was a significant improvement in students' achievement in physics content test after the intervention with VLEs. Other factors might have affected the post test scores which were not covered in this inquiry due to the limitation of not having a control group.

7.2. Result of focus group interviews

From the analysis of transcribed textual data we generated codes and traced patterns that led to the generation of the themes discussed here below.

7.2.1. VLEs, facilitated the visualisation of micro worlds. 7 out of the 10 groups of students indicated that the VLEs enhanced their visualisation of micro-scientific phenomena. In the simulations they were able to see field lined motion and real-time graphs as they interacted in the VLEs. This feature of the VLE was believed to be the main reason why they tending to understand the physics concepts more.

7.2.2. Embedded activities and tasks enhanced self-directed learning and assessment. All 10 focus groups indicated that they were able to independently drive their learning within the VLEs such that they rarely felt the need to ask for help.

7.2.3. The virtual classroom space enhanced collaboration with peers on learning tasks. All focus groups also indicated that the interactive nature of the VLEs enhanced collaborative learning within and amongst their learning group. The chat room feature was said to have enhanced communication among group members, an affordance which helped them to complete tasks without necessarily seeing each other.

7.2.4. VLEs provided a convenient way to learn sciences. Again all the groups indicated that VLEs were great because they could be accessed from any location if a person had connectivity.

7.2.5. The VLEs did not promote authentic science learning. 8 of the 10 focus groups indicated that the VLEs was not quite useful in cases where authentic learning is required. They suggested that the use of VLEs can only be complementary of their traditional laboratory experiment.

8. Discussions and conclusions

Findings of this study based on the obtained results suggest that VLEs have the possibility of enhancing student's understandings of physics concepts. The findings also concur with other studies like

Zeichner and Zilka (2016) who found that once the initial of using VLEs have been dissipated students enjoy positive learning experiences within virtual learning spaces. (Zacharia & Olympiou, 2011) also found that for physics learning, conceptual understandings are enhanced when students combine traditional laboratory learning with interactive virtual learning. Just like the findings from the qualitative phase of this study, Hsu, Lin, and Yang (2017), found that students did not relate to the authenticity of

virtual learning. We therefore recommend that VLEs considered as enhancers for physics learning in particular and science learning as a whole. From the qualitative phase of the study, it was noted there could be other factors that would possibly contribute to the improvement in the post test scores because of the limitation of not have a control group. We therefore recommend that, larger scale experimental research be conducted across universities whereby a control group could be identified and excluded from learning interventions with VLEs.

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INCLUSION OF MUSIC THERAPY AS AN INTERVENTION TOOL IN THE THERAPEUTIC PEDAGOGY CLASSROOM

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Abstract

This study shows the intervention carried out in the classroom of Therapeutic Pedagogy in an ordinary school of the province of Alicante in which it has been used the music therapy. The main goal of this project is to promote the use of the music therapy as an educational discipline and, also, to give an individualized answer to the learning difficulties from a more dynamic and motivating perspective. This therapy creates an atmosphere of trust and fun using the music as the basis of this methodology. The participants of the study had been: two students of Early Childhood Education and two students of Primary School. Each one of these students presents a different SEND (Special Educational Needs and Disabilities): a Developmental Delay, PDR (Psychomotor Development Retardation), a SLI (Specific Language Impairment) and a MID (Mild Intellectual Disability). Through the creation of some individual pedagogical activities using the music therapy, it has been developed an intervention of six sessions per student of approximately thirty to forty-five minutes with designed and adapted materials based on this therapy as an intervention tool. The results obtained have had a degree of effectiveness between 77% and 84% and it manifests the advantages that the use of this methodology has provided to the field of education because it assists the emotional develop. Besides, it has improved the goals that had been worked, the motricity, the concentration and the affectivity of the students decreasing their anxiety. In the future, this project could be improved by using this methodology with other kinds of SEND and, what is more, it could be used for a longer period of time and with new materials to definitely prove its effectiveness.

Keywords: *Assessment, educational innovation, music therapy, special educational needs and disabilities, therapeutic pedagogy.*

1. Introduction

Music is the universal language capable of transmitting words, feelings and emotions through melody, rhythm and harmony. Throughout history it has played such an important role in diverse social contexts that, in its evolutionary process, music has become an indispensable part of other scientific and artistic disciplines. It is used in issues as important as physical and psychological well-being and is approached from a multidisciplinary perspective, with a holistic and integrating character as Gutiérrez (2018) points out.

In an interview conducted in 2011 by Punset, the musician, psychologist and neurologist Koelsch points out that "we are innate musical creatures from the depths of our nature". From this, Punset expresses that nothing has more impact on the brain than music in the sense that it affects memory, movement, emotions... it affects practically everything.

Following Gutiérrez (2018) in the field of medicine, music is in an increasingly considered position, as it favours well-being and the possibility of fighting different pathologies. For all these reasons, it has been consolidated as an independent medical discipline, music therapy, which is now increasingly present in hospitals and clinical and social rehabilitation centres.

Since the fifties music therapy begins to be recognized and defined by various authors among whom is Thayer Gaston who separates the terms music and therapy to unite them as a whole. Gaston (1957) states on the one hand that: "Music is the science or art of gathering or executing intelligible combinations of tones in an organized and structured manner with a range of infinite variety of expression, depending on the relationship of its various component factors" (p. 23). On the other hand, Gaston (1957) defines: "Therapy has to do with "how" music can be used to bring about changes in the people who hear or perform it" (p. 23).

However, the term continues to evolve over the years until today where the Spanish Federation of Music Therapy Associations (2011) defines music therapy as: "The use of music as an intervention in medical, educational and everyday environments with individuals, groups, families or communities seeking to optimize their quality of life and improve their health and physical, social, communicative, emotional, intellectual and spiritual well-being".

This type of therapy is effective in treating certain disorders or improving the subject's quality of life, and acts in two ways: active (playing instruments, singing, playing music) and receptive (using music to induce states of relaxation). Other techniques and artistic forms are also used simultaneously with music, such as drama, dance or painting. Following Blasco (2016) a musical environment rich and controlled in stimuli can provide the child with a balanced emotional, psychophysiological and social development.

Through harmony, rhythm and melody the perspective of education can be changed by introducing music as a therapy and intervention tool in the classroom of therapeutic pedagogy. There are many possibilities offered by music (Chávez, 2012) and it seems that, at times, it is undervalued by not taking its use to the classroom. This project aims to revalue this art and demonstrate that what works as a medical therapy can be used as a starting point to work on the Special Educational Needs and Disabilities (SEND) (García-Allen, 2016).

2. Objectives

The main objective of the project is to promote the inclusion of music therapy as an intervention tool in the Therapeutic Pedagogy (PT) classroom. For this reason, a series of more specific objectives, which are intended to be achieved, have been extracted: to design activities in accordance with the different SEND through music therapy and to evaluate the improvements of the participants in the intervention carried out through the use of music therapy. This project is part of the research line of the research group of the University of Alicante InluTIC (VIRGROB-321).

3. Method

The method of the present work is a study of cases where the main objective is to investigate music therapy as a tool within the educational field through a multiple or collective case for which four students with different learning difficulties have been chosen, both in Early Childhood Education and Primary Education.

3.1. Participants

- **Early Childhood Education**

These are two 4-year-olds who attend the PT classroom. During the course of 3 years, their tutor requested an assessment by the guidance department because they could not adapt to the daily routines of the class, they did not speak, they did not have sphincter control and motorly the second subject was below their class group. After an assessment, case 1 is diagnosed with a Developmental Delay and case 2 is diagnosed with a Developmental Delay and Psychomotor Development Retardation (PDR).

- **Primary Education**

Case 3 is a 7-year-old child who has a curricular gap with his class group. He does not know the letters and this fact makes it difficult for him to keep up with the rhythm of the class. He also presents difficulties in his oral expression, due to the dyslalia. The student was diagnosed as a Specific Language Impairment (SLI).

The last case concerns a 10-year-old girl. In the first year of Primary Education, the department gave her a first assessment and she was diagnosed with a Developmental Delay. Later, the family was recommended to have a neurological assessment. Finally, her diagnosis was modified to Mild Intellectual Disability (MID), according to DSM V.

3.2. Design and process

The methodological intervention consists of two parts. On the one hand, an active methodology has been used because the participants are active subjects of their own therapeutic process which entails a visible external action such as singing, playing an instrument or dancing. And, on the other hand, a passive methodology has been put into practice only in the farewell song at the end of some of the sessions since it deals with relaxation and guided imagination (studying the inner world of the individual).

Concreting the intervention in the educational field, a series of individual or group sessions have been established, depending on the cases, to work with the students on the different proposed objectives. We have worked with each of them twice a week, with a total of six sessions for each student. During three weeks, three objectives per case study have been worked on, so that in sessions 1 and 2 the first objective

has been worked on, in sessions 3 and 4 the second objective and in sessions 5 and 6 the last specific objective.

The specific objectives for children of Early Childhood Education are: to learn the concepts "top-down" and "front-behind", to identify the parts of the body (eyes, mouth, nose, ears, head, shoulders, knees and feet) and to know the vowels and their spelling. For Primary Education students, the specific objectives are: to learn numbers from 1 to 50/100, to acquire the concept of laterality and to know the alphabet and its spelling.

The sessions of music therapy of the subjects of Early Childhood Education have taken place in the psychomotricity classroom of Early Childhood Education and the sessions of Primary Education have been carried out in the classroom of PT of the school. The duration of the sessions has been 30-45 minutes.

The structure of the sessions has been the same for all the case studies: 1. Presentation of the activities with the pictogram book "What are we going to do today?" which has been created to achieve a greater structuring of space-time and, in addition, to motivate them to carry out the activities. 2. Welcome song: these are simple songs adapted with a dance that makes the body wake up to be able to start working. 3. Development activities or Therapeutic Musical Experiences. 4. Farewell song: the session ends with a predictable and familiar ending that facilitates the understanding of the end of the session and the location to your new reality (your classroom).

As an example of infant education activities carried out through music therapy, table 1 shows the activities carried out during the first week of the intervention, i.e. the first and second session of case studies 1 and 2 working on the first specific objective.

Table 1. 1st and 2nd session subjects 1 and 2.

1st and 2nd SESSION (20 and 22 FEBRUARY)	
Objective: To learn the concepts "top-down" and "front-behind"	
Presentation	"What are we going to do today?"
Welcome	"Mi cuerpo en movimiento (Educación Infantil)" extracted from YouTube at the following link https://www.youtube.com/watch?v=4S7_nTdC_RU
Activity 1	The magic box
Duration	10 minutes (Session 1)
Resources	Box with percussion instruments including tambourines, drums, castanets, cymbals, triangles, maracas, Chinese boxes, percussion sticks, coconuts and rattles.
Development	This is the first contact with musical instruments that have made so they have manipulated the instruments freely acquiring knowledge of percussion instruments by exploring through sounds. In the magic box or musical box there were tambourines, drums, castanets, cymbals, triangles, maracas, Chinese boxes, percussion sticks, coconuts and rattles.
Activity 2	Knowing the concepts
Duration	10 minutes (Session 1)
Resources	Two balls
Development	With the help of a ball and to the rhythm of the clapping the Subjects have worked these concepts. When the teacher clapped her hands, the Subjects would put the ball above them; when she clapped her hands twice, they would put the ball below them; with three claps they would put it in front and with four claps behind.
Activity 3	Working the concepts "top-down" and "front-to-back"
Duration	10 minutes (Session 1)
Resources	Song "Música para crecer – Arriba, abajo, delante y atrás"
Development	Using the song "Música para crecer – Arriba, abajo, delante y atrás" extracted from YouTube at the following link https://www.youtube.com/watch?v=xBUC9ummmjs
Farewell 1	Relaxing music
Duration	5 minutes (Session 1)
Resources	"Música de relajación infantil # Incluye técnica todas las edades psicólogo CEPSI" in https://www.youtube.com/watch?v=F8e3VhtfNpk&t=138s and two mattresses
Development	It is a song of relaxation in which the Subjects once were lying down, they are guided with the voice until they manage to sleep their body. For this they have been told: "Imagine that you are floating, close your eyes and feel your body float, imagine that you float over the landscape, look at the colours, feel the sound of relaxation. Feel and think you feel the sensation of experiencing something pleasant".
Activity 4	We review the concepts "top-down" and "front-to-back"
Duration	10 minutes (Session 2)
Resources	Percussion instruments: tambourines, drums, castanets, cymbals, triangles, maracas, Chinese boxes, percussion sticks, coconuts and rattles.
Development	With the help of the percussion instruments they met in the first session. The idea was for them to identify the instrument and place it as it was indicated in the order, for example: "Take the bells and put them under the bench". First they had to identify the instrument and then the concept.

Activity 5	We make a circuit to the rhythm of the drum
Duration	20 minutes (Session 2)
Resources	Zigzag worm, two fences, five hoops, a rope and the drum.
Development	Once the concepts were acquired, they made a psychomotor circuit consisting of four steps. First, they had to pass over a worm that zigzagged, then under two fences, surround five rings in front and finally walk backwards following a rope. In addition, they have done all these activities following the rhythm of the drum. If the drum was played faster they had to make the circuit faster and if the drum stopped, they had to stay still like statues.
Farewell 2	Relaxing music
Duration	5 minutes (Session 2)
Resources	“Música de relajación infantil # Incluye técnica todas las edades psicólogo CEPSI” in https://www.youtube.com/watch?v=F8e3VhtfNpk&t=138s , a feather and a mattress
Development	The students were given a feather in such a way that first one will lie down on the mat while the other Subject passes the feather over his body and then the roles will be changed.

4. Results

In order to evaluate the results obtained, at the end of each session, some evaluation rubrics have been completed for each case according to the evaluation items extracted from the specific objective worked. As an example, table 2 shows the type of rubric completed with the evaluation items for subject 1 in sessions 1 and 2.

Table 2. Evaluation heading subject 1, sessions 1 and 2.

EVALUATION OF SESSIONS 1 AND 2				
Objective: To learn the concepts "top-down" and "front-behind"				
Evaluation Items	ACHIEVED	ACHIEVED WITH AID	IN PROCESS	NOT ACHIEVED
1. Has a positive attitude toward novelty (music therapy)	X			
2. Use the book "What are we going to do today?"	X			
3. Uses his body as a means of expression	X			
4. Participates in all proposed activities	X			
5. Knows and locates the concept "above"	X			
6. Knows and locates the concept "below"	X			
7. Knows and locates the concept "ahead"		X		
8. Knows and locates the concept "behind"		X		
9. Performs the psychomotor circuit autonomously	X			
10. Has a calm attitude in relaxation exercises	X			

On the other hand, in order to finally know whether the cases have succeeded in acquiring the stated objectives, data have been extracted from the evaluation headings and the weighted average to reflect their achievement has been calculated. After calculating the weighted averages as percentages, it is considered that the specific objective is “Achieved” if it is between 75% - 100%, “Achieved with aid” between 50% - 75%, “In process” 25% - 50% and finally, “Not achieved” 0% - 25%.

According to table 3, subject 1 has managed to overcome the specific objective worked in sessions 1 and 2 and the third objective worked in sessions 5 and 6. The objective worked on in sessions 3 and 4 has been achieved with aid (70%).

Finally, table 3 shows the result that averages all the sessions of all participants, in order to estimate the usefulness of music therapy as an intervention tool in each case.

Table 3. Evaluation of the objectives and degree of effectiveness of the use of music therapy in the case studies.

OBJECTIVES	SUBJECT 1	SUBJECT 2	SUBJECT 3	SUBJECT 4
Sessions 1 y 2	95%	70%	90%	78%
Sessions 3 y 4	70%	80%	85%	83%
Sessions 5 y 6	85%	80%	77%	86%
	83%	77%	84%	82%

5. Conclusions

The following conclusions can be drawn from the general objectives of the project according to the results obtained:

- The general objectives have been reached in their totality since, all the cases of study have surpassed the average of the sessions reason why, if the utility of the sessions of music therapy is valued it

is concluded that it is effective for all the subjects being the greater percentage 84% obtained on the part of the case 3 and the minor 77% on the part of the case 2.

- In all the sessions applied, the degree of effectiveness has been very good since none of the objectives have been left "In process" or "Not achieved".

- The nature of the methodology used has fostered the achievement of the proposed objectives, leaving the student himself to feel part of the teaching-learning process and to feel motivated to want to know beyond what he has worked, increasing his desire to learn.

- The definition of the Spanish Federation of Music Therapy Associations (2011) is reaffirmed, associating the use of music with the improvement of quality of life, health and well-being at all levels (physical, social, communicative...).

- It is ratified the opinion of Chávez, S. (2012) that explains that it is possible to work through music any objective that one wants whether it is to know the lyrics or the numbers, to teach concepts such as "top-down, front-behind" or even to learn to express emotions through one's own body.

- The methodological tool, which has been put into practice in a real situation with four case studies and has worked in all the Specific Needs of Educational Support with which it has worked, is very useful for the improvement of the intervention in Education. In this way, the emotional development of the students is favoured, motivating them and improving all their aspects, as it was indicated by García-Allen (2016).

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ENVIRONMENTS OF DYNAMIC LEARNING UNDER 3D INTERACTIVE VISION: RECONSTRUCTION OF THE ORBIT

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Abstract

Introduction: technology, applied to training in health sciences, has undergone great changes over time. These changes always occurred parallel to the technological evolution of society, which is why technological advances have modified the ways of teaching and learning of university students in experimental sciences and health. Between the different subjects in medicine, one of the most important is anatomy. This will form a base which will follow the students throughout their career.

Previous findings: traditionally, anatomical dissection has been the basis of anatomical studies. Although it is a global and accepted method currently used in almost all medical universities, it has its limitations. An important disadvantage is that sometimes the structures in the human body are too small, in addition to the low availability of the object of study.

Later, using radiological sections to analyse and enlarge different structures started. The main problem with this technique is that, even though you can obtain larger images, these are two-dimensional images. In recent years important technological advances have been developed in the post-processing of radiological medical imaging.

Objectives: the aim of our study is to demonstrate the advantages of 3D reconstruction of the orbit in comparison to other ways of teaching and studying. These innovative techniques allow the representation of three-dimensional anatomical images using image diagnostic devices coupled with software capable of reconstructing any radiological section: axial, coronal or sagittal. In particular the orbit can obtain benefit from this system given its morphology: pyramidal shape, walls formed by 7 different cranial bones, small volume, large number of structures inside.

Methods: applied research; comparison, observation and analysis. Devices used: Toshiba Aquilion 64 TC (a whole body 64-slice CT scanner) using Vitrea software.

Results: the three-dimensional vision has become a crucial tool for the learning and understanding of many complex anatomical structures such as the orbit, enabling the introduction of novel techniques for the teaching and learning of anatomical models.

Conclusions: our research demonstrates the advantages of the 3D reconstruction of the orbit; visualization of each structure with its anatomical relationships, image enlargement, precise description, accessibility, morphological comprehension and improvement of spatial perception.

Keywords: *Teaching, technology, 3D reconstruction, anatomy, orbit.*

1. Introduction

In recent years there has been a deep technological development. This transformation translates into all areas of life: social, educational, professional ... That is why consequently it is also about learning. The relationship between the current context of society and technology has evolved rapidly, specially involving medicine and health systems. In university education, we begin to have different experiences and more chiefly in the teaching of medicine. The scope of activity, information and knowledge are particularly relevant in the health sciences, mostly in subjects such as human anatomy (a field shared by several specialities, not only medicine).

Nowadays students have new ways of exploration and representation of information. Mobile devices and tablets represent a real revolution specially among youth. That is why today these new lines of accessing knowledge maintain an outstanding position. There are new ways to access knowledge through

different resources such as platforms or applications. These technological means are considered as complementary tools in academic learning and are an incentive for students.

Currently the transmission of knowledge is changing and the need for adaptation by teachers and students arises. New techniques of education represent a challenge for both teachers and students, but they also constitute a way of enriching knowledge and contributing quality to education. Society evolves more and more towards self-learning, leaving aside the master class and the classical methods of study, producing a displacement of them but not a replacement.

2. Previous findings

Universities and specifically anatomy subjects are increasingly making an inclusion of this emerging technology. Traditionally anatomical atlas, different books or anatomical plates have been used for study. Anatomical dissection has also been used for decades. Although its replacement is not intended, there are some disadvantages: limited accessibility, group study, life size structures...which can make it difficult to understand certain small anatomical areas where many structures such as the orbit converge.

Subsequently, with the technological development they began to introduce several advances such as radiodiagnostic images. These devices allow greater accessibility to the object of study and enlargement of the images, which facilitates the study. Its main problem continues being that they are two-dimensional images, with the limitations that this implies.

There are new learning styles that can be linked together without replacing the traditional ways of training in the area of human anatomy. 3D reconstruction is one of these new methods. This technique is possible thanks to the advances occurred in recent years in the post-processing of radiological images. The three-dimensional reconstruction for the creation of anatomical models is a great diversity of layers of digital information, more interactive, which through its use we can alter or enrich the information. All this provides greater efficiency and improves the quality of the teaching and learning process. They facilitate both learning and training in the medical field.

3. Objectives

The aim of our study is to demonstrate the advantages offered by three-dimensional reconstructions in the study of human anatomy and in particular the orbit. We believe that the orbit is a body area that can specially benefit from this technique given its small size and the number of anatomical structures it houses inside. It is a 30 cm² volume bone cavity that contains and protects delicate structures that comprises the visual system of the central nervous system. It is delimited by 4 walls and 7 bones: frontal bone, sphenoid bone, zygomatic bone, lacrimal bone, ethmoidal bone, maxillary bone and palatine bone.

Inside we find its main organ: the eyeball. In addition, there is a great variety of soft tissues: orbital fat, the 7 extraocular muscles (medial rectus, lateral rectus, superior rectus, inferior rectus, superior oblique, inferior oblique and levator muscle of the upper eyelid) and the intraorbital part of the optic nerve.

We also found blood vessels as the central artery of the retina, and nerve structures both sensitive (V and VII pair) and motor (III, IV, VI pairs) and other structures such as the lacrimal system.

4. Methods

For the elaboration of three-dimensional anatomical models, images obtained by different diagnostic imaging devices are used: computerized tomography (CT), magnetic resonance (MR) or even ultrasound (US). We have focused mostly on the first one, CT, specifically the model Toshiba Aquilon 64 (a whole body 64-slice CT scanner). This scanner has been built on Toshiba's Quantam Detector, a volumetric 64-slice CT scanner with 64 detector channels, 3D cone beam algorithms and volume reconstruction. CT emits multiple simultaneous X-rays from different angles. The tissues in a tomographic plane are assigned a density value proportional to their coefficient of absorption of xrays. The beams are detected after they have passed through the body creating a cross-sectional image, which will be weaker if they have passed through dense tissue. Either two or three dimensional images are digitally constructed from these density measurements. Orbital CT scans are usually obtained in 2mm sections and for greater detail fine cuts at 1mm intervals may be requested. Orbital images can be obtained in the axial plane, parallel to the course of the optic nerve; in the coronal plane, showing the eye, optic nerve, and extraocular muscles in cross section; or in the sagittal plane, parallel to the nasal septum.

The images used come from the radiodiagnosis service of the Complejo Asistencial Universitario de Salamanca and the Affidea center.

Subsequently, for the processing of these images, different programs are used: OsiriX Lite, 3D slicer, vitrea software, amira; in our study for the production of anatomical reconstructions vitrea software was used as a tool. Vitrea software is a multi-modality advanced visualization system providing comprehensive applications in a variety of information technology environments. This CT uses its software to reconstruct (reformat) any section in any direction (axial, coronal, or sagittal). By providing access to advanced clinical tools, Vitrea software enables physicians and students to have meaningful interactions wherever they are.

We value the opinion of students of health sciences degrees where the subject of Human Anatomy is taught through a satisfaction survey to evaluate their opinion. Thus, our objective is to analyze whether the practical study of anatomy with these recently incorporated technological resources is a motivating element in learning as well as their opinion on the effectiveness of these methods. The evaluation of our technological developments of teaching innovation will be considered from a double perspective: a formative and a summative evaluation. The criteria that we apply for the summative evaluation or results is both the quality of the technological environment from a technical, pedagogical and functional dimension (level of effectiveness for the achievement of the objectives set, the relevance of the learning, relation to the cost of tools) as the quality of the learning achieved.

From a formative evaluation approach, that is, with the aim of improving those aspects of the technological background of immersive environments that are detected weaker, we apply some criteria and indicators to be able to contrast and take the appropriate decisions.

The indicators and their objective measure would be satisfaction surveys on the quality of the environment, detecting strengths, weaknesses and suggestions for improvement, by the teachers involved in the innovative experience and by the students.

5. Results

The three-dimensional vision has become a crucial tool for the learning and understanding of many complex anatomical structures such as the orbit, enabling the introduction of novel techniques for the teaching and learning of anatomical models.

With anatomical reconstructions, all the spatial relationships of the orbit are better defined given its small and pyramidal size. Emphasizing on the small dimensions: entrance height 35mm, entrance width 40-45mm, medial wall length 40-45mm and 40 mm depth, 3D reconstruction facilitates its morphological comprehension. Its limits are defined by its 4 walls:

- The roof of the orbit is formed by the orbital plate of the frontal bone and the lesser wing of the sphenoid bone. It is located adjacent to the frontal sinus and has some important landmarks such as the supraorbital notch or the lacrimal gland fossa, which can be perfectly distinguished with this method.
- The medial wall is composed of the frontal process of the maxillary bone, the ethmoid bone, the lacrimal bone and the lesser wing of the sphenoid bone. It is also located adjacent to two sinuses: ethmoid and sphenoid. And some of the most important landmarks that are perfectly defined are the frontoethmoidal suture and the entry of the anterior and posterior ethmoidal arteries.
- The lateral wall is composed of the zygomatic and sphenoid bone. The superior orbit fissure (an important area from an anatomic point of view) can be viewed with the three-dimensional reconstructions and all the structures that passed through it.
- Finally, the floor of the orbit is composed of the palatine, maxillary and zygomatic bone. Here we can perfectly see some important and tiny structures such as the infraorbital groove and the infraorbital canal.

We try to create a tool to adapt the teaching of anatomy of the orbit to current educational trends. In this way we intend to complement the practical study of anatomy with a currently didactic support element: 3D anatomical reconstruction.

6. Conclusions

- The creation of three-dimensional anatomical models facilitates the study of the structures of the orbit for both students and medical practitioners thanks to the development of a practical tool that allows an approach to the study of the orbit dynamically.
- Nowadays it is important the integration of new technologies in the didactic field including medical training.

- It is clear that technological advances define the basis of modern education and offer us the possibility of using in the teaching of experimental sciences and health new resources that offer a more versatile strategy for the representation of knowledge, without losing the formation of the classical perspective.
- It is necessary to keep the teaching methods constantly updated.
- Some of the advantages of 3D reconstruction of the orbit are: visualization of each structure with its anatomical relationships, image enlargement, precise description, accessibility, morphological comprehension and improvement of spatial perception.

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CREATING MOODBOARDS WITH DIGITAL TOOLS: A NEW EDUCATIONAL APPROACH

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Abstract

The paper presents methodologies and first results of an educational experimentation (Brevi, Celi, & Gaetani, 2018) held at the Bachelor of Science in Product Design programme of Politecnico di Milano. In order to build a body of knowledge for Design freshmen, the experience had the aim of matching basic skills developed at the first year with the need of an autonomous approach required at the second year from Metadesign Studio throughout the tools for creating moodboards: a collection of images, colors and texture with the aim of representing emotions, feelings or ‘moods’, suggested by the design research. Moodboards have an important function in developing students’ ability to articulate their thinking. The enacted experimentation had the aim to present and test some practical tool for moodboards development. During the Methods and Instruments for Design course these skills have been developed through targeted exercises of awareness and techniques of photographic processing. To enable students to act in a more conscious way the educational approach has provided lessons with practical visual examples, a selection of on-line materials and step by step guide with suggestions.

Keywords: Metadesign, moodboard, digital tools, integration, photo editing.

1. Introduction

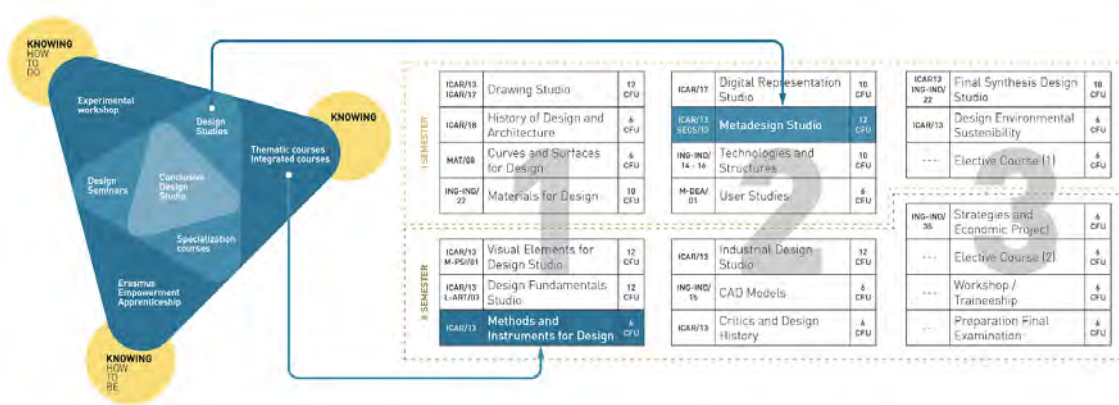
In order to manage a good design process, nowadays there is a strong need of quality both on theoretical knowledge and on technical skills. Design is the discipline of practicing through a reflective approach. Many of the courses offered at the first year at the design schools have the aim of building a common ground from both, theoretical (history, maths, materials) and practical perspective (draw, models, photography). When arriving at the second year often students have problems in facing design studios because these tools and the vocabulary that they have acquired are not yet a “design literacy”. The Metadesign approach, typical of Industrial Design courses at the Politecnico di Milano, can enhance the ability to tackle problems. In other words through Metadesign students may experience the whole design process, reflecting on it, organizing activities and explicating every cognitive step, finding, developing and internalizing their own design method.

The paper presents methodologies and first results of an educational experimentation held at the Undergraduate Product Design programme of Politecnico di Milano. In order to build a body of knowledge for Design freshmen, the experience had the aim of matching basic skills developed at the first year with the need of an autonomous approach required at the second year from Metadesign Studio especially in communicating pre-project phases and final story-telling. One of the main tools for Metadesign research are the moodboards: a collection of images, colors and texture with the aim of representing emotions, feelings or ‘moods’, suggested by the design research. Moodboards have an important function in developing students’ ability to articulate their thinking. Depending on the field and the state of project development, moodboards can provide a visual description of the overall state of the scenario, communicating its flavours and features in different ways. This visualization phase embody a key step toward a successful concept. The enacted experimentation had the aim to present and test some practical tool for moodboards development. Moodboards' creation requires aesthetic skills and sensibility that can be developed and trained since the early years of the Bachelor of Science in Industrial Design. During the course of Methods and Instruments for Design these skills are developed through targeted exercises of awareness and techniques of photographic processing. To enable students to act in a more conscious way the educational approach has provided lessons with practical visual examples, a selection of on-line materials and step by step guide with suggestions.

1.1. The Metadesign educational path in BSc in Product Design at Politecnico di Milano

At Polimi Design School the study plan is the clear expression of an “inductive approach” to teaching. The Product Design undergraduate program provide specific teaching in design, technological process and communications for industrial products. The courses are characterized by the mutual presence of theory and practice often integrated inside specific learning unit labeled *design studio*. In this way the project became the device to explore and learn theoretical issues, methods and tools in the mood of Schön’s reflective practice (Schön, 1983).

Figure 1. BSc in Product Design educational structure (on the left) and programme (on the right) at Polimi.



During the educational curriculum of BSc in Product Design, the course Methods and Instruments for Design is inserted in the second semester of the first year and the Metadesign Studio in the first semester of the second year. The course Methods and Instruments for Design is in continuity with the Drawing Studio and it provides educational content organized into two paths: an analog one, dedicated to sketching and freehand rendering and a digital one, aimed at visual communication for project representation of industrial product. The two paths takes place in parallel throughout the course in an interconnected way (Brevi & Gaetani, 2019). The Metadesign Studio provides a methodological path for the first design skills acquisition: techniques and research methods for understanding the product system, project context interpretation; and tools to elaborate and communicate the research till scenario building and concept generation. It provides both theoretical lessons and practical activities. The aim is defining and understanding the dynamics of the reference market - including users needs and behaviors- investigate the technological aspects and production methods related to the product under investigation and analyze the typological-formal values.

2. Metadesign

The term *Μετά*, in greek, means through, after, behind, between, and in times has acquired the meaning of beyond, further than, so, in the specific context of our discipline, Metadesign means *project of the project, organization of the project* and has to deal with the *initial discourse* with a *more general and more abstract* dimension. In the educational context Metadesign studio is maybe a unique example and has the purpose of giving a method of work and to trigger meta-cognitive abilities. Metadesign studio at Polimi School is the place in which student experiments all the design phases starting from the fuzzy front end to the generation of the concept. Like in a role game they experience several steps analysing the world of constraints and the world of opportunities (Schön, 1983): (a) identify problem during context analysis (problem finding); (b) organize and shape informations on the different levels (problem setting), (c) grasp more evocative and inspirational inputs to nurture the project (trend analysis); (d) translate inspirations into project ingredients (scenario building); (e) synthesize stimuli in a bunch of concepts.

2.1. Moodboards

Moodboards are valuable tools for the design process because they are potentially produced in a short period of time - the activity lasts 1-2 weeks - and they can often provide directions and insights for the following time-consuming stages of design development.

Along our study path for educating the Industrial Designers mood can assumes different roles.

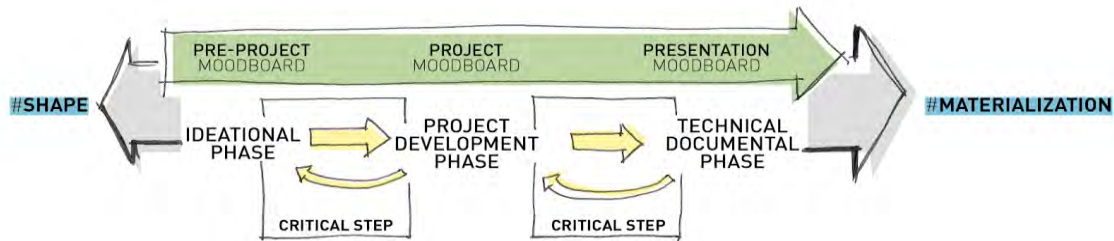
During the first year, developed in an experimental matter between the Methods Instruments for Design course and the Design Fundamentals Studio, moodboards are used to grasp and codify different

aesthetical qualities with the aim of developing the student sensibility in translating and juxtaposing material and immaterial qualities as well as build a coherent product's aesthetic.

During the second year in the metadesign studio the aim of moodboards is double. On the one hand, moodboard are used as pre-project tool - allowing the students to communicate and narrate properly the values and the flavour of product prior to its existence and even before the concept phase - and represents the way to formalize one of the most immaterial part of the project. On the other hand, at the end of the process, the can be the most valuable tool to represent the more consistent and visible part of the project which is built by CMF Color Material and Finishing (Trini Castelli, 1999) that define the project feature in detail.

To guiding the students along the moodboard generation process, faculty ask them to select evocative images to deepen user's personality but also to connect these elements to other products or situations that characterize the user's lifestyle and the connected Aesthetical choices.

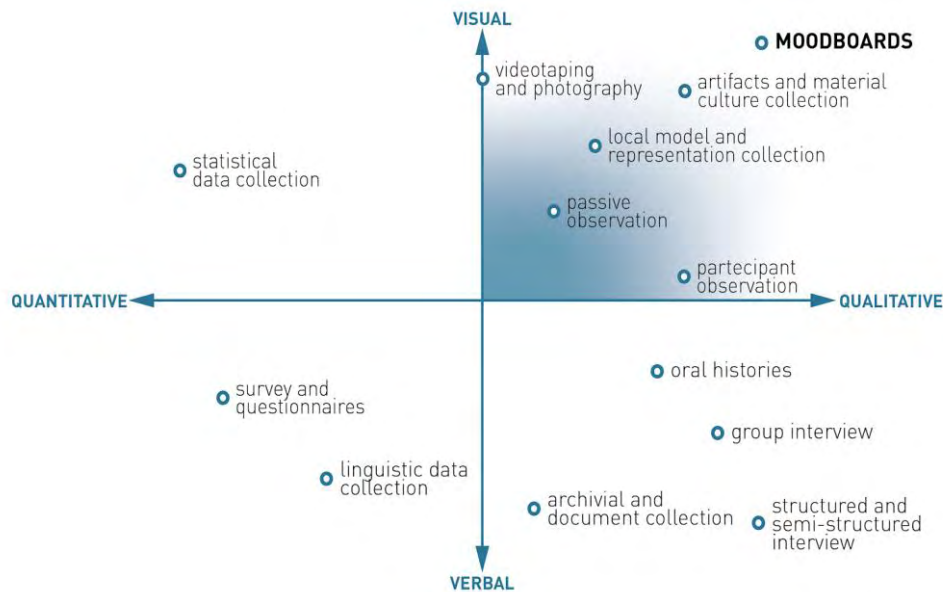
Figure 2. Product Design Process related to moodboard aims.



2.2. Principles of creating moodboards

Many studies on creative cognition suggest that creativity must be more than fun and wild imagination; realistic impact is also essential as the connection between reality, previous acquired knowledge and the capacity to creatively generate new knowledge. The use of visual notes, sketches, pictures, image gathering has a crucial role in the creative thinking performed by designers. Smith et al. (1995), analysing several authors approach to creative thinking, also assess that many studies converge on the fact that nonverbal processing, including visualization, often enhances creative insight. Visualization can be considered as a form of pre-invention as Finke (1990) epitomizes in his study on creative realism through a creative visualization research.

Figure 3. Moodboard positioning in the map of possible design research activities (actualized from Celi, 2011).



In this sense, Moodboards (Figure 3) represents the most qualitative and visual research that a designer may perform in the pre-project phase. They provide the design student with a rich background to nurture the creative process allowing the construction of a visual encyclopedia that offers inspirational

themes, moods, colors, finishing, materials, details, product references, historical stylistic references, etc. - ready to be used into the design practice (Colombi & Zindato, 2017). This practical tool is characterized by a strong visual dimension, the use of evocative images that are not “iconic” of the observed phenomena but that recall certain meanings using allegorical representations and narrative techniques. In this sense what seen from outside looks like a “collage” has a much more deeper meaning. Moodboard for example, are a way to build an aesthetic discourse preserving the historical path and image of a certain brand, or a valuable tool to transform something “old” through new qualities that respect the previous nature using assonance or contrast. they are a way to bridge past and future grasping seeds in present.

How design research can be expressed? When working on design topic, even if with a researcher approach, we need to use design tools. As Ochse suggests “*creativity depends on technique, although, of course it goes beyond it. Routines provide creators with the symbols and the language of their culture: they provide sensory motor skill for artists, heuristics for scientist, vocabulary for poets*” (Ochse, 1990).

The results of the explorations and the gathered materials in the form of pictures may be better exploitable if organized through graphic mind map or in wall of evidences highlighting colours, shapes and different outlines, grid or composite styles may also be useful to assign weight and values to topics, aesthetics and specific languages.

How can we help undergraduate design student in realizing such kind of board and to develop the required sensibility? One of the methods that Metadesign courses use is the so called game of the “what if”. When students come to the difficulty of expressing through images a certain value we ask them to imagine for example what kind of font could express that value? or if it was a famous painting, which painting would be? And if it was a pair of shoes? A car?... This kind of game helps student identify a certain lifestyle and connected products and languages. The next step is to convey them in a coherent representation.

3. Tools for moodboards creation

Methods and Instruments for Design course has been redesigned in the last two years to provide the basic skills on visual communication that will be request to students in other courses more focused on the design process, such as Metadesign Studio.

At the end of each lesson references for platforms and resources already available online are submitted to the class, after a selection on the basis of the quality required and to be aspired to, with the aim of deepening the topics covered in the classroom and of sustaining the students in the execution of the exercises (Gaetani, 2019). The exercises proposed aims to develop skills in creating moodboards; they are designed to develop the sensitivity of students to modify and create images, textures, patterns and color combinations (Sless, 1981). Initially, the students' ability to observe images is developed. Among the characteristics that students are asked to observe are: the interpretation of lights, shadows, colors, picture's cuts, figure/background ratio and focal length. In this phase they begin to create a collection of images that they pick up from topics expressed through adjectives, abstract concepts or other images of reference. The use of social media such as Pinterest allows the discovery of information through images.

Image editing software (e.g. Photoshop) is widely used for different purposes: (i) for the evaluation of image quality and its possible reproduction on physical media (printing) or digital media (screens); (ii) for editing; (iii) to create general or masked color variations as needed.

Vector image editing software (e.g. Illustrator) is used for creating simple boards and for creating custom textures and patterns.

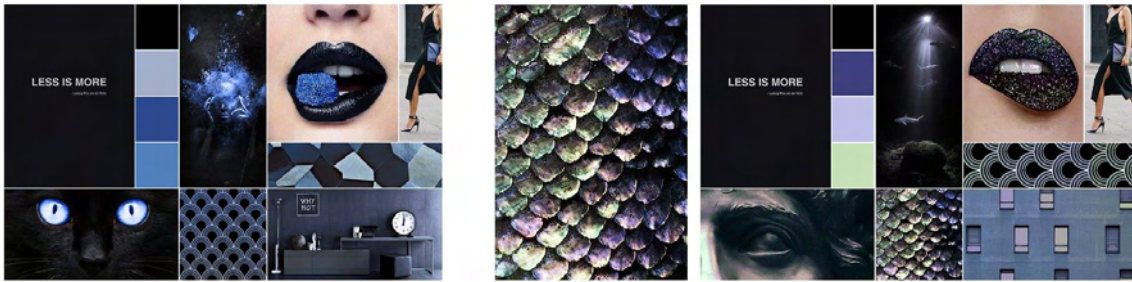
3.1. Case of study

The final moodboard exercise summarises all the previous exercises and it is proposed starting from a reference image provided by the teacher. In addition to the board already assembled, individual images are also provided to allow editing. The basic colours are essentially two: black (the main one) and blue/light blue (the secondary one). At this point the students have to select a reference image for a new moodboard that has the same “mood” as the one provided, but with a different chromatic range. The choice is a critical phase: the request for similarity puts them in front of a selection criteria and at the same time they must be able to distance themselves, without banalising the supplied moodboard.

During this step the students must modify the images or find new ones that are more appropriate and coherent with the chosen reference image. The result is, in fact, a new moodboard, which retains the original character, but stands as an evolution of the previous one.

The process is similar to the one that would take place during a project development phase in which the moodboard is itself as a tool for the project evolution and it changes according to the phases and the project definition.

Figure 4. Reference moodboard (on the left). Reference image (in the center) and modified moodboard (on the right).



4. Conclusions and acknowledgment

The main purpose of this work is to enhance the sensitivity of students in the choice and selection of images during the early stages of their academic career. In this way they will be autonomous and proactive in Design Studios that they will face during their studies, during all the design process.

At Politecnico di Milano Design School we are trying to improve the effectiveness of representation courses by innovation in teaching activities. The case study highlighted in this paper is part of an ongoing basic research project, funded by the Politecnico di Milano Design Department (“Dal Segno alla Forma/From Sign to the Shape” funded by FARB - University Fund for Basic Research). The results are the outcomes of the first two years of experimentation (the second is still in progress).

Besides, the course contents and its management satisfied the students themselves. Indeed, on the basis of the students’ opinions collected by the School of Design through a survey regularly done for every course just before the final exam, the satisfaction level has been effectively higher than the average of the School. In addition to the achievement of our expectations and to the score from the students’ survey, we collected informal feedbacks by the other teachers involved in courses held in the same semester and in the next semester. They felt to have found a class better than usual for the quality of the works (drawings and graphics) that students were able to produce and for their ability to select research materials with a higher aesthetic level and more relevant to the task they were carrying out.

The paper is the result of common research and findings undertaken by the authors. Nevertheless, section 1 was edited by Fausto Brevi; section 2 was edited by Manuela Celi; section 3 was edited by Flora Gaetani.

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5G TECHNOLOGY FOR AUGMENTED AND VIRTUAL REALITY IN EDUCATION

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Abstract

This paper deals with the adoption of 5G technologies in an educational context, focusing on activities based on Augmented Reality (AR) and Virtual Reality (VR). After introducing some scenarios using AR/VR approaches, we will describe the main characteristics of 5G and will provide an example of application in the field of music education.

Keywords: 5G, education, augmented reality, virtual reality, cloud infrastructures.

1. Introduction

In this paper, we will investigate the possibilities offered by 5G technology when applied to an educational context, covering different school grades, from primary school to higher education. With respect to current networking technologies, 5G introduces significant improvements in terms of a larger bandwidth, a more reliable service, very low latencies, and a higher density of devices. These features enable a number of innovative educational services with high-bandwidth and low-latency requirements.

In particular, we will focus on the application of augmented and virtual reality approaches to education, and specifically to lab activities.

Augmented reality (AR) allows enriching the environment surrounding learners with additional information. It is of interest in the field of education thanks to its support to knowledge sharing through the annotation of the environment. Furthermore, it allows supporting impaired students, who may integrate their learning experience through appropriate visual, auditory, and haptic interfaces. *Virtual reality* (VR) allows substituting the real-world environment with a virtual one. It is useful for lab activities where to manipulate objects in a realistic manner, and to conduct training immune from consequences of possible learners' errors. Both AR and VR supply users with immersive experiences, but they require an infrastructure able to provide strong guarantees of high quality 360° videos, low-latency two-way interactions, precise localization and orientation of the users. Thanks to 5G, these experiences might be enjoyed also, e.g., on personal devices, from remote and in mobility, thus unveiling a number of innovative educational scenarios.

The paper first analyzes the state of the art from a technological point of view, introducing the key features of AR and VR environments. Then, it presents a number of already-available educational experiences based on these technologies, and discusses both their didactic implications and their limits due to current technological constraints. Afterwards, an in-depth analysis of the potentialities of 5G technologies is conducted, through the study of supplied services and performance achieved by so far deployed trials, and through an investigation about cloud and edge infrastructures leveraged by 5G to manage content, correlated with the learning modality (in-presence vs. remote vs. in mobility). The study is used to derive the feasibility of AR and VR for both in-presence and remote learning, and to show how network advances can solve the mentioned issues and open new perspectives in education. Finally, the paper introduces some clarifying examples, in particular the application of AR/VR technologies to the field of music education.

2. Preliminaries on augmented and virtual reality in education

AR/VR may be applied to a large range of educational scenarios. In order to understand the impact that AR/VR can have on didactical activities, let us mention our previous experience with an undergraduate, three-year bachelor degree on Security of Computer Systems and Networks, offered also online from 2004/2005 on (Milani et al., 2014). Even if the online version proved to be a very successful

initiative in terms of number of enrolled students, results in exams, and final graduation grades (Scarabottolo, 2018), it suffers a significant limitation: the possibility of organizing synchronous interactive sessions with a student population mainly constituted by already employed people, having difficulties in connecting through a PC during working hours, thus requiring high bandwidth mobile connections. Besides, distance learning can present relevant limitations to hands-on experiments with physical devices. To overcome these issues, it would be useful to be able to reach students through mobile devices and to organizing activities like:

- broadcasting high quality content from the teacher to a population of around 100 students, simultaneously connected and able to interact in real time, also in a virtual environment;
- re-distributing to the above population high-quality materials produced by single students, in order to share and discuss the lab work carried on by each student in response to teacher's stimuli;
- driving the above population into some AR and VR immersive experience, such as the virtual access to a huge computer center where the teacher shows how to configure various devices.

As far as the last item is concerned, a *virtual* network of devices may be accessed by learners in order to configure them, to promptly react to a simulated attack of intruders, or to experiment in compromising them with a virus. Usually, these activities cannot be conducted from remote and with the mentioned high number of students because (i) a sufficient number of devices to allow each student to experiment with them is not available, and (ii) working students do not have at their disposal devices with which to experiment at their homes. VR would allow to overcome these problems, provided that bandwidth and latency requirements are met by the underlying network technology.

Several useful applications of AR/VR to other fields of education can be devised. In the field of History and Archeology, AR can supply additional information about, e.g., the alleged sculptor who created a statue in a museum that learners frame with their devices. VR can provide a 3D reconstruction of tunnels under an ancient Egyptian tomb, which cannot be completely visited by unauthorized persons. In the field of Botany, AR can give a learner the complete classification of a plant s/he photographs, along with images of alternative varieties of the same species. In Chemistry, students can play with 3D models of molecules, and perform without risk virtual experiments with dangerous substances.

So far, these experiences are hard to deploy due to the inability of the network of supplying high bitrates to a high number of students also in mobility, and with low latencies so that the immersive experiences are realistic. As an example, the LTE technology provides a bitrate of at most 150 Mbps in downlink, and with a few seconds of latency in case of high number of users.

3. 5G Technology and AR/VR

The standard document for 5G technology (3GPP, 2019) has been published in March 2018 by 3GPP and officially approved in the Plenary Meeting in June 2018. 5G technology promises to be able to support a number of both traditional and novel applications, such as device-to-device communication and Internet of Things (IoT). In this work, the focus is on 5G functionalities and performance that may ease the implementation of advanced e-learning services leveraging AR/VR. In this context, it is relevant also the capability of facilitating data sharing through the formation of extemporary classrooms anywhere by user devices. To these purposes, an analysis of existing – mainly European – 5G trials is included in order to assess the feasibility of e-learning platforms leveraging this technology.

As far as services are concerned, 5G includes both an ultra-reliable low-latency communications (URLLC) service, and an enhanced mobile broadband (eMBB) service (3GPP, 2019). URLLC aims at providing latencies no greater than 50 ms and reliability of more than 99.9% (Li et al., 2018). Hence, it might fit the requirements of AR and VR applications; though, it will be able to provide a data rate of up to 10 Mbps only. By contrast, eMBB (5G EVE, 2018) aims at providing ultra-high throughput so as to address the needs of users accessing multimedia content, ranging from real-time video streaming to online gaming with 3D 4K video; in particular, it should provide a minimum guaranteed bitrate to users of 100 Mbps. In (5G EVE 2018), the goal for Media & Entertainment applications is TV service for mobile users with throughput of 100-200 Mbps (with peaks of up to 250 Mbps in downlink) and latency lower than 100 ms. Hence, eMBB seems best suitable for AR/VR applications.

In order to assess the characteristics of 5G networks in real or realistic environments, a number of experiments are ongoing. For the Bari-Matera installation in Italy, the 5G-PPP consortium (The 5G Infrastructure Public Private Partnership, 2018) reports an obtained throughput of around 3 Gbps with a latency of about 2 ms (Fastweb, 2018). In this case, 5G is mixed with the LTE technology (Tim, Fastweb and Huawei, 2018); the migration towards pure 5G is scheduled for mid-2019.

The European 5G Observatory (European 5G Observatory, 2018) provides data from around 180 trials and experiments. From the data analysis, it seems that the most realistic measures have achieved 700 Mbps to 1 Gbps data rate in download; this test was conducted in Finland in urban area, hence possibly with a reasonable user density. Over all experiments, average data rates of 1 to 4.5 Gbps have been achieved for users' devices, and latencies < 5 ms. Since AR/VR applications require from 100 Mbps to a few Gbps of bitrate and a latency below 5 ms with a reliability of 99%, 5G performance would satisfactorily support the requirements of AR/VR, thus making it the elective technology to deploy innovative e-learning services such as those discussed in this paper.

The 5G technology presents two other characteristics of interest for education services. First, the 5G infrastructure will include cloud/edge platforms for purposes of network statistics collection and performance monitoring, radio channel reconfiguration according to application demands, and network management and optimization (Taleb et al., 2017). *Cloud computing* means moving data from peripheral devices possibly scarce in resources, through Internet, to groups of high-performance computers where processing may be more efficiently performed. *Edge computing* is a variant of cloud computing where processing is executed in servers on the border of the network, thus reducing network traffic and latency. This characteristic perfectly fits with the needs of AR/VR: on one hand, AR/VR contents are likely of large size, and they may be conveniently stored in a cloud node, rather than on users' devices, from where learners may download them, and where processing is performed guaranteeing the low latency requirements. This solution, jointly with 5G performance, adequately supports blended learning with learners partly in presence and partly remotely distributed across different locations, making the sharing of learning experiences through *cyber-spaces* possible. On the other hand, in the case of extemporary classrooms, one may think to use the teacher's device – appropriately equipped with memory and computation resources – as the edge server from which learners may download shared contents, and possibly upload their own data produced during the lesson for immediate sharing. This is related with the second relevant characteristics of 5G, namely, its multi-RAT (multi-Radio Access Technology) nature. This means that 5G will be able to cooperate with other radio technologies. For instance, WiFi is a license-free technology, and WiFi 802.11ac can reach, in real deployments, a bitrate of up to 200 Mbps. Two millimeter-wave radio technologies are envisioned to support multimedia applications in 5G networks, namely 802.11ad and 802.15.3c (Niu et al., 2015). These technologies supply very high bitrates, of the order of 3-5 Gbps, in small cells of 10 m radius. These technologies may be used for high-quality AR/VR content fruition and sharing for in-presence classrooms, with higher performance than that achievable via the pure 5G technology only, possibly at the expenses of a few compatible routers to connect more cells and enlarge the covered area. Furthermore, license-free technologies allow saving network traffic permitted from the chosen tariff plan.

4. Application of AR/VR to music education

A challenging field of application of AR/VR over 5G is music education. Music implies the exchange of multimedia information, at least in form of high-quality audio streams, in order to support professional applications; moreover, other data types are relevant in a music education context, including symbolic information (score, metadata, lyrics, etc.) and video streams, that are demanding in terms of bandwidth and latency requirements (Baratè et al., 2019b). All the mentioned data should be supported in order to provide a comprehensive environment for distance learning and distributed music performance.

Music education over the net intrinsically poses a number of constraints to network characteristics, and, on top of that, AR/VR approaches add other information layers (Baratè et al., 2018). For this reason, currently available technologies are not suitable for experiencing this kind of didactic activities. In the following, we will discuss some significant case studies that can take benefit from the adoption of 5G technologies.

A first application is enhancing musical or theatrical live shows through AR techniques to let participants investigate specific aspects of the representation. Examples may include labels that highlight the name and role of characters on stage, subtitles for the lyrics, insights about the plot, a score-following function, etc., as shown in Figure 1. If the traditional audience of a show could be distracted by additional information, the introduction of AR into an educational context can conversely improve the efficacy of the didactic experience, by engaging young people, raising their attention and providing user-tailored aiding tools. For instance, a visually impaired student could watch a high-contrast version or enable a sound description of the scene, a dyslexic child could be administered an alternative score with colored notation, and so on. Usually, the information associated to AR is not particularly demanding in terms of bandwidth, unless user's position has to be continuously tracked, processed by a service provider and finally sent back. In the mentioned example of labels over characters, labels are lightweight text information whose position is demanded to the AR visor; in other cases (e.g., when custom score

representation must be delivered to specific devices), network requirements are more demanding. In general terms, 5G performance is required when the behavior of a user-tailored application cannot be computed on the user's device, which has to get customized contents in the form of high-quality multimedia streams from a server. Network issues are made even worse when: i) multiple streams have to be delivered simultaneously to each user, such as in multi-layer approaches to music representation (Baratè et al., 2019a), ii) multiple users cannot share the same content since the experience is customized, and iii) fruition takes place in a crowded location or in mobility.

Figure 1. An interface that adds contextual and user-tailored information during an opera performance (Baratè and Ludovico, 2016).



A more advanced use case is the remote participation to live lessons. The idea is to provide on-line students, who are watching a music performance in real time via the web, with the possibility to rotate their head or even move in the virtual classroom. In this case, user-customized multimedia streams have to reconstruct the remote environment in terms of both high-quality spatialized audio and 4K spherical video. This kind of educational application requires also real-time interaction with the teacher and other peers. Once more, the availability of a network technology able to support real-time exchange of multiple media streams with little delay is fundamental, and, with respect to current technologies, only the expected performance of 5G are apparently suitable for this kind of experience.

In the abovementioned case study, the subject to watch was a real one, e.g., a student playing his/her instrument, captured through a dedicated system such as a 360-degree video camera. Nevertheless, the setting could also be virtual, say an unreal classroom where the teacher and one or many students, geographically distributed worldwide, are able to meet each other and interact virtually. With this kind of VR application, bandwidth and latency requirements are critical.

Finally, in order to explore the third characteristic of 5G, namely the support offered to a high number of devices in a small area, let us mention the case of many network-attached devices interacting in an educational environment to produce a collaborative music performance. For example, the considerable amount of continuous data produced by users' smartphone sensors could be gathered and collectively processed, thus influencing the behavior of a set of virtual instruments as a form of serious game.

Please note that the expected characteristics of 5G should support all the experiences described so far both in crowded places, like opera houses and concert halls, and in mobility, e.g. when commuting or travelling. These aspects may open up new, unpredictable avenues for future educational activities in music.

5. Conclusions

In this paper, we have discussed the possible adoption of 5G technologies in an educational context, focusing on activities based on Augmented Reality (AR) and Virtual Reality (VR) and providing some examples dealing with the evolution of both online academic courses and music education

experiences. We have described the expected characteristics and performance of 5G with respect to the requirements of AR/VR applications. Current network technologies prove to be unable to fulfil those requirements, while 5G will provide services that are expected to fit them, thus opening new perspectives in the deployment of innovative educational scenarios.

The real pervasive deployment of 5G will be able to show the effective performance of the technology, that may significantly differ from those extracted from currently existing trials, due to either high concurrency amongst users in the same cell or to the behavior of future hardware and software components.

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COMPARISON OF OPTIONS FOR SUPPORTING SOCIALLY DISADVANTAGED ROMA PUPILS WITHIN THE CZECH AND SLOVAK REPUBLIC EDUCATION SYSTEM

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Abstract

Efforts at securing equal treatment in education have involved developing various compensatory procedures focusing on people in disadvantaged situations. Within the Czech and Slovak Republics, support measures are generally designed for pupils from a demotivating social environment; pupils who live in deprived districts, pupils in families who do not want to or cannot focus on their children's needs, pupils from families with long-term or severe difficult relationships, pupils living in facilities under the protection of social services or educational facilities securing institutional or protective care. A large proportion of pupils who fall within this group are from the Roma community. Thus from a long-term perspective, support measures become one of the most important tools for alleviating the future impacts of Roma marginalisation, allowing for greater chance of social participation. Systematic steps supporting the education paths of Roma children and school success are subject to great expectations, and a lot of effort and endeavour is invested in them, alongside significant funds. In order to achieve a higher level of education for socially disadvantaged Roma children, co-operation is naturally required on the one hand from the Roma themselves who should be engaged in meeting targets and implementing education objectives, while greater involvement is also essential. In seeking "equal opportunities", Czech and Slovak education policy endeavours to create such support measures and compensatory procedures which can help to balance out difference in education chances. In our research project, we have endeavoured to utilise the tool of comparative analysis in our two selected countries which have not just the common features of history, social stratification and similar development genesis, but in particular social problems and the social protection system set up. In analysing and subsequently comparing specific documents and strategies at a national level, programmes and projects, we have endeavoured to find common and different integration tools which the education and political system in both countries are striving to achieve, and which through implementing they aim to balance out the chances for disadvantaged Roma pupils, thus increasing their chances for professional and social participation within society.

Keywords: *Roma minority, social policy, education.*

1. Introduction

The Roma are the largest and most vulnerable minority living in the territory of Europe. Their population is estimated at 6 - 12 million, two thirds of whom are living in Central and Eastern Europe. The Roma form the second largest ethnic minority in Slovakia, even if according to some sources, they are the largest minority (Šuvada, 2015). In the last population census of 2011, only 105,738 Roma admitted that they belong to the Roma minority, which is about two percent of the total population of the Slovak Republic. The population census is based on the voluntary identification of the citizens with one or the other nationality or ethnic group. Most of the Roma, perhaps due to ignorance or fear of subsequent discrimination do not voluntarily admit their Roma ethnicity and opt for another nationality category, citizens of Slovakia and Hungary (Vaňo, 2001). Upon application of the principle of, so-called, "attributed ethnicity", the structure of the Slovak population is diametrically different. In consequence of this, the outputs of the statistical estimates and sociological mapping differ while according to some sources, about half a million Roma live in Slovakia (Šuvada, 2015). The Atlas of Roma Communities 2013 (Atlas rómskych komunit 2013) (Mušinka et al., 2014) provides a qualified estimate of the number of Roma living in the territory of Slovakia at the level of 403,000 people, which is approximately 7.4 percent of the total population.

Similar problems exist in the Czech Republic concerning the citizens' public declaration of their Roma ethnicity. Nevertheless, according to the latest sources, The Report on the status of the Roma minority in the Czech Republic for 2017, the Roma are the largest ethnic minority living in the Czech Republic. The qualified estimates of the coordinators for Roma affairs state that in 2017 the Roma population in the territory of the Czech Republic was 240,300 people, which is 2.2 % of the total population of the Czech Republic. In terms of the socio-economic status of the Roma families, we can differentiate the social position of the Roma into two different groups. The first is the group of Roma who are integrated in the society and the second is the group of Roma who are socially isolated or are endangered by social isolation. For instance, concerning the Czech Republic, polemics exist to the effect that the ratio of the groups is about fifty-fifty.

Table 1. Comparative demographic development of the Roma in the Czech Republic and the Slovak Republic, 2011.

Age group	Roma population in the Czech Republic	Roma population in the Slovak Republic
0 to 14	23.2%	39.4%
15-64	73.6%	58.5%
65+	3.2%	2.1%

Source: Adjusted according to Šprocha 2014, p. 21, www.czso.cz

The educational level of the Roma in Europe is historically very low and to date, the difference in the education of the Roma and the rest of the population was not overcome mainly in the countries of the former, so-called, Eastern Bloc. Although education was a key element of the assimilation campaign in the period of the Socialist era of these countries and was seen as a tool of political and economic socialization, which would simplify the integration of the Roma, mainly in terms of employment. Nevertheless, in spite of these efforts, the foundation was laid for inequality in education, especially in terms of quality because many Roma were directed to schools outside the main educational stream system. The politicians in all the Member States of the EU are making an effort to solve this situation, nevertheless, the situations require the comprehensive and cooperative approach of many stakeholders and solution of the issue of the education of Roma students seems to be a long process.

2. Objectives/methods

The objective of the research was to identify the differences in support provided in the education of the Roma in the Slovak Republic and the Czech Republic. We focused on the specification of parameters in the area of support for the education of Roma students in the Slovak Republic and the Czech Republic. The main objective of the research is to map the issue of the education of Roma students in the Slovak Republic and the Czech Republic from the viewpoint of the support measures. The particular targets were:

- ✓ Map the current status and situation of the Roma in Slovakia and in the Czech Republic in the legislative documents.
- ✓ Identify the common features of the support measures within the scope of the educational policies.
- ✓ Capture the differences in support provided in the education of the Roma in the Slovak Republic and the Czech Republic.

We used the qualitative research methodology with application of multiple methods such as comparative analysis of documents, literature, action plans and legislative norms.

Table 2. Compared documents.

Czech Republic	Slovak Republic
Principles of the Long-term Roma Integration Concept up to 2025	Comprehensive program for development of Roma Settlements 2002-2006
Roma Integration Strategy up to 2020	Government policy concept of the SR in the integration of Roma communities 2006
The development of Roma education in the Czech Republic, Evaluation of the situation in the Czech Republic and the Strategic Guideline of the Roma Educational Fund, 2007	The medium-term concept of the development of the Roma national minority in the Slovak Republic - SOLIDARITY-INTEGRITY-INCLUSION 2008-2013 (SOLIDARITA-INTEGRITA-INKLUZIA 2008-2013)
Concept (project) of timely care for children from the socio-culturally disadvantaged environment in the field of education, 2005	The actions plans of the strategy of the Slovak Republic for integration of the Roma up to 2020
Action plan of inclusive education for the period 2016-2018	Concept of integrated education in the Slovak Republic

Strategy of the educational policy of the Czech Republic up to 2030+	National Programme for Development of Training and Education 2018-2027
Action Plan of measures for the education of Roma children, pupils, students for the period 2015-2017	Government document “Learning Slovakia (Učiace sa Slovensko)”
Report on the fulfilment of the Decade of Roma Inclusion 2005–2015	Step by Step and the Programme of Education and Social Justice
Educational situation reports (Zprávy o stavu školství)	Educational situation reports (Správy o stave školstva)
Decree No. 27/2016 Coll., on education of pupils with special educational requirements and gifted pupils, as amended under Decree No. 270/2017 Coll., Decree No. 416/2017 Coll., and Decree No. 244/2018 Coll.	Act No. 383/2013 Coll., on contributions upon birth of a child and contribution for more children born at the same time
Act No. 117/1995 Coll., Act on State Social Care	Act No. 561/2008 Coll., on children’s social allowances
	Act No. 627/2005 Coll., on contributions to support of additional care for children
Act No. 108/2006 Coll. Act on social services	Act No. 448/2008 Coll., on social services
Act No. 359/1999 Coll., Act on the social and legal protection of children	Act No. 305/2005 Coll., on the socio-legal protection of children and social guardianship
Act No. 561/2004 Coll., Act on pre-school, primary, secondary, higher vocational and other education (The School Act)	Act No. 596/2003 on the State Administration in Education and Educational Self-Government
	<u>Act No. 544/2010 Coll., on subsidies for food</u>

3. Results

Below, we state the comparison of the most significant measures for support of the education Roma children in both countries:

Table 3. Measures for support of the education Roma children - common features.

Czech Republic	Slovak Republic
Special educationalist in the schools	Special educationalist in the schools
Assistant educationalist	Assistant teacher
Zero year	Zero year
Social scholarships	Social scholarships
Merit scholarships	Merit scholarships
Community Centres	Community Centres
Assessment and testing of educational capacity	Assessment and testing of educational capacity
Grants under the project - School lunch for children from deprived families	Grants for free lunch in schools
Contribution to school aids	Grant for purchase of school aids

Table 4. Measures for support of the education Roma children – differences.

Czech Republic	Slovak Republic
Absence of the position of a social educationalist	Special educationalist in the school
Obligatory pre-school education	Pre-primary school education of children is not obligatory
Child allowance depending on the size of income	Family allowances for all children without testing on the revenues of the parents
75 percent discount on the railway and bus transport fares for students up to age of 26	Free railway transport

The Roma are recognised as a national minority in the Constitution of the Slovak Republic, Czech Republic and international documents of the Council of Europe ratified by the Slovak Republic and the Czech Republic guarantee the right to education in the mother tongue. In the case of the Roma minority, however, the exercise of this right was complicated by the fact that the Roma language was not standardized until 2008. A further persisting problem remains the acute deficiency of qualified teachers of the given subjects and deficiency of teaching texts and materials. The situation is the same in the Czech Republic. The greater majority of the Roma population is for this reason educated in Slovak and Czech schools, which do not teach the Roma language and literature. In the education of these pupils, it is necessary to realise that they are members of the socially weakest and backward classes of the population - in the process, the term “pupils from the Marginalized Roma Communities (hereinafter “MRC”) is used, or pupils from the “Socially Disadvantaged Environment (hereinafter “SDE”)”. The problem continues to be the unclear use of this definition in practice. A similar intent of this institute was for a Roma assistant teacher to work with the pupils from the SDE/MRC, at best from the given community that is conversant with the Roma language and local dialect. Currently, only a minimum number of the assistant teachers (pedagogical assistants) master the Roma language.

In the rest of the years, the instruction of obligatory pre-school education was discussed in Slovakia, mainly in relation to ensuring the school attendance of Roma children. One of the targets of the Draft National Training and Development Programme known as “Learning Slovakia” is guaranteed

pre-primary school education for all children from the age of 3. Pre-primary school education shall be obligatory from the age of 5 and shall be free-of-charge. This measure was implemented on the basis of the good experience of other European countries. In an effort to ensure the participation of all children in pre-school education, most of the European countries made pre-school education free-of-charge and obligatory at least for one year prior to entering primary school (Austria, Bulgaria, Latvia and Switzerland) (European Commission/Eurydice/Eurostat 2014, 40). The Czech Republic introduced obligatory pre-school education from the age of 5 in September 2017 (European Commission 2016).

Concerning the Roma children, the problem is also in the inadequate network of nursery schools in the localities where they live. In comparison with other countries, we rank last in this area and this measure seems to be fundamental within the framework of support for education.

The second significant institution, which should help the pupils from the SDE, is the so-called “Zero Year”. The minimum number of pupils in the zero-year class is 8 and the maximum is 16. For each pupil assigned to the zero year, the school shall receive 200 % of the normative. For many teachers, this is a significant and sensible tool for the pupils from the SDE to catch-up in the social and cognitive areas with children growing up in a normal environment so as for them to enter the “educational mainstream” as soon as possible. The pupils from the socially disadvantaged environment are entitled to support from the Ministry of Labour of the Slovak Republic in the form of a grant for meals, aids and also a motivational allowance for the child’s regular school attendance. (Regional research of marginalize Roma, 2011, UNDP/World Bank)

It is further necessary to support study at secondary school and universities which is successful only thanks to scholarships, which may be merit or social in character. Part from this, the State supports the education of Roma children also by means of recurrent allowances such as family allowances, one-off grants for purchase of school aids, free lunch. Apart from this, the support of community social services is being promoted - community centres, which focus on the reflection of the opinions or needs of the clients. The involvement of the community in any development processes is a generally accepted criterion and the condition for participation with objective to involve the participants in the identification and solution of social problems and thus improve the quality of the life of individuals and the society. Involvement of the family in the education of small children is however acknowledged as a fundamental right and duty (OECD 2012, 2).

4. Conclusions

The Slovak educational system shall in future require comprehensive reform, which shall be based mainly on:

- Rapid increase of the training of children from the MRC from the age of 3 in nursery schools - significant investments in pre-primary training of children and education of children from the MRC together with support of the programme for child care at an early age;
- Processing and implementation of the desegregation standard in the education (together with the indicators and subsequent monitoring of segregation), which should respect the principle of social interaction of the Roma and non-Roma children at the highest possible quality of education and achievement of the learning outcomes, with the exception of the Roma national school system and localities with a majority representation of the Roma population (the condition for this, however, remains the observance of the principle of top quality in education and achievement of the learning outcomes);
- Processing of specific models of educational inclusion for various situations and target groups with the ambition to create a general model of an inclusive school. During the creation of the inclusive educational environment, it is necessary as a priority to take into consideration the personalities of the pupils who come from the environment of the marginalized Roma communities. A significant document is the National Training and Education Development Programme, which proposes the modernisation of the methods applied in the battle against negative social phenomena (e.g. with prejudices of racist, xenophobic and discriminatory features in the school environment) based on modern concepts, such as, training for global citizenship. Global citizenship is a significant component of the UN Agenda 2030. The Ministry of Education of the Slovak Republic is the coordinator of training for global citizenship within the framework of the national programme titled “Agenda 2030” and development of the given methodology.

Concerning the Czech Republic, a problem that is frequently mentioned in connection with the education of Roma children is the absence of the teaching of Roma History and Culture within the scope of the syllabus at primary and secondary school, whereas it is just the knowledge of Roma culture and history that is the basis for merging of the majority society with the Roma minority. According to the Roma Minority Status Report in the Czech Republic for 2017, the teaching of Roma culture and history with special regard to the holocaust period, which at international level in 2017 disturbed even the Ad hoc Committee of the Council of Europe for Roma Affairs with the outcome that this topic is not adequately

reflected in the European countries. A further problem is lack of an adequate number of Roma assistants in the schools. These assistants are also missing from schools with a higher ratio of Roma pupils. At the same time, communication and cooperation on the part of the school - pupil - parents - other institutions is poor. It is mainly necessary within the scope of communication with the parents to place emphasis on emphasis of the importance of education for the future of their children. Efforts at balancing of the chances of the Roma pupils with the chances of the pupils who come from the majority society are being made in the educational systems of both countries through various integration tools. The support measures are generally intended for the pupils from a highly uninspiring social environment, pupils who live in, so-called, deprived areas, pupils in families that do not want or cannot pay attention to the needs of children, pupils from families with long-term or seriously disrupted relationships, pupils located in social protection and school facilities for the purpose of institutional or protective care. In all, the objectives of all concepts in the area of education are focused on the support of the educational success of socially disadvantaged Roma children in the main educational stream, for support upon achievement of qualifications and hence the creation of conditions for better engagement in the labour market, whereas the primary vision is:

- for the Roma children to achieve the same average education as non-Roma children,
- for the educational structure of the Roma to be close to the educational structure of the non-Roma population,
- for the Roma children not to be “over represented” in the educational programmes with lower educational ambitions
- for the gifted (talented) Roma children to be supported by the State and society in their ambitions to achieve higher education.

On the basis of the above-stated major visions, we subsequently earmark further proposals and measures for adoption:

- ✓ Support of informal education - school clubs combined with tutoring
- ✓ Study materials in the Roma language
- ✓ Alternative forms of teaching
- ✓ Development of community social services - field staff to work with the families
- ✓ Provision of free capacity in schools, construction of nursery schools in the communities
- ✓ Provision of supervised bus transport to school free-of-charge

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WORKSHOPS

EFFECTIVE INSTRUCTION IN VIRTUAL HIGHER EDUCATION: ENSURING COGNITIVE, SOCIAL, & TEACHING PRESENCE

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Abstract

Considerable research on effective instruction in the classroom exists. Yet, very little is known about the extent to which instructor presence (cognitive, social, and teaching) is related to effective online instruction. Low attrition rates and high retention, engagement, as well as student- and instructor- success rates are critical aspects of an effective virtual classroom and program of study. However, without adequate cognitive, social, and teaching presence in the online classroom, student- and program- success rates likely suffer. This workshop is designed to improve participants' knowledge of these constructs and share tools, as well as tips, for successful implementation. Armed with this knowledge, participants will be able to design and instruct online courses integrating best practices in cognitive, social, and teaching presence in order to bring their teaching to the next "level" in terms of effectiveness and enjoyment for students and instructors alike. Key points of this workshop entail a literature review, definitions and examples of cognitive, social, and teaching presence, tools and tips for integration, effectiveness highlights, presenters' experiences with design and teaching aspects, and participants' experiences, concluding with Q&A. This session will be conducted by full-time university faculty members who played an integral part in the design of seven self-paced instructor presence modules, which were disseminated to all faculty members aligned with the College of Health, Human Services, and Science at Ashford University. Following the lecture portion of this workshop, participants will be encouraged to exchange experiences and ask questions. This workshop is intended for faculty, course developers, and leaders of educational institutions with online course offerings. There is no limit for the number of participants.

Keywords: *Instructor presence, cognitive presence, social presence, teaching presence, instructor effectiveness.*

1. Introduction

Online learning has gained more attention in the area of higher education (Ward, 2018) but graduation rates remain under par (Jaggars, 2012; Xu & Jaggars, 2011). It is therefore imperative to develop and apply practical strategies to enhance student success and ensure thriving online classrooms in the future.

While various factors related to presence have been examined, such as video design (Fiorella, Kuhlmann, & Mayer, 2018), student-centered learning (Peneva, Djambazov, & Keremedchiev, 2017), student motivation (Cole et al., 2017), student satisfaction (Ladyshevsky, 2013), and strategy identification (Watson, Watson, Janakiraman, & Richardson, 2017), noteworthy gaps in existing research appear to exist. For instance, sparse research is available pertaining to learning outcomes when the cognitive-, social-, and teaching- presence domains were effectively applied. Furthermore, no scholarly sources are available that assess the concrete personality characteristics of instructors who apply effective instructor presence strategies. The same is true for the effectiveness of self-paced modules that focus on developing instructor knowledge about presence.

This workshop will entail the examination of the three domains of presence, cognitive, social, as well as teaching, based on the Community of Inquiry (COI) model (Garrison, Anderson, & Archer, 2001). Strategies that can be applied by online instructors and tips for success, based on the presenters' quantitative and qualitative study findings, will be covered and shared with all participants.

2. Brief review of literature

Learning via online modalities is continuously expanding; however, student success appears to be a growing opportunity for improvement for administrators and instructors employing e-learning options. Existing research suggests that effective instructors are intentional about presence, promote interactivity, and allow students to do most of the work (Pelz, 2004) but to foster success, the instructor's role must be carefully examined and instructor development should occur (Bonk, Kirkley, Hara, & Dennen, 2000; Hewett, 2015; Maor, 2003; Rose, 2012). Institutions have room for improvement in

terms of fostering instructor development (Lehman & Conceição, 2014; Terantino & Agbehona, 2012) and increasing instructor knowledge on successful behaviors when facilitating online courses to enhance knowledge and learning (Goodyear, Salmon, Spector, Steeples, & Tickner, 2001; Revere & Kovach, 2011; Illinois Online Network, 2015).

Various studies have examined strategies pertaining to the traditional classroom; yet, many variables are different in the online platform (Bork & Rucks-Ahidiana, 2013; Relan & Gilliani, 1997). As instructors often lack expertise in developing, implementing, and facilitating online courses effectively, it is essential to equip instructors with effective strategies and tools to foster student engagement with subject content, peers, and the course instructor (Revere & Kovach, 2011; Paquette, 2016).

3. Research questions and hypotheses

Based on apparent research gaps, this team focused on answering the following research questions, prior to designing the workshop.

1. Will virtual instructor personality characteristics affect the level of presence applied to courses?
2. Will virtual instructor work load (i.e., number of students in the course, number of concurrent courses being taught, teaching in multiple higher educational institutions) affect the level of presence applied to courses?
3. Will the effects of consistent application of all three areas of presence, as defined by The Community of Inquiry (COI) within the online context, improve retention and success rates?
4. Will instructor perceptions affect the level of applying the COI presence variables within their courses?
5. Will student achievement improve in the courses that apply all three areas of presence consistently versus those that do not?
6. Will the dissemination of training modules, designed specifically for online instructors, improve the teaching practices applied?

The subsequent hypotheses were used as a base for this study:

1. Retention and student success will be improved in online courses where all three components of presence are consistently applied by the instructor.
2. Instructors completing specialized training in the application of Instructor Presence will increase these applications within their courses.
3. Personality characteristics will affect the level of application for at least one of the three areas of instructor presence.

4. Methods

Beginning 2017 through 2018, a series of seven self-paced interactive learning modules were created and disseminated to faculty at Ashford University. At the start of this dissemination, a consent form, for those wanting to participate in the formal study, was collected and archived to be used once all modules were available. The study followed OHRP guidelines (<http://www.hhs.gov/ohrp/>) for protection of human subjects.

A correlation matrix was constructed to ensure the selection of performance measures that do not overlap (i.e., capture the same variance). Regression analyses were then conducted on the selected measures to assess the extent to which specific personality characteristics predict performance. Triangulation method, using two to three researchers from this team, and a rubric assessment were used to evaluate the applications within designated courses. The findings have been assessed against the quantitative findings to better determine the potential student outcomes related to applications of instructor presence. This mixed method project allowed this research team to more effectively triangulate the findings.

5. Discussion and conclusions

At the time of this paper submission, the research analyses are not yet finalized; however, concrete outcomes and recommendations for future research and practice will be discussed in the workshop. The main points of this workshop will encompass key literature review findings, definitions and examples of cognitive-, social-, and teaching- presence, recommendations for integrating success strategies in the online classroom to improve effectiveness and enjoyment among learners and instructors, and presenters' experiences on design and teaching aspects. Lastly, workshop participants are invited to share their own experiences and ask questions.

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CULTIVATING SELF-BELIEF IN STUDENTS

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Abstract

The two presenters have very different backgrounds. Gavin Jinks is a senior lecturer in social work. Denise Harber has been a teacher, head-teacher and school adviser. Both have concluded that the ability to create self-belief in a student group, be they primary school pupils or students in higher education, is fundamental to their achievements. Gavin has been the project leader for an award winning student mentoring project on the BA Applied Social Work at the University of Derby. Denise Harber was an adviser on a team that designated a primary school in the south of England as a 'cause for concern'. She then took on the role of Head-teacher and led the school to be designated as good in a subsequent Ofsted inspection. Underpinning both of these pieces of work was a commitment to develop the self-belief of the students. This was seen as being a fundamental building block in bringing about real change in the achievements of both the students and the pupils concerned. This workshop will explore how Gavin and Denise went about these pieces of work. They will explore the transferability of these ideas to other educational settings and situations, particularly settings with traditionally low academic engagement. They will also be encouraging participants to consider how it might be possible for them to cultivate a culture of self-belief in their own students/pupils.

***Keywords:** Self-belief, cultivate, develop, fundamental, create, engagement.*

1. Introduction

My name is Gavin Jinks. I am a Senior Lecturer in Social Work at the University of Derby. I have overall responsibility for Year 1 of the programme, as Year Tutor. In 2015 I initiated a student mentoring and peer assisted learning project in order to increase the level and varieties of support available to Year 1 students. The progress and development of this project has taught me much about the transformational power of self-belief, not least it has taught me about the power I have to influence the self-belief of students within my cohort. I am here because I want to share some of my findings and to encourage you to consider if and how you might apply these ideas in your own settings.

Denise Harber has been a teacher in primary schools in four UK local authorities, including a London borough. She has been a head-teacher in two schools, and a local authority primary adviser in two local authorities. Throughout her career Denise has maintained a keen interest in the professional development and training of teachers. She has been an Ofsted inspector and an accredited School Improvement Partner and is now an independent education consultant. She works with senior leadership teams and governors on school improvement matters and performance management. She is also the Chair of Governors in a primary school near her home in West Sussex.

Denise will briefly summarise her belief that to be successful in any endeavour individuals have to commit to the objective in two ways, they have to want it, so it has to be relevant and important to them, but they also have to believe that they can be successful. She believes that too many youngsters slip through the net in school and don't achieve their full potential because of their lack of self-belief and the paucity of their own aspirations and because education policy is and has always been largely focused on the practical aspects of teaching. When attempting to tackle the problem of underachievement policy makers usually concentrate on the content of lessons and the means of delivery, or they deal with questions about how to compensate for the perceived deficits of learners. Rarely do the suggested approaches to change address the disposition of learners, in particular their confidence and aspirations or, more accurately, the absence of these.

2. Self-Belief

Back in 1965 Rosenthal used some rather controversial methods to demonstrate the extent to which the expectations of students could impact on their performance. (Rosenthal, R & Jacobson, L. 1992). If teachers were told that students were intelligent and high performing the students produced results which reflected those beliefs. And vice-versa if teachers were told that students were less intelligent and low performing. This and other pieces of research have consistently demonstrated that our surroundings are absolutely crucial to our success.

It's not our boundaries that determines our performance, it's what we believe these boundaries are. (selfication.com)

As Henry Ford said *"Whether you think you can, or you think you can't – you're right."*

2.1. Exercise 1

Identify at least one instance where you have seen the positive impact of self-belief and the negative impact of lack of self-belief in your own life. To ease you into this we will both give you examples from our own lives. You have 2 mins for this.

Followed by very brief feedback.

2.1.1. Application in schools. It is Denise's view that effective teaching has to be underpinned by good judgement. This involves collecting and analysing information about learners' interests and expectations, their prior attainment and capability and any barriers they have to learning in order to identify what they are capable of, without putting caps on their achievement or nurturing inaccessible goals and dreams. It is then about empowering learners by elevating and sponsoring their aspirations and enabling them to acquire the knowledge, understanding and skills they need to achieve what they aspire to.

In the workshop she will outline the action she took as the Headteacher of a primary school, situated in a socially and culturally diverse community, to develop the self-esteem of pupils and teachers in order to raise individuals' personal aspirations and school standards.

2.2. Exercise 2

Denise will invite workshop participants to reflect on the precursors of some of their own successful learning experiences. She will also make reference to some of the ways her thinking has developed recently through observing teachers in a small village school using practical strategies, influenced by 'Growth Mindset', to develop children's independence, and resilience. (mindsetworks.com).

2.2.1. Application in higher education. Much has been written about the value of student mentoring and peer assisted learning projects in higher education. Andrews, J & Clark R (2011) have summarised much of this work. Collier, P.J. (2017) has summarised the benefits from an American H.E. perspective. Having been persuaded about the potential of such projects I introduced the idea on the BA Applied Social Work at the University of Derby in 2015. In the first year I recruited 5 student mentors to add a layer of support to that which was already available to Year 1 students. Fast forward to 2018 and we now have 42 mentors including mentors who are now employed as social workers. The support is now provided to students on all 3 years of the degree programme. Support is provided in the following ways:

- Each group has a student led Facebook group where support and advice can be sought from mentors in the year above. The Year 1 group is open from the summer before students commence their studies.
- Student induction is largely produced and presented by mentors.
- Each student in year 1 and 2 has a named mentor who they can contact for advice and support.
- Mentors who have excelled in particular modules help deliver assignment guidance to students undertaking the same modules the following year. Mentors who have developed particular skills and knowledge in certain fields assist with teaching in relation to their specialist knowledge.

The project is underpinned by partnership between myself and the mentors. All decisions about the development of the project are made jointly. A key theme has been that mentors are trusted to make decisions and to take responsibility for their input. Student feedback regarding the project has been overwhelmingly positive from both mentors and mentees. I have a huge number of emails from mentors who have said that being asked to be a mentor and being trusted to undertake roles within the project has made a huge difference to them personally and as a developing professional.

2.3. Exercise 3

Identify an instance when you have seen the positive impact of one person putting faith in another. 2 mins plus 1 min feedback.

2.4. Exercise 4

Work in groups of 3-5 people from broadly similar work settings. Overall aim of this exercise is for participants to produce a plan of action for cultivating self-belief (10 mins):

- At least 3 ideas to take back to their workplace;
- What they hope the introduction of these ideas might achieve (Min 3 outcomes);
- 3 specific immediate steps to be taken as soon as they return to their workplace.

Summing up (3 mins)

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SMOOTH TRANSITIONS: ASSESSMENT AND ADVANCEMENT OF LEVEL 2 WRITING STUDENTS AT HOUSTON COMMUNITY COLLEGE

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Abstract

Houston Community College's Intensive English program was started by Maria Bazan-Myrick in 2012 and operates at nine campuses around Houston that sometimes educate upwards of 12,000 ESL learners per academic year. It consists of five levels, the first three of which (Intro, Level 1, and Level 2) are taught by Continuing Education-Languages instructors. The program received the Exemplary Program Award from the National Council for Continuing Education & Training in 2013, and was awarded for being the top performer at HCC in 2017. Ongoing assessment of both students and the practices of the program has been vital to its success, and the idea for this workshop originated from a student learning objective (SLO) data analysis of students who took Level 2 courses during the Summer 2018 semester. The purpose of this workshop is to foster discussion about building a strong writing foundation in an ESL curriculum. By the end of this workshop, participants will be able address questions about how to build the curriculum, how to meaningfully assess student performance, and how to promote development of students' writing skills.

Keywords: *Writing, evaluation, data analysis, ESL.*

1. Opening exercise (slides 2-3)

This workshop will be conducted via PowerPoint. The presenters will first guide the participants through a calibration activity.

1.1. Calibration activity (slide 2)

Participants will be presented with writing samples produced by various students who have taken Continuing Education-Languages courses at Houston Community College and copies of the rubric that instructors in the program use to grade students' writing samples. Using the rubric and their own ideas about quality writing, they will be given a few minutes to evaluate each sample and assign it a level.

1.2. Calibration activity review (Slide 3)

The presenters will reveal the levels that they assigned to each sample. The participants will be given the opportunity to identify the key differences between each sample and discuss whether or not they agree with the presenters' assignments.

2. SLO analysis (slides 4-6)

The presenters will share and review results of a student learning objective (SLO) data analysis that focuses on the writing test results of a cohort of 97 Level 2 students who took summer Continuing Education-Languages courses.

2.1. Background (slides 4-5)

The presenters will explain the methodology, scope, and limitations of the SLO analysis to the participants.

2.2. Results (slide 6)

The presenters will share and review the results of the SLO analysis with the participants. The most noteworthy results are listed in Figures 1 and 2 below.

Figure 1. Grades Received by Site.

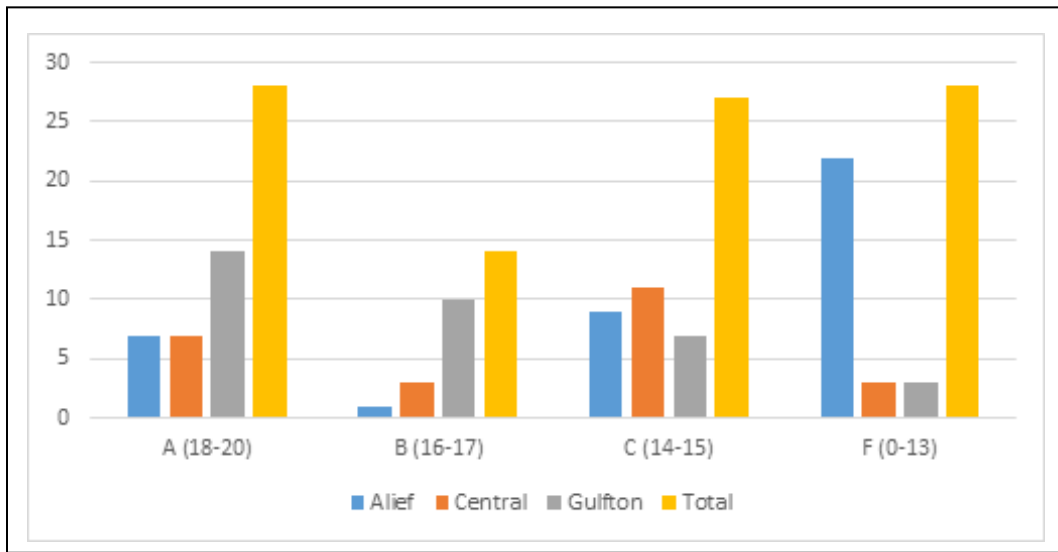
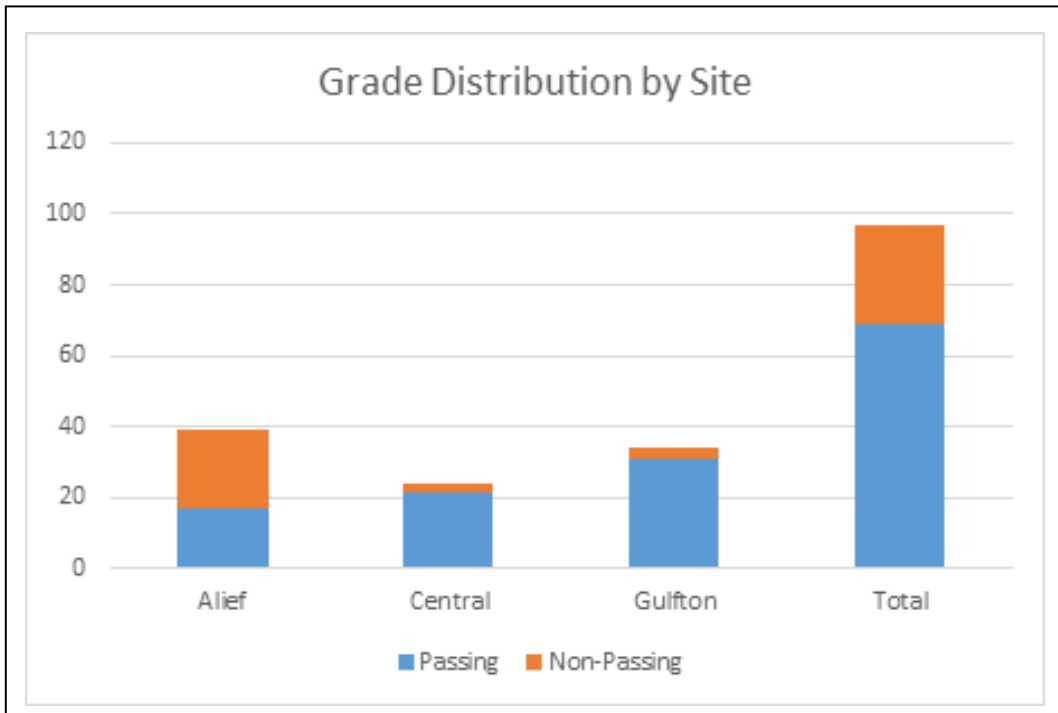


Figure 2. Passing and Non-Passing Grades by Site.



3. Conclusions (slide 7)

The presenters will provide a list of suggestions for improving student performance in areas where numerous errors were observed, as detailed in Figure 3 on the next page.

Figure 3. Suggestions for Improving Students' Scores.

Spelling	<ul style="list-style-type: none"> • Focus on teaching phonics in Listening & Speaking classes • Teach common spelling rules • Teach word forms and suffixes that change the form of words (e.g. -tion, -ment, -ize)
Transitions	<ul style="list-style-type: none"> • Focus on teaching conjunctions and the purpose of different transition words/phrases • Emphasize importance of transitioning between different ideas in paragraphs and essays
Verb forms	<ul style="list-style-type: none"> • Focus on the proper situations in which to use various verb tenses • Focus on moods (e.g. subjunctive) • Emphasize the proper use of gerunds and infinitives
Prepositions	<ul style="list-style-type: none"> • Stress meanings and usage of common prepositions
Capitalization	<ul style="list-style-type: none"> • Stress capitalization of proper nouns and significant words in names and titles
Punctuation	<ul style="list-style-type: none"> • Stress proper placement of commas after dependent clauses and full stops (or semicolons) after independent clauses
Outlines	<ul style="list-style-type: none"> • Add outline to rubric and require students to make one before writing anything more involved than a journal entry

4. Discussion & evaluation (slide 8)

The presenters will share a list of outstanding questions raised by the SLO analysis and the current evaluation standards that they will discuss with the participants.

The presenters are aware that the structure of the program in which they teach is very different from those of other higher education institutions. In sharing this information, they hope to elevate awareness of the diversity of ESL program structures and collect and share information that will help HCC and other institutions improve student writing and assessment processes.

References

No references were used. This was practical analysis of student data as given by teachers.

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