EDUCATION AND NEW DEVELOPMENTS

2019

VOLUME II

Edited by
Mafalda Carmo

Education and New Developments 2019

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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 II 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 second volume focus in the main areas of TEACHING AND LEARNING and ORGANIZATIONAL ISSUES.

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?

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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 Autonoma University, Barcelona and the British University in Dubai.

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

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RELATIONSHIP BETWEEN ITEM DIFFICULTY LEVEL
AND ITEM DISCRIMINATION IN BIOLOGY FINAL EXAMINATIONS

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Abstract

Item analysis is a useful tool for a number of reasons, including the assessment of the quality of the test items. It indicates how difficult each item is and its ability to discriminate between the better and poorer students. The aim of the current study was to examine the quality of Biology Advanced level Paper 1 final examination and to see if there was any relationship between the item difficulty index and the item discrimination index values in these examinations. The data involved scores obtained by post-secondary students attending a public institution between 2014 and 2018. Final examination scores of a total of 1311 post-secondary students aged 16-17 years were analysed. Two different discrimination values were calculated, discrimination index and discrimination coefficient, to find which is the more appropriate to discriminate between high and low achievers. Both were appropriate, however the coefficient gave more positive results. No negative discrimination values, indicative of a 'defective' item, were recorded when using the two different formulae for discrimination. The correlation between the indices was investigated. Neither the discrimination index nor the discrimination coefficient was correlated with the difficulty index. Only the discrimination index was found to be significantly correlated with discrimination coefficient (0.563; P=0.000). The overall difficulty level was 'moderate' ($0.3 < P < 0.8$) in all years investigated and optimal (P=0.50) in 2018. In the five years investigated, 7% of the items (4/56) were 'too hard' and the rest, 93% (52/56) were of 'moderate' difficulty. Recommendations that result from this study are that tutors should design questions to include 'easy' ones, place them in order of increasing difficulty and to use item analysis to shed light on the discrimination power of the set questions. Results from this study show that a bank can be developed from which questions with the appropriate level of difficulty and discrimination may be chosen to increase the effectiveness and quality of future examinations.

Keywords: *Difficulty index, discrimination index, discrimination coefficient, Biology, post-secondary.*

1. Introduction

Examinations serve for a number of reasons, such as to ensure that students have learnt the core of a course, as well as to give feedback to students and teachers on how effective the learning and teaching were. For Maltese post-secondary students, the final examination plays an important role in the students' future as it determines whether they may proceed to their final year of studies and pursue a degree, or not. Item analysis is a valuable procedure performed after the examination that provides information regarding the reliability and validity of a test item. A plethora of research exists on item analysis of multiple choice questions (MCQs) because according to Halikar et al. (2016) they are most commonly used to assess the knowledge capabilities of undergraduate, graduate, and postgraduate students. MCQs are frequently used because they are very fast to grade, prevent the student from writing unnecessary information, are objective, eliminate assessor's bias and allow extensive coverage of the subject in a short period.

The Royal College of Physicians and Surgeon of Canada (2007) describe short answer questions (SAQs) as 'questions that can be answered in a few short words or phrases'. The same source continues to explain that such questions usually contain words such as "list" or name", suggesting that the answer consists of a series of short responses. Sam et al. (2016) argue that SAQs may provide greater validity than multiple choice questions if the aim of the assessment is to examine the student's ability to synthesise or generate rather than to recognise a correct answer. Despite the potential advantages of SAQs, their use in large-scale assessments has been limited since they cannot be marked by machines (Scalise et al., 2006). Item analysis is important to determine the quality of items in examinations and can be applied to SAQs. Item analysis of SAQs conducted by Tariq (2017) on Medical Pharmacology internal assessment exams is one of the few papers encountered on such item type.

2. Objectives

1. To find out the item difficulty level, discrimination index and discrimination coefficient of individual test items in Biology Advanced level final examination of post-secondary students.
2. To find out the relationship between: item difficulty and discrimination index; item difficulty and discrimination coefficient; discrimination index and discrimination coefficient.

3. Materials and methods

3.1. The examination and data collection

The Advanced Biology Paper 1 examination consists of 10-14 compulsory short items, carrying a total number of 100 marks and must be completed in 3 hours. A group of six tutors contribute items to set up the paper. In this study, 56 short questions taken over the period 2014-2018 were analysed. Students sit for the examination in June, at the end of the first year of teaching. A total of 1311 students sat the examination over the five-years investigated, with an average of 262 per year. The scores of the students were supplied by the Biology Department and to respect anonymity, they were handed over against an index number. Thus it was not possible to carry out analysis on gender.

3.2. Item analysis

The scores were then used to determine the difficulty index and power of discrimination using Microsoft Office Excel. Steps for item analysis were:

1. Ranking students in descending order of merit based on their test scores.
2. The top 25% were taken as high achievers (H) and the bottom 25% (L) as low achievers.
3. The calculations for the difficulty index for subjective questions, followed the formula by Nitko (2004):

$$P_i = \frac{A_i}{N_i}$$

where: P_i= Difficulty index of item i, A_i =Average score to item i, N_i = Maximum score of item i

The average difficulty index P for the entire script, can be calculated by the formula below:

$$P = \frac{1}{100} \sum_{i=1}^{N} P_i N_i$$

4. The discrimination index used in this study was calculated as:

$$\text{Discrimination index} = \left[\frac{\sum H - \sum L}{N \left(Score_{max} - Score_{min} \right)} \right]$$

H = total score for 25% of students in the high achievement group.
L = total score for 25% of students in the low achievement group.
N = 25% of total numbers of student tested.
Score$_{max}$ = maximum (full) marks for the question.
Score$_{min}$ = minimum marks for the question.

5. The advantage of using the discrimination coefficient instead of discrimination index was emphasized by Matlock-Hetzel (1997). Discrimination coefficients include every single person taking the test but only the upper (25%) and lower scorer (25%) are included in the discrimination index calculation process. There are over twenty discrimination indices used as indicators of the item's discrimination effectiveness. The Pearson Product Moment Correlation (r) between a specific item score and the total score of the same student was computed. Values range from -1.00 to 1.00. Higher positive values for the item-total correlation indicate that the item is discriminating well between high- and low-achievers. Negative values mean the opposite: low-achievers are more likely to get the item correct. If values are near zero, means that the item is not discriminating between high- and low- achievers. All students have similar probabilities of answering the item correctly, regardless of their total assessment score.

3.3. Interpretation

Table 1. Classification of the Difficulty Index and Discrimination Power values and suggested recommendations.

Difficulty Index	Classification of Difficulty Level	Modification Results
P < 0.3	Too hard	Modify
0.3 < P < 0.8	Moderate	Accept
P ≥ 0.8	Too easy	Modify
Discrimination Power	**Description**	**Recommendations**
D = negative	Defective Item	Rejected or improved
D between 0-0.19	Poor discrimination	Poor items to be rejected
D between 0.2-0.29	Acceptable discrimination	Marginal items usually need and subject to improvement
D between 0.3-0.39	Good discrimination	Reasonably good but subject to improvement
D = 0.4	Very good discrimination	Very good items; accept
D > 0.4	Excellent discrimination	Very good items; accept

3.4. Statistical analysis

The discrimination index and discrimination coefficient values, were determined using Pearson correlation analysis by SPSS version 24. P value of <0.05 was considered to indicate statistical significance.

4. Results and discussion

The difficulty index, discrimination coefficient and discrimination index were worked out for each item over the five-year period (total number of items = 56) and the results are shown in Table 2 and Figure 1. The same table shows that the same items were classified differently by the two different discrimination formulae. The majority (98%) of the items over the study period had a discrimination coefficient value > 0.4 that is considered as 'excellent', but the majority (93%) of the items had a discrimination index value of 0.20-0.39, classifying them as 'acceptable' to 'good'. This indicates that irrespective of the type of formula used to calculate the discrimination power, both gave positive results. However, the discrimination coefficient gave more desirable results compared with the discrimination index since the majority of items had 'excellent' discrimination.

Table 2. Discrimination Coefficient (DC), Discrimination Index (DI) and Difficulty Index (P) values for each item in Paper 1 classified by year. Values in red are less than 0.3.

Question	2014			2015			2016			2017			2018		
	DC	DI	P	DC	DI	P	DC	DI	P	DC	DI	P	DC	DI	P
1	0.57	0.28	0.27	0.62	0.35	0.70	0.63	0.27	0.61	0.70	0.46	0.63	0.60	0.29	0.56
2	0.57	0.35	0.45	0.56	0.31	0.47	0.77	0.44	0.41	0.60	0.35	0.53	0.68	0.43	0.47
3	0.72	0.45	0.47	0.62	0.26	0.76	0.64	0.26	0.29	0.67	0.34	0.33	0.73	0.49	0.53
4	0.69	0.37	0.38	0.67	0.32	0.57	0.79	0.20	0.54	0.57	0.27	0.45	0.72	0.45	0.45
5	0.58	0.40	0.50	0.44	0.18	0.64	0.67	0.26	0.36	0.60	0.31	0.31	0.68	0.37	0.67
6	0.64	0.36	0.39	0.63	0.32	0.61	0.51	0.20	0.73	0.66	0.31	0.37	0.64	0.33	0.40
7	0.47	0.30	0.54	0.63	0.31	0.27	0.45	0.21	0.64	0.73	0.43	0.64	0.62	0.37	0.31
8	0.50	0.15	0.42	0.36	0.16	0.48	0.70	0.41	0.50	0.61	0.29	0.44	0.57	0.19	0.65
9	0.65	0.38	0.47	0.56	0.29	0.62	0.61	0.32	0.34	0.65	0.32	0.36	0.54	0.29	0.31
10	0.58	0.24	0.34	0.55	0.33	0.36	0.58	0.39	0.43	0.55	0.31	0.74	0.53	0.31	0.56
11	0.51	0.39	0.52	0.62	0.36	0.46	0.54	0.29	0.63						
12	0.60	0.35	0.64												
13	0.33	0.32	0.27												
14	0.62	0.29	0.53												

Results from Figure 1 are encouraging since none of the items were classified as defective. This indicates that over the entire study period, tutors were able to write questions with ''good'' to ''excellent'' discrimination as calculated by the discrimination coefficient. Based on the discrimination index, only 4/56 (7%) items had a 'poor' discrimination (discrimination index = 0-0.19). Ovwigho (2014) also concluded that the discriminating power of test items could be measured by the discrimination index and discrimination coefficient. Results of the present study show that, over the five-year period investigated, the majority of the Biology Paper 1 items were able to discriminate and were valid.

Figure 1. A bar chart showing the percentage of items described according to the Discrimination Index and Discrimination Coefficient, classified by year.
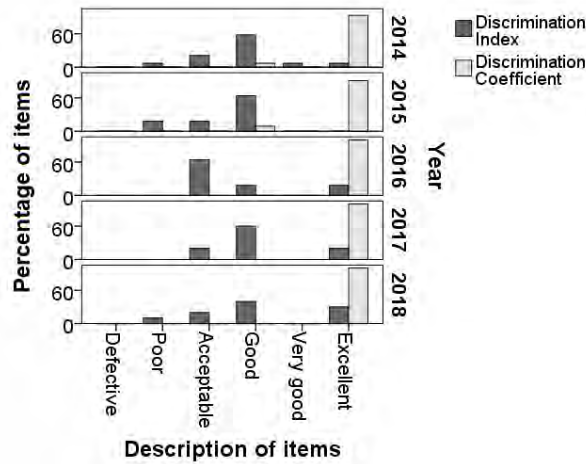
An ideal examination should have a mixture of difficulty levels, however, results presented in Table 3 show that this was not the case in the examination papers investigated. 'Too easy' ($P \geq 0.8$) questions were never recorded in the five years investigated and in two consecutive years, the questions were 100% of 'moderate' difficulty. The overall difficulty level was 'moderate' ($0.3 < P < 0.8$) in all years investigated and optimal ($P=0.50$) in 2018. Thus paper setters consistently design examination questions of an overall 'moderate' level, irrespective of different persons involved each year and no written guidelines are given.

Table 3. Percentage of items per year having a Discrimination Coefficient and Discrimination Index of > 0.3 (good to excellent discrimination) and a Difficulty Index classifying them as 'too hard' (P < 0.3) and 'moderate' (0.3 < P < 0.8).

	Year					Discrimination power or Difficulty level & Description
	2014	**2015**	**2016**	**2017**	**2018**	
Discrimination Coefficient	100	100	100	100	100	0.3 and above [good to excellent]
Discrimination Index	71.4	63.4	36.4	80	60	
Difficulty Index	14.3	9.1	10	0	0	*P* < 0.3 [too hard]
	85.7	90.9	90.0	100	100	0.3 < *P* < 0.8 [moderate]

5. Analysis of correlation

The relationship between the difficulty index, the discrimination coefficient and index over the whole study period (2014-2018), was determined by Pearson correlation analysis and is given in Table 4. The strength of association as shown by Pearson correlation coefficient is as follows: small ($r = 0.1$ to 0.3), medium ($r = 0.3$ to 0.5) and large ($r = 0.5$ to 1.0). According to Suruchi et al. (2014), the difficulty indices and discrimination indices are most often reciprocally related. This was the case in this study. A small negative correlation ($r = -0.082$), which was not significant, was obtained. A linear relationship was observed from scatterplots between the difficulty index and discrimination coefficient as well as between the difficulty index and discrimination index, respectively. A negative correlation indicates that as the difficulty index values increase, the discrimination index decreases. This means that as the test items get easier, the discrimination index decreases, thus it fails to differentiate between high and low achievers. This finding is similar to that reported in the literature. For example, Mitra et al. (2009) obtained a negative correlation ($r = -0.325$) when working on multiple choice questions taken by pre-clinical students. Ahmed & Moalwi (2007) also reported ($r = -0.453$) for multiple choice questions taken by medical students in anatomy. Table 4 shows that a significant large positive correlation (0.563) value was obtained between the discrimination index and coefficient when all Paper 1 items were considered over the five-year study period. A linear relationship was obtained on plotting a scatterplot distribution for the discrimination coefficient and discrimination index. Table 5 shows Pearson correlation coefficient (r) between the indices calculated for each year. A significant large positive value of r was obtained for only three years 2015, 2017 and 2018 between the discrimination index and discrimination coefficient.

Table 4. Correlation between the various factors, Pearson correlation coefficient (r) and p value.
(* Significant at the 0.05 level).

Variables correlated	Correlation coefficient (r) and *P*-value
Difficulty index and discrimination coefficient	-0.031 ($p = 0.823$)
Difficulty index and discrimination index	-0.082 ($p = 0.549$)
Discrimination index and discrimination coefficient	0.563 ($p = 0.000$)*

Table 5. Correlation (r) between Difficulty Index and Discrimination Index, Difficulty Index and Discrimination Coefficient, and Discrimination Index and Discrimination Coefficient per year. The p-value is also given.
*Correlation is significant at the 0.05 level.

Year	Difficulty Index and Discrimination Index		Difficulty Index and Discrimination Coefficient		Discrimination Index and Discrimination Coefficient	
	r	*p*-value	r	*p*-value	r	*p*-value
2014	0.295	0.305	0.246	0.397	0.439	0.117
2015	-0.175	0.607	0.082	0.811	0.846*	0.001
2016	-0.430	0.187	-0.485	0.131	0.374	0.258
2017	0.493	0.147	0.012	0.973	0.777*	0.008
2018	-0.197	0.585	0.012	0.973	0.848*	0.002

6. Conclusion and recommendations

Results of this investigation emphasises a significant role of item analysis to educators and paper setters in determining the quality of test items. Examination of the item parameters of difficulty and discrimination will help a paper setter in detecting the defective and good individual items. Recommendations that result from this study are that tutors should design questions to include 'easy' ones, place them in order of increasing difficulty and to use item analysis to shed light on the discrimination power of the set questions. Although the discrimination index and discrimination coefficient can measure the discriminating power of test items, the discrimination coefficient gave better discrimination power than the index.

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THE EFFECTS OF IMPLEMENTING THE SYDNEY SCHOOL GENRE-BASED APPROACH IN A THAI EFL WRITING CLASSROOM

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Abstract

This paper reports on students' writing improvements after the application of the Systemic Functional Linguistic (SFL) genre-based approach. The research participants were 37 students who enrolled in the English Report Writing Course. In this study, the approach was employed in the teaching of three genres (description, report, explanation). Similar findings were shown after analysing students' writing drafts of the three genres in that students gained control over the key features of the required genres, however, grammatical mistakes at clause level still existed. This paper discusses how the approach helps students improve their writing. Due to the limitation of space, students' writing on one genre (description) will be illustrated and discussed. This paper will also discuss some implications in terms of language learning and teaching.

Keywords: Writing skills, SFL genre-based approach, description.

1. Introduction

Writing is often a difficult skill for students regardless of any learning contexts in which they are located. It is not a technology, but involves a set of skills which must be practiced and learned through experiences (Pribady, 2012). For this reason, the writing process requires guidelines, training, practices and comments for improvements. Given that writing for different purposes deploys the resources for meaning-making through the grammar in different ways (Gerot & Wignell, 1994), this makes the writing process even harder for language learners. Especially for non-native speaking learners, the writing goals and explicit guidelines of how to compose different texts are considered as necessary. It is therefore important that EFL teachers find the best ways to support their students to construct the texts which successfully achieve different purposes. The present study employed the Systemic Functional Linguistic (SFL) or Sydney school genre-based approach (an approach to writing which focuses on the relationship between written texts and the contexts in which written texts are produced- Hammond, 1987) in a writing classroom of a university in Thailand to teach three different kinds of texts: description, report and explanation. This paper demonstrates students' writing on one text type: a description. The study aimed to answer the research question below.

1. Can the SFL genre-based approach help students improve their writing of a description? And in which way?

2. Literature review

2.1. The concept of genre-based approach

Genre in SFL's perspective is defined as a staged, goal-oriented, purposeful activity in which speakers engage as members of our culture (Martin, 1984: 25). It is "social because we participate in genres with other people; goal oriented because we use genres to get things done; staged because it usually takes us a few steps to reach our goals" (Martin & Rose, 2007: 8). Moreover, texts are classified based on the variations of: field (the social activities and topics that relate to the chosen situation), tenor (the relationships of those involved in the situation), and mode (whether they are spoken or written- Feez, 2002: 62). Field, tenor, and mode are register variables which have the role to predict particular patterns of language that will be used in different situated texts. In this way, the language used in an explanation of how waste water is recycled (field) written in a textbook (mode) for engineering students (tenor) would

be different to that used in a recipe of how to cook a beef pie (field) published in a cookbook (mode) for any interested readers (tenor). Based on these certain forms of language required for the communication of different social goals, scholars claim that the SFL genre-based approach has the potential to provide model, guidelines and help students improve their writing of different text types (e.g. Chaisiri, 2010; Kongpetch, 2006; Payaprom, Srinon, 2010).

2.2. The teaching and learning cycle

The instructional process of the Sydney school genre-based approach follows a wheel model of a teaching and learning cycle consisting of three stages: *deconstruction* (the target genre is introduced to students); *joint construction* (students carry out exercises, reading, researching, disseminating information, and compositing a text of the required genre in groups); and *independent construction of texts* (students produce actual texts independently- Hammond, et al, 1992).

2.3. The focused genre

The focused genre in this study was a description. A description aims to describe a particular person, place or thing (Hammond et al, 1992). Table 1 below demonstrates a model text of a description. The situated text is constructed as a description of an animal (field) shared by a knower for passengers (tenor) published in a column of the airline magazine (mode). Table 1 below presents the schematic structure and significant linguistic features of a description.

Table 1. Sample text of a description (taken from: AirAsia Inflight Magazine, 2017:50).

Schematic structure	Text	Significant grammatical patterns
Identification	**The Lionhead rabbit** is another easily-[recognizable] creature, simply because **it** has fur like a lion' mane!	--Focus on specific rather than generic participants (**Bold**) --Simple present tense --Verbs of being and having (Underlined) --Use of descriptive adjectives to build up long nominal groups [Brackets]
Description	**These cute bunnies** come from Belgium, and are mostly [brown], [black] or [white] in colour. **They** are an [intelligent] species and can be trained to do a [wide] variety of tricks-**they** can even be potty trained! **The Lionhead rabbit** is the [perfect] first pet to initiate children into the world of pet ownership.	

3. Methodology

The students who participated in this study were 37 (5 males and 32 females) English majored- sophomores who were undertaking the English Report Writing Course in the second semester of academic year 2018. Their level of English proficiency was intermediate. This group of students enrolled in the Essay Writing Course prior to undertaking the investigated course.

English Report Writing was a compulsory course for English majored students in the context of study. The course aims to enhance students' knowledge of writing principles and necessary language for report compositions, develop students' research skills from different sources, practice writing different kinds of report, proposals, and referencing. In this study, students were practicing how to write three different kinds of genres, namely: description, report and explanation, through the Sydney school genre-based approach.

In the first week of the semester, the teacher made a brief overview of the course and introduced the SFL genre-based approach. The stages of the teaching and learning cycle were also introduced and explained to the class as the learning process to be organised in the classroom. To begin the lesson of a description, students were asked to write their first drafts on the topic assigned. Then, the instruction was conducted through the SFL genre- based approach, following the stages of the teaching and learning cycle. After that, students were told to revise the first drafts and make changes, based on the learnt knowledge. Students then submitted their second drafts to receive feedback from the teacher. After students edited their second drafts, they submitted the final drafts.

After students got familiar with the SFL genre-based approach, the instructions of the next lessons (report and explanation) were conducted through the teaching and learning cycle. Students composed their first drafts after the instruction and submitted their final drafts after receiving the teacher feedback. Altogether, students composed two drafts in these two lessons.

To analyse the data, students' writing (first and final drafts) were examined and compared in terms of writing goals, generic stages, and significant language features.

4. Findings

Prior to the intervention, students were assigned to write draft 1. The task was for them to describe about the place they had just visited in the previous week (Koh Change Island, Trat) as part of the English for Tourism Course. Students were told to imagine that they were working as a tourist guide and had to write a report about the facts of the city to provide information to tourists.

The analysis of students' first drafts showed that most students composed their drafts which have got the language features of a recount (a text which retells event for the purpose of informing or entertaining- Gerot & Wignell, 1994). According to Gerot & Wignell (1994), a recount is composed of three main stages: Orientation (provides the setting and introduces participants) ^ Events (tell what happened in what sequence) ^ [Re-orientation] (closure of events). The symbol ^ denotes "followed by" and [ ] denotes an optional stage. Table 2 below demonstrates the writing draft of Yindee, an advance learner, composed in the structure of a recount.

Table 2. Sample of students' first draft.

Schematic structure	Text	Significant grammatical patterns
	yindee (High achiever)	
Orientation	<u>Last week</u> **I** had a nice trip in Trat province with **my beloved teacher** and **my lovely classmates**. The trip was fabulous *and* **I** had a really good time with **my favourite humans**.	
Events	The trip lasted three days and two nights. Begin with the day one, our destination was Ban Taranae. The bus [left] at 4.00 a.m. from my university toward to Chantaburi; the eastern province of Thailand. **We** [arrived] at Krua Lung Cjaey; one of a famous local restaurant in Chantaburi province about 1.05 p.m. **We** had a nice lunch there. My favourite food was Loan Pu. It was very good taste *and* **I** loved it a lot. <u>After lunch</u> we [continued] our journey to BanTaranae which is located in Trat province. <u>After spending a long time on the bus</u> **we** finally arrived Ban Taranae about 2.50 p.m. The hosts [gave] **us** a warm welcome *and* the whole villagers were friendly. **I** had a great time there. **I** [did] many fun activities; tasting local cakes, taking the boat to enjoy the view of mangrove forest; learning local life; planting mangrove tree and having a wonderful dinner. <u>For the second day of the trip</u>, **we** [continued] our trip to Koh Chang. **We** [arrived] at Koh Chang Ferry Terminal about 10.40 a.m. <u>Then</u>, **we** [took] a big ferry boat toward the Kh=oh Chang. **We** [arrived] at Magic Resort about 11.30. the resort was a kind of bungalows. The room was nice *and* the services were good with interesting prices. **I** enjoyed my time a lot. **I** [took] a lot of photos *and* [walked] along the beach. **I** also [went] to Koh Yuak. It was a beautiful island. The sea was as clear as mirror *and* the sands were so nice. It was my first time there to dive into the sea. **I** saw so many kinds of fish and many wonderful kinds of corals. <u>In the evening</u> we had dinner on the beach *and* sang Karaoke. My second day trip was so great. <u>For the last day</u>, <u>after having breakfast at the resort</u>. **We** [took] a huge ferry back to Koh Chang Ferry Terminal. It was time to back hoe. **We** [stopped] at A-Ah gift shop it's a big souvenir shop in Chantaburi. There were a lot of local foods, local snacks and fruits. **I** [bought] some snacks for **my friends**. *And* **they** [gave] **me** a good feedback.	--introduce personal participants (**Bold**) --use chronological connection (<u>Underlined</u>) --use of linking words (*Italics*) --use of action verb in simple past tense [Brackets]
Re-orientation	Although our trip was a long journey trip *and* we [spent] almost of our time on the bus, it can't deny that it was a wonderful trip.	

Table 2 shows that Yindee was not aware of the writing goal assigned in the task. She composed her draft as a recount, re-telling the activities she had done with her classmates.

After receiving comments from the teacher, Yindee edited her work and submitted the final draft. Table 3 clearly shows her ability to take control of the text by organising the final draft which successfully achieves the writing goal of a description and the text is composed of the two required schematic stages: Identification ^ Description.

Table 3. Sample of students' final draft.

Schematic structure	Text	Significant grammatical patterns
	Final draft	
Identification	**Trat** <u>*is*</u> the easternmost province along the Thai coast.	
Description	**Trat province** <u>*is*</u> best known for the 52 islands off for its coast, **Koh Chang, Koh Maak and Koh Kood**. Long, [white sandy] beaches have made **Koh Chang** one of Thailand's top of the island. The climate in that province <u>*is*</u> one of the [wettest] in the country. **Trat province** also <u>*has*</u> many attractions. The most famous place of **Trat** <u>*is*</u> **Koh Chang**. It *takes* around 45 minutes by Ferry boat. **Koh Chang** <u>*is*</u> the located in southeastern region of Thailand, near the border to Cambodia in the Gulf of Thailand. Activities at **Koh Chang** <u>*are*</u> snorkeling at **Koh Yuak**. Attractions <u>*are*</u> [fine white sandy] beaches, [clear blue] marine waters, [rich] marine life and rice rainforest wildlife. **Koh Chang** <u>*has*</u> many resorts to relax. The resort <u>*is*</u> equipped with double bed, airconditioner, television, refrigerator, water heater and [beautiful] beaches. The place to learn culture <u>*is*</u> **Baan Tha Ra Nae** in Amphoe Muang **Trat, Trat**. It <u>*is*</u> an eco-tourism destination with [rich] mangrove forest. It the [large] mangrove forest of 2,000 rai over 100 year old. **This place** <u>*is*</u> a [abundant] source of food. **This mangrove forest** *catches* crabs, fish, shrimp and mussels until it <u>*becomes*</u> a miracle mangrove forest. The magic <u>*is*</u> right on the boat ride.	--Focus on specific rather than generic participants (**Bold**) --Simple present tense (*Italics*) --Verbs of being and having (<u>Underlined</u>) -- Use of descriptive adjectives to build up long nominal groups [Brackets]

The improvements in students' writing after learning through the Sydney school genre-based approach could also be found in other students' writing.

Despite these improvements at text level, students also demonstrated their better control of language at clause level, however; some problems in terms of grammar could still be found (for example "Trat province also <u>has</u> many attractions." "Koh Chang is <u>the located</u> in southeastern region of Thailand." "Koh Chang <u>has</u> many resorts to relax." "<u>It the</u> large mangrove forest."). This problem as well as other types of mistakes (including the use of word form and word structure) also existed in other students' writing, especially the poor learner group.

5. Discussion

The findings from this study have provided some implications for the teaching of writing and for future study.

First of all, the problems found in students' writing in terms of grammar and word form reflect the problems of students in the context of study. These findings are consistent with the claims from previous studies regarding the problems of Thai students in terms of grammar (e.g. Seetrakarn, 2017; Sukasame et al, 2013) and word structure (e.g. Rayupsri & Kongpetch, 2014).

Moreover, the investigation of poor students' writing drafts showed that problems still existed after receiving feedback from the teacher. This implies the need of poor students for closer attention from the teacher and further feedback maybe provided to this group of learners, using the feedback types which are more explicit. Sritrakarn (2018) investigated the types of feedback which were most helpful for students' writing improvements and found that metalinguistic type (when the teacher provides some kind of metalinguistic clue as to the nature of the error- Ellis, 2009) was the most effective type. Further study may consider using this type of feedback when assessing their students' writing drafts.

The last implication is concerned with students' familiarity with the approach and theory. As SFL genre-based approach has not been widely employed in the Thai EFL learning context, some technical terms related to the tools of genre and register could be new and create challenges to students. SFL metalanguage should therefore be foregrounded at an early stage. Once students get familiar with the terms, the approach may be used more widely in other subjects for a variety of learning purposes, for example, in planning for, reflecting on, and assessing student literacy across the curriculum (Macken- Horarik, 2002: 18).

6. Conclusion

This paper reports the results from the application of the SFL genre-based approach in a writing classroom. The findings showed that the approach could help students improve their writing drafts at a broad structure by constructing the texts which achieve the writing goal of the target genre. At discourse semantic level, students' texts were also organised successfully with the required schematic structure. The findings showed that students had shown the awareness of the required language features, however, problems in terms of grammar and word structures still existed. Based on the findings, the study proposes that further feedback maybe provided to students, in particular to the lower level learners, and that further study should focus on students' writing of other genres.

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CREATING CONTEMPORARY PICTURE SHORT STORIES USING INTERTEXTUAL HEROES & PLOT SUBVERSION: AN EMPIRICAL RESEARCH

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Abstract

It is a fact nowadays that the child's ability to acknowledge specific narrative structures has become one of the main objectives in the field of children's literature and its teaching approach. Although there is plenty of research showing that preschoolers are able to comprehend and generate both verbal and pictorial narrative structures, there is no recent study concerning the way in which specific narrative elements can be used in combination to produce a particular literary type. Taking this fact into account, the particular research aims to assess preschoolers' ability of creating contemporary picture short stories using two dominant narrative elements. Therefore, the evaluation of the extent to which the 'intertextual hero' and the 'plot subversion' elements can be used in their narrative speech, is explored. For the purposes of this empirical research, a teaching intervention was conducted with a sample composed of preschoolers from two public Greek Kindergartens, aiming at the creation of contemporary picture short stories containing elements of intertextual heroes and plot subversions. More specifically, the preschoolers' performance of using the aforementioned narrative elements in their narrative speech is evaluated via context analysis. The results prove that the teaching approach of these specific narrative elements led to their use in the preschoolers' narrative speech in order to generate narratives of the picture short story type. The particular research discusses the way in which teaching approaches centered on contemporary picture short story's narrative elements could develop the narrative skill in early childhood.

Keywords: Picture short story, intertextual hero, plot subversion, teaching intervention, early childhood.

1. The use of intertextual hero and plot subversion by preschoolers on their narrative speech

During early childhood, the narrative skill plays a fundamental role in the development of self-esteem and at the same time sets the foundations for narrative comprehension and literacy skills (Whitehead, 2010). The development of narrative skill leads children's informal, verbal interactions to formally structured written communication patterns (Gamble & Yates, 2008). According to Melrose's critical review (2012) of the development of preschoolers' writing skill, it appears that reading picture books could be likened to the creation or writing of a story. In Cairney (1992) and Lancia (1997) researches on the interdependence of illustrated stories, the findings revealed that the narrative speech of preschool and primary stage was influenced by the texts they already knew. Both researchers observed that students made reference to other texts in their own oral and written narratives in the following ways: by copying or reproducing a particular literary genre, by using the heroes or character archetypes, by including identifiable contents without copying the plot completely, by copying the plot, by overturning the events, by copying plot and content together, by transforming descriptive content into a narrative, and by creating a new narrative using other pictorial narratives.

2. Research design

2.1. Objective

The reason why this research has limited itself to exploring the understanding and use of the intertextual hero and the plot subversion is because the use of these specific narrative elements develops the ability to decode and interpret pre-existing knowledge, such as the perception of the chronological order of plot events, the archetypal heroes and fairy tale patterns (Pantaleo, 2006; Lancia, 1997; Cairney, 1992). Although field studies have shown that each of the above narrative elements can be used by preschool

children, there is limited research on how they can be used combined in the production of narrative speech based on the theories of creativity (Dresang, 1999). In order to prove the above hypothesis, it was attempted to explore the extent to which the narrative elements of intertextual hero and plot subversion can be used in combination by preschool children in order to create contemporary picture short stories.

2.2. Sample

Two public kindergartens were selected for sampling on the basis of social equivalence and cultural parity (Bloom & Quint, 1999). Two groups of preschoolers (one group per kindergarten) participated in the research with a total number of thirty four preschoolers. The sample formed of preschoolers of typical development, between the age of 5 and 6,5 years old, since at this age their narrative skill is differentiated significantly and is developed radically into distinctive developmental stages enabling the comprehension and generation of specific structural and morphological narrative elements (John et al., 2003; McCabe & Rollins, 1994; Applebee, 1973).

2.3. Teaching intervention

The particular empirical research included the observation of the population sample during their participation in a teaching intervention conducted within a six month period (Allington, 2001). Before the implementation of the intervention, preschoolers were asked to produce short stories based on fairytale pictures by introducing characters from other fairytales and making any necessary changes to the plot. The intervention consisted of specially designed and adapted activities, based on the objectives of the national curriculum regarding the learning area of language, so that their learning outcomes could prove the hypothesis of the present research. The performance in the activities of the intervention was evaluated by the researcher through context analysis of the preschoolers' narrative speech (Huckin, 2004). The design and implementation of this intervention aimed at the assessment of the comprehension level and use of specific narrative elements in preschoolers' narrative speech (Silva et al., 2014; Landry et al., 2006; Doyle & Bramwell, 2006), in particular, the two elements which were evaluated were the intertextual hero (introduction of a new fairytale character in a specific role) and the plot subversion (reversal of the sequence of events). The activities of the teaching intervention were categorized in two program phases. Each phase of the intervention was aimed at the comprehension and use of a specific indicator. Each indicator (I) was evaluated in regards to the degree of comprehension (C) and use (U) through four specially designed activities (two activities aimed at comprehension and two activities aimed at use), which led at the specific learning outcomes, as described below in Figures 1 & 2. Each activity was repeated as many times as needed in order for every preschooler to produce narrative speech.

Figure 1. Teaching Intervention objectives and activities aiming at comprehension and use of the intertextual hero indicator (I1).
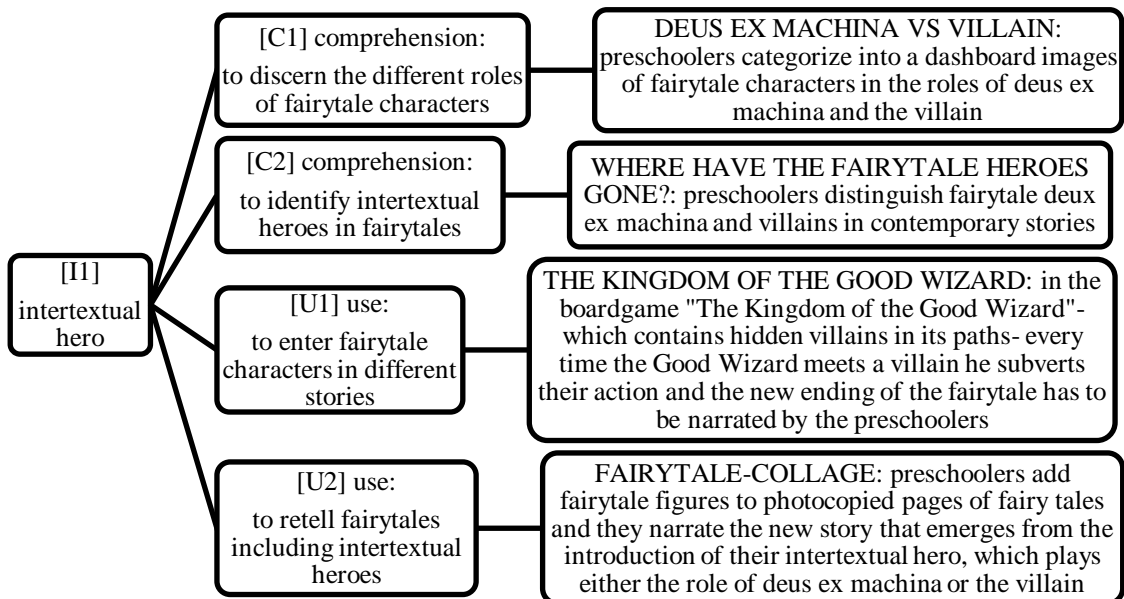
Figure 2. Teaching Intervention objectives and activities aiming at comprehension and use of the plot subversion indicator (I2).

	[C1] comprehension: to discern archetypal patterns	**MAGICAL NUMBER 3:** preschoolers distinguish the reversal of the archetypal pattern in the contemporary story "Goldilocks and just one bear"
	[C2] comprehension: to identify reversals of the good hero and the villain role	**WHERE'S THE VILLAIN GONE?:** preschoolers distinguish the reversal in the role of the good hero and the villain in the contemporary story "The true story of Little Red Riding hood!"
[I2] plot subversion	**[U1] use:** to subvert the archetypal patterns	**PLAYING X3:** a group of preschoolers changes the archetypal pattern of number 3 in the classic tale "Goldilocks and the three bears" and another group narrates the plot subversion
	[U2] use: to reverse the characters' action and the chronological sequence of events	**LOOK WHO'S TALKING!:** in the board game "Meet you at the Granny's house" -where four different starting points and paths end up at the Grandmother's house- preschoolers play with the four pawns of Red Riding Hood, the Wolf, Granny, and the Hunter, reaching the house each time in a different chronological order and narrating the new sequence of plot events

3. Discussion of findings

3.1. Context analysis of preschoolers' narrative speech

For the present study, the context analysis of preschoolers' narrative speech produced during the intervention was chosen, as this qualitative approach treats data as representations of text, image and expression created to be interpreted by the researcher's personal judgment. It is a methodology which can be used to identify, quantitate and analyze specific words and phrases that can be observed in a text, aiming to discern certain subject or rhetorical patterns embodied (Huckin, 2004). The context analysis of narrative speech at the primary stage, before the implementation of the intervention, showed that preschoolers' short stories included intertextual heroes without any discreet role, whose introduction didn't cause any alteration to the plot of events. In fact, preschoolers had just retold the fairytale from where the picture had been extracted using the basic narrative structure. On the contrary, the evaluation of the narratives produced by the preschoolers during the intervention confirmed the research hypothesis as the elements of the intertextual hero and plot subversion were detected in the texts. In particular, by understanding the possibility of introducing a hero to more than one story, preschoolers introduced characters from classical fairytales, contemporary stories and films and retold the earlier texts by intervening in certain parts of the plot and by subverting the sequence of events based on the profile of the new intertextual character (Transcription 1).

Transcription 1. Introducing the intertextual hero.

"Once upon a time there was a princess who was playing every day with her golden ball. One day she dropped the golden ball into the well and a frog brought it back to her but before the frog asked for his favor suddenly Lord Duloc came and grabbed the ball from the princess. But the Mother Goat who was nearby came to help. She bit Lord Duloc and he gave the ball back to the frog. Now the frog can ask from the princess to take him with her in the castle as a favor. But the princess didn't want him and she pushed him against the wall and his frog skin fell off and he became a king. The princess and the Frog King got married and they lived happily ever after"

In their produced narratives it is clearly showed that the role they gave to each intertextual character (deus ex machina or villain) was related to the reversal of the plot. Furthermore, by changing the archetypal patterns, as well as by overturning the linear sequence of events of fairy tales, the preschoolers produced contemporary versions of two classic fairy tales (Transcription 2). In their meta-narratives of "Goldilocks and the Three Bears", they distinguished and changed the fairytale pattern which they illustrated in groups embodying all of its new versions and depicting every single subversion in the character's action.

Transcription 2. Subverting the archetypal pattern.

"...In the Bears house Goldilocks decided to play with the colors because she liked painting a lot. She painted the floor of the three Bears' house, her shoes and her face. When the three Bears returned to their house they slipped into the water colors that Goldilocks had forgotten to pick up from the floor. And then because Goldilocks left footprints all over the place with her colored shoes the Bears found her hiding. And when the tree Bears saw Goldilocks' painted face they got scare and they run away from their little house so Goldilocks stayed there forever"

In addition, through the board game LOOK WHO'S TALKING! preschoolers used the first person narrative to overturn the chronological order of events of the "The Little Red Riding Hood" classic fairy tale (Transcription 3).

Transcription 3. Overturning the sequence of events.

"I am the Granny and I reached my house and there was nobody inside and I started knitting" / "when me the Hunter reached the Granny's house I found her knitting so I went to hunt something for the Granny to cook it" / "when I the Red Riding Hood got in the Granny's house I found Granny knitting and I saw the Hunter hunting near the house to cook and eat. I sat down to watch TV"/ "when I the Wolf went to the Granny's house I saw Granny, Red Riding Hood and the Hunter inside. Granny was knitting, Red Riding Hood was watching TV and the Hunter had brought something for lunch and he was helping Granny with the cooking. I ate Red Riding Hood first and then I ate Granny and the Hunter together"

The design of the teaching approach of these specific narrative elements took into consideration the developmental stages of narrative speech through preschool age (Peterson & McCabe, 2013; Applebee, 1973). It was the pre-existing knowledge that enabled preschoolers to categorize the fairy tale characters into the roles of deus ex machina and the villain in order to introduce them in different stories, intervening in the plot. After being familiar with the plot changes caused by the introduction of the intertextual hero, preschoolers attempted to subvert all the stages of a story, a skill which, according to Cairney (1992) and Lancia (1997)) presupposes the decoding and interpretation of the pre-existing knowledge, such as the perception of the chronological order of plot events, as well as the recognition of the archetypal patterns. After the implementation of the intervention, preschoolers were asked once again to produce short stories based on fairytale pictures. At this last stage, preschoolers produced short stories introducing intertextual characters in a discrete role (either the one of deus ex machine or the villain) and by subverting the sequence of plot events. What is worth mentioning is that preschoolers took the initiative to illustrate their short stories in order to depict the intertextual heroes and the new chronological order of events in the picture as well (Transcription 4).

Transcription 4. A contemporary picture short story.

"Once upon a time there was Red Riding Hood. She had moved to a big city where there were a lot of colorful houses. Every house had a different color but they all looked like each other. One day Red Riding Hood went to her Granny's house to bring her some soup. But she was lost in the big city and she couldn't find her way to the Granny's house because all houses look like each other. Then Pluto came to help her. He sniffed their way to the Granny's house but he also sniffed the Big Bad Wolf

who was also inside the house. Pluto barked very loud and the Wolf got scared and he ran away without hurting the Granny. Red Riding Hood adopted Pluto to be her guide into the big city and she never lost her way to the Granny's house since then and they lived all together happily ever after in the colorful city"

In conclusion, the teaching intervention has produced measurable results which assess the development of preschoolers'' narrative speech through the context analysis of their narratives produced during and after the implementation of the activities. The comparison between the primary and the latter stage of the research show that the preschoolers narratives were enriched in the extent of combining particular narrative elements and producing contemporary picture short stories using intertextual heroes & plot subversion.

3.2. Limitations and future extension

Given that the teaching intervention was implemented for the purposes of the present research at preschool stage, a multi-level approach is recommended for future use in order to achieve a holistic evaluation of reliability. Specifically, apart from the evaluation of performance at preschool age (level 1), the exploration of teacher's experience and attitude towards the effectiveness of the intervention could be considered in a second level (level 2), whilst in a third level (level 3) demographics of regions where the Kindergartens located can be included. With that multilevel analysis of nested data, the different levels (preschooler, teacher, kindergarten) will provide a more complete view due to multiple dimensions and criteria (Frenzel et al., 2007). Furthermore the consecutive implementation of the intervention in older stages could lead to assumptions regarding the development of narrative speech in regards to the use of specific narrative elements. In conclusion, it could be supported that the present research sets the grounds for discussion regarding the enhancement and development of practices aiming at the evaluation of narrative skill at preschool age.

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SELF-MONITORING AND PEER FEEDBACK STRATEGIES: CHALLENGES AND OPPORTUNITIES IN THE EFL WRITING CLASS

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Abstract

Although learning paradigm has shifted from teacher-centered to student-centered for more than a decade, where students are encouraged to be left independent and able to learn writing collaboratively, the teaching and learning in the EFL writing context still poses many problems. The problems can be students' lack of proper understanding of the writing skill; language knowledge limitation; ambiguity of feedback; and low self-efficacy for writing. These are factors that affect how students perform in their writing as well as on their ability to think critically. This study aimed to explore students' attitudes toward the implementation of the self-monitoring and peer feedback strategies in the EFL essay writing class using a four-point Likert scale attitude questionnaire and semi-structured interview as instruments. Participants were 30 mixed-ability third-year undergraduate students majoring in English for International Communication at a university in the northeastern region of Thailand. Findings revealed that students had positive attitudes toward these two strategies, stating that it helped them to learn via social process and to gradually develop their critical thinking skills. This paper, based on the data, concluded that challenges in implementing the self-monitoring and peer feedback strategies in the writing class where the majority of students were in the low-intermediate level due to lack of proper understanding of the characteristics of the writing skill and of learning how to write; due to possible low self-efficacy for writing and collaborating with peers due to their limitation of language knowledge.

Keywords: Self-monitoring, peer feedback, EFL writing.

1. Introduction

1.1. Background

Many different approaches and strategies to writing instruction have been sought out to enhance students' writing performance and foster their independence and collaboration in learning writing. Self-monitoring and peer feedback are among those strategies. However, the self-monitoring strategy is found to most benefit students of a high-proficiency level (Chen, 2009; Xiang, 2004), while the peer feedback strategy is likely to most benefit students of the same proficiency level or higher (Gielen, Peeters, Dochy, Onghena & Struyven, 2010; Rollinson, 2005; Yu & Hu, 2016). This instance is often witnessed in many EFL writing classes where the students' langauge abilities are mixed making it quite challenging to couple and implement these two strategies. In the context of teaching and learning writing in Thailand, teachers and educators attempt to seek for effective methods to minimize such a problem; however, very few studies have been found to come with possible variables that may affect the implementation of the self-monitoring and peer feedback strategies with mixed-ability students in essay writing classes in Thailand.

1.2. Purpose of study

As mixed-ability students are commonly seen in most writing classes and it is rare to find studies conducted on the self-monitoring coupled with peer feedback strategies in an essay writing class in Thailand, there is an urgent need to find out challenges and opportunities of the implementation of these two important writing strategies. Thus, this study was to explore students' attitudes toward the implementation of the self-monitoring and peer feedback strategies in an essay writing class in order to shed light in the EFL writing context.

2. Methods

2.1. Research design and participants

This study was mixed-methods. A four-point Likert scale and semi-structured interview were used as instruments to find out how students viewed the strategies after attending a 14-week course of study. Participants were 30 mixed-ability third-year undergraduate students majoring in English for International Communication at a university in the northeastern region of Thailand, aged 20-23 including male and female. The English writing proficiency of most students was at the intermediate and low levels.

2.2. Data collection

The questionnaire was distributed to thirty students at the end of the course of study. It took about 10-15 minutes for the students to complete the questionnaires. All questionnaires were returned (100%). Moreover, the semi-structured interview was conducted with nine students including three high, three intermediate, and three low-proficiency students. The interviewees were asked to report and elaborate their views in Thai regarding the implementation of the two strategies. Each interview took about 20 minutes. All interviews were audio recorded.

2.3. Data analysis

The criteria of the questionnaire was set prior to the analysis to interpret the data. The data were interpreted as follows:

1 = strongly disagree (1.0-1.49)   2 = disagree (1.5-2.49)
3 = agree (2.5-3.49)   4 = strongly agree (3.5-4.0)

Data obtained from the questionnaires were calculated by using descriptive statistics. The statistical methods used to analyze the data were as follows:

1. Percentage was used to show a proportionate part of a total of the questionnaire. It allowed the participants to rate their agreements and disagreements using four-point Likert scale.

2. Arithmetic mean was used to calculate the average level of agreements or disagreements of the questionnaire.

3. The standard deviation was used to investigate how much variance there was in the mean.

In addition, data gained from the semi-structured interviews were analyzed using content analysis. Data were transcribed and later categorized into three aspects: self-monitoring strategy, peer feedback strategy, and additional comments and suggestions. After that, the differences and similarities of the responses toward the questions were tallied and reported.

3. Results

Regarding the results of the questionnaires, it was found that many (72.5%) felt that they liked the self-monitoring strategy. The strategy was important in the writing class (79.25%) and it helped them (75.75%) improve their essay writing skills. Many (78.25%) also reported that the strategy helped them read more critically and ask better questions in the same percentage, but many (72.5%) thought that it was a difficult strategy and that they (65.75%) felt confident using the strategy.

As for the peer feedback strategy, conversely, most (80.75%) felt that they liked the strategy and were confident giving peer feedback (71.75%). Some (65%) thought that it was a difficult strategy. The strategy was important in the writing class (81.75%) and it helped them (81.75%) improve their essay writing skills. Moreover, the strategy helped most of them think more critically (83.25%) and learn collaboratively (81.75%). Table 1 illustrates the results of the questionnaires.

Table 1. Students' attitudes toward the self-monitoring and peer feedback strategies.

Students' attitudes	Mean	SD	Percentage
Self-monitoring strategy 1. I like self-monitoring strategy.	2.90	0.48	72.50
2. I feel confident when self-monitoring.	2.63	0.72	65.75
3. Self-monitoring is an important strategy in a process writing course.	3.17	0.53	79.25
4. Self-monitoring is a difficult strategy.	2.90	0.55	72.50
5. Self-monitoring strategy makes me feel more confident and motivated in writing.	2.83	0.59	70.75

Students' attitudes	Mean	SD	Percentage
6. Self-monitoring strategy helps me improve my essay writing skills.	3.03	0.49	75.75
7. Self-monitoring strategy helps me read more critically.	3.13	0.43	78.25
8. Self-monitoring strategy helps me ask better questions from my writing.	3.13	0.57	78.25
9. Self-monitoring strategy helps me learn to be autonomous.	3.10	0.55	77.50
10. Self-monitoring strategy helps me get specific feedback.	3.07	0.52	76.75
11. I will use self-monitoring strategy in my future writing.	2.97	0.56	74.25
Peer feedback strategy 12. I like peer feedback strategy.	3.23	0.57	80.75
13. I feel confident when giving feedback to peers.	2.87	0.73	71.75
14. Peer feedback is an important strategy in a process writing course.	3.27	0.45	81.75
15. Peer feedback is a difficult strategy.	2.60	0.56	65.00
16. Peer feedback strategy makes me feel more confident and motivated in writing.	3.17	0.53	79.25
17. Peer feedback strategy helps me build rapport and relationship with friends.	3.27	0.52	81.75
18. Peer feedback strategy helps me improve my essay writing skills.	3.27	0.52	81.75
19. Peer feedback strategy helps me think more critically.	3.33	0.48	83.25
20. Peer feedback strategy helps me learn collaboratively.	3.27	0.52	81.75
21. Peer feedback strategy helps me understand problems in my writing.	3.30	0.53	82.50
22. I will use peer feedback strategy in my future writing.	3.27	0.52	81.75

Based on the results of the interviews, it was found that most of them reported that the self-monitoring strategy was difficult, but useful. The high-proficiency students stated that although the self-monitoring was a difficult strategy, it did help them think more deeply and be more careful of all writing aspects. The strategy fostered them to be more critical and careful when reading and writing their own work. It also helped them feel more confident in writing. With critical reading skills, the students learned to evaluate their weak points and tried to avoid making the same errors in the future. Therefore, they felt more confident in their writing.

The intermediate and low-proficiency students disclosed that it was useful, but difficult for them to self-monitor and question their work because they felt unsure whether or not their work was correct. They further highlighted that it did not mean that they could not self-monitor at all, but they sometimes did not feel certain of their ability to provide good annotations, especially on vocabulary, language use, and mechanics. They addressed that these three writing aspects were important to them and that they wanted to improve their writing more on these aspects. The following were sample data from the interviews on the self-monitoring strategy.

I think it was really good because it helped me gain more confidence in my writing. When I had problems that I was not sure about, I formulated some questions and asked my friend and she could clarify the problems or, at least, make me feel more confident to revise my work. The strategy also helped me think carefully and know my weak points. It was not too difficult to self-monitor. (Student #9 – High)

The strategy was useful and it helped me improve my essay writing skills. However, I think it was quite difficult because I had to think a lot and come up with annotations for my friends to give feedback to me and I could not see problems in my work, especially on vocabulary and grammar. (Student #6 – Intermediate)

I was not sure whether my writing was correct and that made it quite difficult to ask questions, especially on vocabulary, grammar, and mechanics. I wanted to improve these writing aspects, but I did not know what to ask. (Student #1 – Low)

In terms of the peer feedback strategy, most students reported that the strategy was good, easier than the self-monitoring, and they liked it, especially the intermediate and low-proficiency students. This was because the strategy allowed them to talk more openly and use more casual language with their partners. Also, they sometimes could benefit from the feedback on the aspects that they did not

self-monitor well, for example, the vocabulary and language use. However, some of them, especially the high-proficiency students reported that they did not like the strategy. They revealed that the strategy had drawbacks where their partners did not provide useful peer feedback, especialy on the aspect of grammar to them because of their limitation of language knowledge. This was why some of the high-proficiency students did not easily accept the feedback to use in their writing.

Whether or not the strategy improved their essay writing skills, the high-proficiency students reported that they did not benefit from the strategy that much. This was because, although the questionnaire data suggested otherwise, the majority of their partners were at the intermediate and low proficiency levels, thus, unable to provide useful feedback to the high-proficiency students, particularly on the vocabulary, language use, and mechanics. Although they could benefit from the feedback given on content and organization, they had to evaluate the feedback carefully before using it in their work checking whether or not the feedback would be valid and useful to them. If they were not sure about the given feedback or the feedback did not really answer their questions, they would not use it. Rather, they would stick to the old versions of their writing, ask the teacher for feedback, or check the answers from the Internet, books, or dictionaries.

The intermediate and low-proficiency students revealed that they were able to benefit from the strategy when paired with students of a higher proficiency level, thus being more satisfied with the strategy. They could use feedback on vocabulary, language use, and mechanics to revise their writing. Although these students were likely to benefit more than the high-proficiency students, they revealed that they still had to evaluate the feedback before using it in their work as well. If they were not sure about the provided feedback, they would ask the teacher for accuracy and appropriateness. The following were sample data from the interviews on the peer feedback strategy.

I didn't like the strategy because my partner didn't give her all in the feedback and didn't really answer my questions. Some feedback wasn't really beneficial to me at all and I wouldn't trust her feedback either. I would like the teacher to give feedback to me instead. (Student #8 – High)

I liked this strategy. It was easier than self-monitoring. My partner could see my errors in my writing and I could revise and edit my work based on the feedback and comments. However, I didn't believe all the feedback given by my partner. When I wasn't sure about the feedback, I asked the teacher about it and re-checked before revising or editing my work. (Student #4 – Intermediate)

I think it was good. My partner could detect errors that I did not ask for such as verb tense and mechanics and I could benefit from her feedback. (Student #1 – Poor)

Overall, students were satistied with the strategies. Although some students preferred one strategy to another, i.e., high-proficiency students, due to limitation of language knowledge and possible low self-efficacy of their partners, it was evident that these two strategies could help students learn writing collaboratively, gradually develop their critical thinking skills, and improve their writing skills.

4. Discussion

Findings suggest that although students were satisfied with the self-monitoring and peer feedback strategies in general, there were challenges when implementing these strategies in the EFL writing class where the students' language abilities were mixed.

4.1. Possible low self-efficacy for writing

Based on the results from the questionnaire in the areas of self-monitoring (item 1, 2, 4, 5, 10, and 11) and the area of peer feedback (item 13), we can see the lowest among high average scores. This evidence perhaps emphasizes the challenge in implementing the self-monitoring and peer feedback strategies in a class where the majority of students are in the low-intermediate level due to possible low self-efficacy for writing and collaborating with peers due to their limitation of language knowledge.

Studies on self-efficacy levels in writing (Garcia & De Caso, 2006; Pajares, 2010; Pajares & Cheong, 2003) showed that students with improved self-efficacy were able to learn writing better than those who had low self-efficacy. However, high self-efficacy alone might not guarantee students' writing improvement and their satisfaction toward using the strategies as it involved other factors such as teaching styles and methods, feedback, etc. (Magogwe, Ramoroka & Mogana-Monyepi, 2015). Thus, this implies that boosting students' self-efficacy for writing together with other aspects such as teaching methods, teacher, content, etc. may contribute to students' satisfaction toward writing classes that employ the self-monitoring and peer feedback strategies.

4.2. Limitation of language knowledge

Evidence from the interview where the intermediate and low-proficiency students addressed that they found it difficult to self-monitor on vocabulary, language use, and mechanics, whereas the high-proficiency student did not trust in the feedback given by lower-proficiency peer also suggests that the intermediate and low-proficiency students might feel that their limited language knowledge did not

fully empower them to comment, while the high-proficiency students might have preferred the teacher to provide feedback instead. Research (Chinnawongs, 2001; Lee, 2005 & 2008) on students' perceptions on peer feedback and teacher feedback found that students, especially of the low-proficiency level, might feel constrained by their weakness of English so it limited their ability to comment on their peers' work, and they wanted teachers to provide feedback instead or tended to depend upon teacher support. This suggests that although content and organization are major and important writing aspects, further training on using these strategies emphasizing language knowledge is also needed and should not be overlooked.

4.3. Lack of proper understanding of the characteristics of the writing skill and learning how to write

Evidence from the interview where students, especially the high and intermediate students, reported that they preferred the teacher to give feedback to them suggests that students might lack of proper understand of the characteristics of the writing skill and learning how to write where writing is done for a wider audience, not only for the teacher. Students can learn from one another through feedback they get from peers and improve their work. As autonomy and collaboration are important aspects to be encouraged in writing classes (Hyland, 2000), it is important to renew the beliefs of students that although the teacher has more experience and is the main source of writing knowledge, they can certainly learn from one another in the area of content and world knowledge.

5. Conclusion

This study shows that students were satisfied with the self-monitoring and peer feedback strategies in general. Although the two strategies were found to come with challenges when they were implemented with mixed-ability students in the EFL writing class due to a possible low efficacy for writing, limitation of language knowledge, and lack of proper understanding of the characteristics of the writing skill and learning how to write, it provided insights into strengthening any writing course that specially emphasized using these two strategies, which may contribute to success in teaching and learning writing in the EFL context.

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WHAT MAKES AUTONOMOUS LEARNING OBJECTIVES AUTONOMOUS: A CASE STUDY FROM HIGHER EDUCATION

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Abstract

Teachers and other professionals at all levels of education worldwide are aware of the inevitable changes to the existing education systems. Traditional teaching methods are failing to yield effective results when mirrored against the skills graduates need to be able to succeed professionally in the modern globalized world. Responsibility for the preparation of leaders for the world of the future rests strongly with higher education institutions. This paper aims to contribute to the various approaches college and university teachers are adopting to introduce changes to their own teaching in an effort to provide their learners not only with the knowledge in their area of expertise, but also to empower them to become self-directed life-long learners and authentic personalities possessing key competences for the 21st century. The author´s approach is based on her belief in the power of autonomous learning as a process the learner goes through from the start line of self-assessment to the finish line of the evaluation of and reflection on learning achievements. The core of this paper lies in the presentation of the results of a case study focused on autonomous learning objectives of students in higher education. It outlines the tools and procedures the learners use when working with an e-portfolio to set themselves their own goals prior to the start of their learning, provides a description of the learner goal categories, and presents a conclusion in terms of what makes learning objectives autonomous. Although the specific context of the case study is language learning, the author aims at a broader perspective to draw more general conclusions about learner autonomy in higher education.

Keywords: Higher education, autonomous learning, learning objectives, e-portfolio, case study.

1. Introduction

This paper is a contribution to my research into learner autonomy in higher education. My motivation for the investigation results above all from the belief that changes to the existing educational systems are absolutely necessary and inevitable, which has recently been accentuated worldwide. Teachers and professionals in education as well as students, their families and the general public are becoming less and less satisfied with the results of traditional teaching that, in general, has not changed much over the past 200 years. Many institutions are still approaching the teaching and learning processes using methods that are very similar to those used at the times of the industrial revolution. However, the current world is completely different.

As I indicated in the abstract above, the context of the case study presented here is language learning, or English for Specific Purposes specifically. However, the main goal of this particular paper is to present a potential contribution to effective changes within educational processes in the form of an example of how to enhance the concept of autonomous learning objectives in higher education in a broader sense.

2. Case study

2.1. Context

First of all, let me explain the context of this study. I have worked in higher education for 15 years. A major part of my workload consists of teaching English for Specific, Academic and Scientific Purposes. My research focus has recently moved from English Language Teaching Methodology and Applied Linguistics to the development of learner autonomy. I have been looking for new approaches to teaching to help my students become not only more autonomous learners, but autonomous personalities with an internalised concept of life-long learning and self-development. This is what I believe can

contribute to success both in their professional careers and personal lives. Having done some training to become a life coach, in the past 2.5 years I have been applying principles of coaching to my teaching and looking into the changes this approach has yielded for my students, the way they learn and how they perceive their own learning, and for myself as a teacher. My goal is to use the results of my investigations to alter the syllabus, methods and requirements of the subjects I teach.

Following this line of research, I started with an introductory study which confirmed that "adopting a coaching approach and applying principles and tools originally used for coaching seems to be desirable in order to help students acquire transferable soft skills valuable for their future professional as well as personal lives." (Hlouskova 2018). Although my initial focus was on teaching and learning English for Specific and Academic Purposes, during the observations and analyses for the purpose of this study I began to see many aspects that are universal to learning in general. Thanks to this I could adopt a more general perspective. It was above all the transformation processes that the students talked about during the interviews that made me think about broader contexts. As far as the theoretical background is concerned, this experience encouraged me to go beyond theories of autonomous language learning (e.g. Holec 1981, Little n.d. or Little, Dam and Legenhausen 2017 or Benson 2011) and read more on coaching, experiential learning and transformative learning (e.g. Whitmore 2009, Kolb 1984 or Mezirow 2002).

2.2. Methodology

The specific case for the purpose of this investigation was represented by a group of 17 students enrolled in a post-graduate course of English for Electrical Engineering and IT B2+ – C1 at the Faculty of Electrical Engineering and Informatics of the University of Pardubice, Czech Republic, in the academic years 2017 – 2018 and 2018 – 2019. As an introduction to the course, the students were asked to reflect on their previous learning and to do the self-assessment of their current skills. Based on this they were encouraged to set their individual learning objectives for the specific course period (one semester). They were granted access to Mahara, an online e-portfolio tool incorporated in the University LMS Moodle system but were also given the freedom to use another e-portfolio tool according to their own preference (all of them stayed with Mahara although two did not complete the course). In line with the application of coaching principles to the process of learning, the students were instructed to create SMART goals (Specific, Measurable, Agreed/Attainable, Relevant/Realistic, Time phased; cf. Whitmore, 2009). As described in Hlouskova, 2018, "the students were informed that they would evaluate their own goals and the extent to which they managed to achieve them at an interview at the end of the semester as part of their exam."

Upon course completion and after the final interviews, the students´ learning objectives were downloaded from their self-assessment and goal setting pages in the Mahara e-portfolio. They had a form of short texts stating the current level of their linguistic competence (with heading such as *"what I can do", what works well for me",* etc.) and their objectives for the semester in each language skill, namely listening, reading, spoken interaction, spoken production, writing (*"what I want to learn", "where I want to improve"*, etc. and *"how exactly I am going to do this",* which meant formulating the SMART goals). These short texts were then analysed using the mixed approach of qualitative and quantitative content analysis. The process included determining the text units to be coded, developing content categories and analysing the data.

The fundamental research question was:

What makes autonomous learning objectives autonomous?

2.3. Results

Looking for answers to the research question could not been done without referring constantly to the most common definitions of learner autonomy including the one by Holec who described it as "the ability to take charge of one´s own learning" (Holec 1981, p. 3), which also means "to take charge of one's learning is to have, and to hold, the responsibility for all the decisions concerning all aspects of this learning" (ibid).

It is important to note that the students found it very difficult to set themselves their individual learning objectives. The main reason they gave during the final interview was that this was a completely new and also unusual task in which they had no or very limited experience as it is usually the teachers that set the objectives. Normally, the students are supposed to achieve them, and there is hardly any discussion about methods, individual learning styles, relevance, etc. Therefore, the course requirements took most of the students by surprise. They were encouraged to think of their specific individual needs and decide what they needed to achieve with respect to the communicative situations they were finding themselves in already or were going to face in the future in their educational, work or personal contexts.

As students of post-graduate programmes they had had quite a significant history in learning English, they knew their starting line thanks to the self-assessment they had done at the beginning of the course, and now they thought carefully about where they wanted to find themselves at the end of the semester in terms of progress in each of the language skills. Taking all these circumstances into consideration, it is not surprising that the students´ goals for each of the language skills were different.

When analysing the content of the students´ learning objectives with respect to the nature of learner autonomy, the main attention was paid to what the objectives had in common and how autonomy was reflected in them. As a result, the following categories were developed:

1) Study materials to work with individually in order to achieve the desired objectives.

The majority of the students decided to use **materials outside their professional field** (65% in the case of audio-visual materials used for the improvement of listening comprehension and 76% in the case of texts used to make progress in reading comprehension; the students also used these materials to develop their spoken production and writing skills[1]). When reflecting on their learning during the final interviews, most of them stated that they needed these types of materials to make an actual progress because their English skills related to their field were sufficient. They also emphasized that – to increase their intrinsic motivation – they wanted to go for something different than the materials used in traditional classes.

2) Preferable learning situations and environments.

The analysis showed that most students preferred situations and environments outside the classroom for individual development of their communicative competence. This was obvious from the material preferences (see above) as well as from the situations and environments they chose to develop their spoken interaction skills: 82% chose **informal education contexts.**

3) The target situations in which they knew they would be using their newly acquired knowledge and skills.

The learning objectives the students set themselves concerned mostly communication in **work contexts or personal life** (76%). As for study reasons, they perceived their competence being in harmony with their needs. This is in line with their choice of study materials and learning contexts.

2.4. Discussion

As I stated above, the principle question I had formulated for the purpose of this empirical study was *What makes autonomous learning objectives autonomous?* The data collection and analysis yielded the following answers: the nature of the approaches that support autonomous learning is reflected in a great variety of objectives that stem from the students´ individual needs, learning styles and preferences. This is often difficult to support in traditional teaching in higher education, where the syllabi are usually based on the objectives determined by the instructors. When the students are given more autonomy, they choose study materials and learning contexts according their own preferences. Although they reflect on this particular way of learning as difficult mainly in the initial self-assessment and goal-setting stages, after course completion they conclude that it is more relevant to their needs and more enjoyable, emphasizing the advantages that are in harmony with the essence of autonomous learning as described in the definitions (see above). They appreciate the flexibility, responsibility and increased motivation resulting in better achievements compared to traditional learning. It is also noteworthy that this approach motivated the learners to improve their knowledge and skills beyond the course requirements, which are strictly related to their field of study when set by the course leaders within the traditional concept of teaching in higher education.

3. Conclusion

I aimed at more general conclusions about autonomous learning in higher education. However, I need to point out that when collecting and analyzing the data I realized how difficult it was for me to step out of the shoes of a language teacher and researcher into language learning. It would be useful to discuss autonomous learning methods and styles with teachers of other subjects. Hopefully this study can serve as an inspirational example of new approaches to learning and teaching in higher education and encourage more academic discussion.

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[1]Detailed results of the analysis are available. They are not presented here as the author wishes to concentrate on a broader perspective of autonomy in higher education, not just (English) language learning and development of the individual language skills.

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EXPLORING THE IMPACT OF A SWISS BILINGUAL PROGRAM THROUGH A MIXED METHOD DESIGN

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Abstract

The use of mixed methods has increased in research over the past decades, especially in the field of education. In this article, we describe how the use of two methodological approaches led researchers to evaluate the competences of 10- to 12-year-old pupils in a bilingual public primary school in Switzerland. The following target disciplines have been selected for the aim of the study: L2 (French or German) and mathematics. The first part of the article focuses on quantitative aspects: by using close-ended questionnaires, L2-tests in four communicative competences and mathematics tests, we have compared the results of children following the bilingual program (n=76) with the results of children following monolingual education (n=214). The second part of the article describes the qualitative approach adopted in order to gain a better understanding of classroom activities and perceptions of a teacher involved in the bilingual program. This part includes the discursive analysis of classroom social interactions and the semi-structured interviews with teachers. The use of mixed methods has been helpful in detecting the complex context of knowledge production in the analyzed setting, in which the use of two languages has been effective in enhancing content and language learning. Therefore, recommendations for the growing number of bilingual programs such as benefits of combining methodological approaches are presented in the final part of the article.

Keywords: Mixed methods, communicative competences, mathematic skills, bilingual education.

1. Introduction

Considerable quantitative research has documented the modern bilingual education since its beginning in the 1960's, mostly in Canada. After two decades of exploring these programs, large reviews were published in the 1990's and showed that students from bilingual schools tend to develop strong L1- and L2-proficency (e.g., Calvé, 1991) and also tend to be more creative and flexible (Cathomas & Carigiet, 2008). Qualitative research in this field started later and described different pedagogical aspects of the bilingual education, such as the type of interactions that take place within the lessons (e.g., Gajo, 2001) or the use of plurilingual competences (Moore, 2006) by the pupils. However, there is very little use of mixed methods aiming to get a global view on bilingual education.

This study aims to describe the competences of 10- to 12-year-old pupils in a specific type of bilingual program (two-way immersion) and to understand their development with two different approaches. First, we measured the competences in L2 and mathematics using standardized tests and questionnaires. Second, we attended one mathematics lesson and interviewed the teacher in order to explore the use of code-switching, the balance between content and language as well as the perceptions of this teacher.

In this article, we will first present a literature review on bilingual education. Then we will describe the methodological frame and the results of the study. Finally, we will give recommendations for the growing number of bilingual programs and emphasize the benefits of combining methodological approaches in the final part of the article.

2. Literature review

Bilingual Education has been studied from a number of angles since its beginning in the 1960's and different trends reflect the progress in research (Gajo, 2001). The first important studies on bilingual education were conducted in Canada and were focusing on the outputs and the cognitive competences of bilingual pupils. Some of them were skeptical about the idea of mixing languages and were arguing that learning one language could hinder the development of another (e.g. Penfield, 1965). The methods used by some researchers at that time were criticised as they consisted of comparing groups of local students as monolingual with immigrants as bilingual individuals. Nonetheless, the latter often had lower

socio-economic status. Then qualitative research designs appeared in research on bilingual education and the focus was still set on the L2-Proficency. Calvé (1991) showed for example that the receptive competences (oral and written comprehension) of children from immersion programs were usually more developed than their productive competences (oral and written production). Lyster (1990) found out that the pupils of bilingual programs used to learn the L2 until a certain point but noticed that some mistakes were hard to erase. He called this phenomena "fossilization" and proposed the organization of L2-specific lessons in order to manage this issue. Nowadays research field on bilingual education has become wider and methodology has evolved. Gajo (2001) studied for example teacher-pupil interactions showing that the speaker tends to focus not only on the form but also on the content when addressing a public from another language. Berthoud and Gajo (2005) studied the balance between language structure and content in bilingual education. They concluded that learning a subject in more than one language could even be an advantage for the discipline as the students will need to reformulate what they heard, to reflect and to use the new contents in different contexts. Moore (2006) mentioned several studies showing that code-switching produced by bilingual children can have different functions such as using a more accurate word for which the speaker does not find an equivalence in the other language, putting distance from the concepts or building the language competence. These works showed the important role of school disciplines in bilingual education and, if those aspects are taken into account, the potential of bilingual education not only for the language but also for the subjects.

The lack of research on language and school disciplines in bilingual education using mixed method led us to conduct a study aiming to measure as a first step the competences in L2 and mathematics and, as a second step, to better understand the practices and perceptions of a teacher involved in the teaching of mathematics in German to a mixed group of French- and German-speaking students.

3. Methods

Mixed methods have been used in the fields of sociology and education over the past decades but there is little research on their use in bilingual education. Creswell (1999:9) defined mixed methods as methodologies "for conducting research that involves collecting, analyzing, and integrating quantitative and qualitative research in a single study or a longitudinal program of inquiry". They should be used when a more complete understanding of a phenomenon cannot be provided by either a quantitative or a qualitative approach alone.

As bilingual education and specifically two-way immersion requires more quantitative assessments in every new context but also qualitative approaches in order to understand their implication, we decided to describe and evaluate the competences of 10- to 12-year-old pupils in a bilingual public primary school in Switzerland using a mixed method. This school called "FiBi" introduced the idea of setting up classes with 50% of pupils with German as main language and 50% of pupils with French as a main language starting at nursery level (children of 5 years old). This is only possible because the city, in which this study was conducted, has a balanced proportion of speakers of both languages. In this project, school disciplines are taught half in French and half in German using the model of "one person-one language" (1P/1L) described by Ronjat (1913). Today the FiBi-project has more than 300 pupils aged 5 to 12 years old.

The first part of the study measured the competences in L2 and in mathematics of children following a bilingual program (n=76) and of a control group (n=214), following monolingual education. The L2-tests were aiming to evaluate the four communicative competences described in Council of Europe (2001). They were adopted from Lenz and Studer (2014) and partly translated and adapted for the aim of this study. The mathematics tests were based on regional official curriculum goals. The exercises were inspired by standardized activities from Humbolt-University (2013) and completed by tests from local textbooks. Using closed-ended questionnaires, data on the linguistic and sociological profile of each student were collected. Then we compared the means of both groups by using Student t-Tests in SPSS.

In order to gain more of an overview on the classroom activities of this two-way immersion project and to question the findings presented above, we video-recorded mathematics lessons and we discussed with the teacher shortly afterwards by using a semi-structured detailed interview. Two cameras were used in order to cover a large part of the classroom and to benefit from two opposite angles. We briefly informed the pupils about the reason for our presence and asked them to behave as if we were not there. Of course the presence of both cameras and the researchers might have influenced the behaviour of the pupils, but we tried to minimise those effects. The class visit was examined through the analysis of social interactions, using the paradigm of discourse analysis.

4. Findings

The quantitative and qualitative data have been analysed separately and will therefore be presented in two different sections. In the discussion of the results the two parts will be linked and the relations between them will allow the formulation of interpretative hypotheses.

4.1. L2- and mathematical competences

The scores of both groups in mathematics as well as in the four communicative competences (written comprehension, oral comprehension, oral expression and written expression) were compared with Student t-Tests. The results of this part are presented in Table 1.

Table 1. Comparison of means (Student t-Test) of both groups (FiBi and regular classes) in the tests of mathematics and L2.

	Group	N	Mean	Diff./max points.	Std	Sig.
Mathematics	Regul.	214	25.84	4.27/54 (7.91%)	8.94	.000
	FiBi	76	30.11		8.73	
Written comprehension	Regul.	208	2.89	.64/7 (9.14%)	1.03	.000
	FiBi	76	3.53		1.16	
Oral comprehension	Regul.	208	2.89	.64/7 (9.14%)	1.24	.001
	FiBi	76	3.53		1.40	
Written expression	Regul.	208	2.24	2.14/7 (30.57%)	1.21	.000
	FiBi	76	4.38		1.24	
Oral expression	Regul.	200	2.79	3.30/7 (47.14%)	1.85	.000
	FiBi	76	6.09		1.15	

The scores of FiBi students are significantly higher than the scores of non-FiBi students in the five situations. In mathematics the test has a total of 54 points and in L2 the total amount of points of each test was 7. In mathematics FiBi students have a mean of 30.11 points, which is 4.27 points (7.91%) higher than the students of the regular classes. The difference is not as important as in the other tests but significant. Concerning the written competences, the result for comprehension competences is lower (9.14%) than the result for productive competences (30.57%). The difference is even larger concerning the oral competences with 9.14% for the comprehension and 47.14% for the expression. These aspects will be discussed in the next section of the paper. Generally speaking we observed a larger difference between both groups in the L2 than in the mathematics and, within the L2, an important difference between the competences concerning comprehension (reception) and expression (production).

4.2. Class visit and semi-structured interview

The observed mathematics lesson focused on quantities and proportions. The teacher first introduced a situation with all the students in front of the black board where he had drawn three orange juice bottles of different sizes linked to different prices. After a short discussion on elements influencing prices, the teacher sent the pupils back to their desks to do individual exercises. After a few minutes several pupils came back to the teacher in order to obtain specific explanations. During those explanations different interesting pupil-teacher interactions (with French-German code-switching) have been identified.

First the teacher sometimes translated the question into French directly after the question in German, like in the example below.

```
16 ROC     was gibt acht mal fünfzig rappen huit fois cinquante
```

This example shows a code-switching within the same sentence without any marks of change, probably in order to catch the attention of the French-speaking pupils. This way of changing the language in the middle of an output could also represent a way to stress an important part of the question that the teacher wants to make clear to the class.

The next example shows code-switching from a child during a phase where the teacher asks different students about the factors influencing the price of orange juice. One first student's answer is not audible but probably states that the profit should be a reason as the teacher repeats and validates this as one possible factor. Then a second student stresses that the time of the year may influence the price. The teacher validates this response but keeps asking for other factors. At this moment another student (EL06) says the answer "les transports" in French. The reaction of the teacher is interesting as he validates this answer by repeating the same word but in German and by rising his tone of voice. This example of code-switching shows at least two interesting aspects. On the one hand the interaction is not interrupted because all parts (students and teacher) are able to understand it and on the other hand the teacher stays focused on his question and the topic without starting an explanation about these words in both languages.

```
23 ROC     (…)was wird alles berechnet wenn man etwas. verkauft . was
           was es gibt nicht nur die WARE aber es gibt nicht nur den
           orangensaft . der kostet en ... und also ich meine die
           migros muss auch die orange einkaufen oder die die das
           einpacken oder. also die ware ist sicher etwas . dann die
           verpackung das wäre auch noch etwas das .. kostet\ ((nom
           de EL01))
24 EL01    ((séquence inaudible))
```

```
25 ROC      die wollen gewInn machen ja und sonst/ ((nom de EL06))
26 EL06     also zum beispiel früchte. die sind nicht ehm. ehm alle ...
            also .. vielleicht eher im sommer und im winter
27 ROC      genau die saisonalen bedingungen. äh also eben im sommer
            ist es vielleicht . günstiger als im winter/
28 EL2      les transports
29 ROC      transport/ aber das ist bei beiden gleich .. huh. ich meine
            das grosse muss man transportieren das kleine auch\
```

The most likely reason for the emergence of this code-switching is probably that the student does not know the word in German but wants to answer the question asked by the teacher anyway. This example shows the intention of the student of giving an accurate answer without making a linguistic issue and hence, keeping the focus on the content. We can hypothesise that this kind of code-switching benefits the disciplines and the language as the interaction about the price of orange juice move forward while the rest of the class hear one world (very similar in this case) in French and in German in a very short period of time. For the pupil that switched the language this could be a sort of decontextualization as the word he used in French is then introduced in turn by the teacher and hence, in the mathematics lessons.

The analysis of the interview with this teacher gives more information about the didactic organisation of the lessons and of the perceptions of the teacher about it. This article will not be able to show all the important aspects, but we present here the main findings regarding code-switching and the language-content balance. First the teacher explains that he has to adapt his way of teaching to the FiBi-population as he has French- and German-speaking students as well as speakers of many other languages attending his lessons. Indeed he argues that he uses more non-verbal communication such as gestures or illustrations than in monolingual programs. He also states that he uses code-switching usually as a last option when a child does not understand something, but he does not mention the potential of code-switching for the construction of linguistic competences. He stresses that the guideline of the project states that one teacher should speak only one language, referring to Ronjat's model. Hence he explains that he sometimes asks students to translate one word, but he never plans in advance such an intervention (or part of it) in French. This last aspect is exemplified in the following extract.

```
70-GST      Und Momente auf Französisch, das plannst du nicht zuvor,
            das kommt geraden auf dem Moment dran.
71-ROC      Genau. Grundsätzlich ist es schon die Vorgabe, dass es auf
            Deutsch sein soll. Ehm deshalb plane ich das nicht auf
            Französisch ausser, wenn ich weiss es ist schwierig, dann
            plane ich das insofern das sage wer kann das jetzt auf
            Französisch übersetzen. Aber dann kommt es nicht von mir,
            sondern von den Kindern. Wenn von mir Französisch kommt,
            dann ist es spontan. Je nach Situation.
72-GST      Ausser vielleicht so Wörter
73-ROC      Genau, ausser wo ich weiss aha das sind schwierige Wörter,
            dann übersetze ich sie, schreibe sie auf oder arbeite mit
            Bildern, wenn ich nicht unbedingt les nuages oder die
            Wolken, wenn ich nicht les nuages aufschrieben will,
            zeichne ich Wolken.
```

This example shows that the teacher uses French only in a spontaneous way and that he prefers to draw something rather than to use the translation. As mentioned above he does not plan the use of French in his classes, but he can do it if needed. In this case he would rather ask a pupil to translate, which is a possible way of making others participate in linguistics issues during the lesson.

The interviewee states that the writing productive competences represent one main issue of this project as he noted that French-speaking children tend to translate word by word from French into German. Finally, this teacher declares that he mostly focuses on the contents during the mathematics lessons but that he would immediately correct the form if one student would say something wrong. This is probably one other important aspect of two-way immersion that we will link to the results of the quantitative analyses in the next chapter.

5. Discussion and conclusion

Quantitative data showed that the FiBi-pupils developed significantly higher competences in L2 when compared to students of regular classes. This result is in line with the main findings from Canada presented by Calvé (1991). Nonetheless, we noticed larger differences in the productive rather than in the receptive competences, which could be seen as a potential benefit of the presence of speakers of L1 and L2 within the same class. Indeed, this mixed composition of the classes enables interactions on two levels: pupil to teacher and pupil to pupil. The second type of interaction is only possible in mixed classes and is surely improving the language productive competences of those pupils as they have more application opportunities. Another possible explanation for this difference is the construction of the tests in a communicative approach, which allow the pupils to make mistakes as long as the message is

understandable. The studies from the 1990's were probably giving more weight to the exact accuracy on the outputs of the children.

The interview of the teacher shows that the interactions in L1 and in L2 are quite natural for children of his class. The quantitative findings regarding competences in mathematics can easily be related to the researches of Gajo (2001) and Gajo and Berthoud (2005) as the FiBi-population has better results than the students from regular classes. The use of two languages in pupil-pupil interactions could represent a way of putting distance from the concepts in a sort of decontextualization (Moore, 2006) and learn the content through multiple tools. Examination of class activities showed that the mathematics lessons were focusing on mathematical aspects and not on linguistic issues, which sometimes is presented as a confusion in bilingual education. Indeed, the interaction was not interrupted when a student would produce an output in French during the mathematics lesson in German, as shown in the example of the sequence of the transcript above.

Qualitative data show how the code-switching situation can serve a number of different purposes. First, it is sometimes used as an unplanned way to catch the attention of the pupils with a different language and this was confirmed in the interview. But it is also a way for pupils to be more accurate (as in the example of the sequence about the price of orange juice) with the possibility to use the exact word. Interesting is that this aspect did not slow down the lesson in the example presented above. This aspect can be related to the general findings of the quantitative part of this study. Indeed, if the children are able to learn mathematics and L2 at the same time, this could be a serious argument in favor of bilingual education. Of course, further research will still be needed on this subject, in order to understand this phenomenon in a wider range, including aspects such as IQ or socio-economic status.

Both quantitative and qualitative parts of this study helped to shed light on bilingual education and two-way immersion. First, learning in L2 as well as in an important school discipline such as mathematics appear to develop in a considerable way. Second, the teacher implication in the development of discipline competences of the pupils seems not to be hindered by linguistic considerations, which probably has an impact on the results in mathematics that have been shown in the quantitative part of this paper. Thirdly, the presence of code-switching can represent an advantage for the discipline as argued by Moore (2006). Thus we recommend presenting aspects such as code-switching, balance between language and contents or class interactions in teacher training as they can play a major role in the success of bilingual programs.

In conclusion, the use of mixed methods for this study has been useful in order to measure the competences of children of a two-way immersion program on the one hand and detecting the complex context of knowledge production and code-switching in the class on the other hand. Further research implying mixed methodologies on classroom interaction or teaching school subject in L2 and code-switching appear important for a better understanding of the complex phenomena regarding bilingual education.

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ASSESSING THE EFFECTIVENESS OF TECHNOLOGICAL TOOLS IN TEACHING AND LEARNING ENGLISH AS A SECOND LANGUAGE

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Abstract

With the developing of information age, there is a tendency for many countries around the world to improve the quality of language education with the help of technological tools. This study tries to investigate the influence of virtual learning platform for university students in their English learning as second language. The quantity research was carried out and the participants were 144 second-year English major students coming from the Faculty of Foreign Languages in Gansu Agricultural University in China. By evaluating the data collected by the questionnaire, the results are as following: (1) It demonstrated the students' perception about using technological tools in studying English; (2) It verified the improvement for students' English competence with technological tools, especially in speaking and listening; (3) There were evidences that the communication between students and teachers had also been promoted; (4) The autonomous learning was formed when it came to acquire a higher level of English.

Keywords: Technological tools; second language acquisition; English learning; autonomous learning.

1. Introduction

Nowadays, the developing of technology has led to the constant scientific advances, and brought an advance of materials in a fast and varied way (Álvarez, Campo et al., 2009). From certain perspectives, technological tool is a reconstruction of traditional media to respond to the digital revolution. Technological tools are not only used in the most relevant computational advances, but have also led to some modifications and changes in the interactive processes that are carried out in the network. Therefore, there is no doubt that information and knowledge technologies (ICTs) have entered the educational field, in such a way and to such a point, that such confluence converts these ICTs into technologies for learning and collaborative knowledge (TAC) (García, 2010).

As these technological tools are developed, countries around the world are increasingly closer in their political relationship and economic and cultural development (Shi, 2015), and this new structure of the whole world implies that the relations are established by means of language. Hence, it is needed for citizens of different countries to improve their competence in one or more foreign languages. Today, there are more and more people learning foreign languages in China, due to the current need to make connection with the whole world. At the same time, how to improve the quality of second language teaching is highly necessary.

Pinto-Llorente, Sánchez-Gómez, & García-Peñalvo (2017) mention that the purpose of teaching English as a second language (L2) is to provide students with the necessary skills to carry out adequate communication. Therefore, second language teaching is an area based on the development of different communication strategies, skills and competences in which technological tools can play a fundamental role (Vega, 2016). The technological tool will be a key element that helps the development of different activities that favor the desired result and the improvement of the teaching-learning process of a second language. The use of technological tools is increasingly used by the demand of the global environment at the same time. One of the main reasons why I chose this topic is because of the tendency that everyone studies a second language and the need to improve the quality of education in our current society.

In this work, we will observe and analyze the benefits or disadvantages of the application of technological tools in the process of didactic activities. Meanwhile, the relationship between the use of different technological tools (mobile devices, virtual platform) and the improvement of foreign language learning is also investigated.

2. Context

The students in this study were English learners in Foreign Languages Department of Gansu Agricultural University in China who enrolled in the subject of English as a foreign language. They were separated in three groups (GroupA, Group B and Group C) with a number of students between 43 and 52, and their teachers were specialized in teaching English as a foreign language. During the experiment, each of the classrooms was equipped with a video projector, an electronic projection screen and a fixed acrylic blackboard, and all of the participants were allowed to use the virtual platform. The study lasted approximately three months.

A platform called "Moso Teach" was used in the experiment. It is an interactive tool with the support of the Internet, and IPTV technology is also included for users to communicate and evaluate each other. Every participant is able to transmit information through the forum in the plarform. This can be used on mobile phones and at the same time teachers can control it on their computer or use it in the classroom with a projector. Teachers can carry out educational activities on this platform, and watch students' performance. It also has the support of a large number of tools (new media) to be used in the design of activities during the teaching-learning process of English as L2.

3. Objectives

The objectives of this study were to analyze the influence of technological tools (mobile devices, platform) for learning a foreign language, specifically English. There were four research questions in the study: (1) Do The students know the importance of using the technological tools in studying English? (2) Whether technological tools can improve the students' English or not? (3) Could the communication between teacher and students in the new teaching environment be more active? and (4) Do technological tools help students develop autonomous learning?

4. Method

An anonymous questionnaire (English version) was posted in the virtual platform to investigate students' perception about using technological tools in English learning ($\alpha=0.885$).

The questionnaire was divided into three parts: Personal information, the use of new medias technology and the study about English learning. There were various dimensions in the questionnaire. Students were asked about their personal information and English learning experience, their perception of digital competence, frequency about using the platform, the expectations that students had about learning English and their opinion about the effectiveness of the activities carried out through tools to see the influence on their competence of English, especially oral expression and listening comprehension. They were asked if the interaction between teachers and students had been improved with this platform. It also included questions to evaluate if the technological tools help them build autonomous learning. Students valuated the platform when a temporary study ends.

This questionnaire was formed by Likert-type scales, it also included open, closed questions and with the prescriptions "yes" or "no" depends on their real situation.

5. Results

According to the data provided by the participants, among 144 students who completed the questionnaire, 98 of them were females, taking up 68%, and 46 males, which occupy 32%. As for the length of English learning, 52% of the participants indicated that they have learned English for 5 to 10 years, while 48% indicated that they have learned English longer, for 10 to 13 years. The fact showed that each participant has mastered English at certain level.

We asked participants if they considered the technological tools that used in this study contributed or helped them to improve oral expression and oral comprehension. According to the results obtained, 35.4% of them confirmed that these technological tools had helped them a lot to improve their oral expression and 38.9%, regular, because they were able to use the mobile phone and Internet to get various materials meanwhile teachers would ask them to do oral practice that every student could evaluate and communicate through the virtual platform. According to the average calculation, it showed that the average score of these questions surpassed 3. With respect to the data obtained in the listening comprehension, more than 50% of the students, specifically 52.8%, considered that this contribution was good. We also emphasized in the obtained results and in regard to the improvement of the pronunciation that the students considered that it had helped him between regular, 31.9%, and quite, 40.3%, which indicated that

technological tools had a good impact on improving oral compression, and there was a 36.9% of participants who believed that these technological tools had an excellent function (Average= 3.19). With these data, we can see the positive influence exerted by the technological tools on oral expression, oral compression and pronunciation. We noted that most students have improved their oral English.

Figure 1. Frequency of using technological tools.
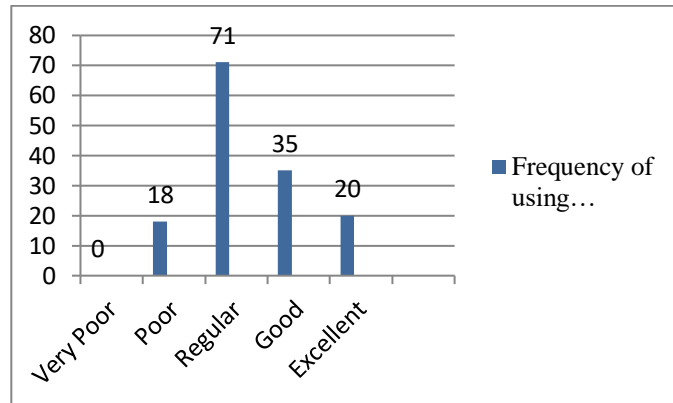
Regarding the variable that was referred to the frequency of using technological tools mentioned, we highlighted that the vast majority of students used it on a regular basis (Figure 1). On the other hand, based on the data collected, most students considered that the use of technological tools in learning a second language was quite effective, which the average score was 3.19.

Table 1. Result of the questionnaire: The interaction between participants.

	Average	Very Poor	Poor	Regular	Good	Excellent
The interaction between teachers and students	3.29	0	0	12.5	45.8	41.7
Communication On-line	3.17	0	0	12.5	58.3	29.2

The results (Table 1) also showed that 41.7% of those students thought that after using these tools, they communicated more with their teachers (Average=3.29) , When asked about the communication on-line, the average score is 3.17 and more than a half of them thought their role in English learning had changed because of the platform, everyone could express their opinion instead of receiving feedback from only one person.

We evaluated the tools that they used to see if they can establish an autonomous learning throughout their English learning. 51.4% of them believed that technological tools had helped them to improve autonomous learning (Average=3.11) and 35. 4% developed a collaborative learning in significant measure, encouraged them to study in a group and carry out a continuous study (Average=3.52). About the study environment offered by the technological tools in learning English, 41.7% thought it was open and natural. With the forum, students learned in groups, did exercise in a critical way and thought creatively.

6. Conclusions

The study was aimed at identifying students 'perception and experience in using technological tools in learning English. The results showed that technological tools were effective in teaching and learning English, as well as improving oral expression and listening comprehension. Technological tools implemented interactive and collaborative resources to create the e-activities that are appropriate to improve students' English pronunciation level and ability to perceive and produce English more accurately (Pinto-Llorente, Sánchez-Gómez, & García-Peñalvo, 2015). Communication between teachers and students had also been improved, and this type of learning helped establish an autonomous learning when it came to acquiring a higher level of English. In their comments, students emphasized that the technological

learning environment afforded the possibility to think not only as a receiver but also a giver, and that this motivated them to put more effort into the language study.

These technological tools offered a direct opportunity for students to learn a second language (Pinto-Llorente, 2012). In addition, the effective of using technological tools in the classroom for learning-teaching foreign languages depends on the ability of teachers and students to interact with technological resources.

Because of the recent international situation, we needed more people who can adapt this brand new social environment and economic market. According to Wang (2012), the development of teaching foreign languages has undergone a substantial change in recent years due to new technological tools. It has gone from a synchronic teaching that takes place in a specific place to an asynchronous multimedia teaching that develops in virtual spaces. A future trend in teaching a second language is the improvement of the processes of b-learning and the use of synchronous and asynchronous tools offered by virtual platforms.

The findings of the research brought encouraging conclusions and suggested, it is crucial to supplement language teaching with technological tools. However, a limitation of this study is that the sample was not very large (144 students) and the duration of the study was relatively short (3 months). We have not evaluated the participants' digital competence which could influence the results of this experiment. Future research should assess the advantages and disadvantages of more type of technological tools with larger populations and adapt the concept according to teachers' and students' perceptions and needs. The objective is to find the balance of instructional strategies that is specifically targeted at improving student foreign language learning ability and also maximize its positive impact in teaching process.

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METHODOLOGICAL CREATIVITY IN PEDAGOGICAL RESEARCH – GLOBAL CHALLENGE

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Abstract

Most pedagogical issues cannot be explored or explained in the example of numerous indicators and mathematical analyzes. This does not mean that statistical indicators do not have to be present in pedagogical research, but it is emphasized that without any qualitative indicators not a single pedagogical phenomenon could be fully explored. This topic raised another important issue – the issue of publishing works in which mostly qualitative methodologies have been used in highly indexed journals. Such works by scientists (reviewers) are often classified as "works of the second order" because they do not show "higher" level of statistics. In addition, such works often do not pass the first step, which is a preliminary review that mainly refers to a methodological analysis. For these reasons, it is much easier to publish a paper using rather quantitative than qualitative methodology. Numerous researchers have already been alerted about this situation, and now it reached its peak.

We will come across a special report by scientists and reviewers if we use the futurology methods of research in the methodological part of the paper. This is, according to some, another step below the "evaluation" of those who do not even know the futurology research methods. As a counterpart to such an understanding and to the research corpus, there is a "third part". In addition to the quantitative and qualitative methodology we have a mixed methodology that seeks to alleviate the positivist approach in pedagogical research.

That opens some space for reflection on the new approach (in addition to the existing ones) in the methodology that would give a new framework for pedagogical phenomena. Can the choice of methodology be less restrictive for researchers? Is a high level of precision and the ability to check the results obtained, and thus greater relevance than the actual changes in practice? Can methodology be "creative"? Those are the questions that need answering.

The paper aims at raising awareness of the importance of a qualitative approach in the research of pedagogical problems and at offering ideas that can contribute to changes in the creation of a new methodological framework that certainly represents a new global challenge.

Keywords: *Creativity methodological approach, mixed methodology, pedagogical research, qualitative methodology.*

1. Introduction

The paper seeks to emphasize the need for equal representation of qualitative and quantitative research methods in research of pedagogical phenomena, since the exclusivity of one would distort the holistic approach. In an attempt to emphasize the situation "on the field" an analysis of graduate theses of the students of the Teacher Education (Faculty of Education, University in Osijek, Croatia), was conducted (Dubovicki, Mlinarević & Velki, 2018) which showed that 60.6% of students in their graduation theses used survey as the only research instrument within the frame of the positivist paradigm. If we consider the fact that the most significant scientific area comes from social sciences (36.47%), and within them from the field of pedagogy (46.55%), we will notice an inequality of other scientific paradigms, and in particular the lack of other research methods that go hand in hand with qualitatively methodology. Sometimes we try to justify ourselves to our colleagues, saying that we, as mentors to students (graduates and/or Ph.D. students) used qualitative methods in our research. Nordstrom & Happel-Parkins (2016) also warned about that state, referring to it as the *methodological drag*.

> *"When we explain and defend qualitative research to, for example, skeptical colleagues, we must perform authoritatively and definitively. We must have the "Truth" about qualitative research even though we know there are multiple, contingent, and partial truths about qualitative research. We do this to justify and validate qualitative research to other faculty members and administrators so that our students' research can, in turn, be validated."*
> *(Nordstrom & Happel-Parkins, 2016, 151)*

The so-called methodological resistance should not be a dogmatic term that seeks to reduce the presence of qualitative research methods, it should represent a strategy that seeks to open up multiple and contingent ways of understanding the qualitative methodology for all those who use the qualitative methodology in their future research. With qualitative data, we can reach the deepest human experience (Mitchell & Clark, 2018) and they are thus extremely important in pedagogy.

2. Problems of publishing pedagogical papers that used qualitative approaches

Papers that used only qualitative methodology are often exposed to a greater number of criticism (mostly non-public) by scientists and reviewers who often reduce the value of papers written in such a way. By deciding to use qualitative research, you have already "cut down the chance" to have your work published in well-known and highly-indexed journals. Such papers often do not even pass the first step, which is a preliminary review that mainly refers to methodological analysis (Dubovicki, 2017). Suzić (2017) also points out that one of the most important conditions for publishing papers in highly indexed journals is, actually, the use of quantitative methodology (especially in the Balkans). Twining, Heller, Nussbaum & Tsai (2017) emphasize the fact that qualitative research (due to ontological and epistemological viewpoints) does not take into account the sample representability for the whole population and for these reasons we cannot expect to be able to generalize the obtained data, as is the case with quantitative research. This can also undermine the categorization of work. Wishing for their papers to be approved and published (which is essential for collecting points for advancement at professional level), numerous pedagogues decide to use quantitative methodology and positivist paradigm in their research. Bognar (2012) warns us that such an attempt to apply the methodology of natural sciences to social sciences, alongside the aspiration to mathematize pedagogical phenomena, could lead to the complete separation of pedagogical theory from practice. The introduction of numerical methods in social sciences that are associated with rationalism (17th century) and positivism also contributed to this state. We can say that the new epistemology started, hand to hand, with the constitution of certain social sciences, especially pedagogy. Numerous researchers (Soltis, 1984; Bognar, 2012; Avenier & Thomas, 2015; Dubovicki, 2017; Twining, Heller, Nussbaum & Tsai, 2017; Mitchell & Clark, 2018) warned about this situation, which reached his peak a few years ago (especially in Croatia). Serikov (2016) points out that it would be desirable to use Volodar Viktorovich Kraevsky's ideas in the research of pedagogic phenomena. Pedagogical methodology should offer a creative approach towards research, via the creative activity of researchers.

> *"The purpose of methodology is to substantiate the means of constructing pedagogical theory as a cognitive construction that supports a trinity of functions: explanations, designs, and forecasts of the functioning and genesis of pedagogical reality. The aggregate of activities that substantiate the means of perceiving pedagogical reality comprises methodological activities in pedagogy."*
> *Serikov (2016, 527)*

This state of affairs is less alarming if we only take into consideration the publication of the papers (and its methodology), however, if we add, to the mentioned above, the situations in which the success of the projects are evaluated (in the end) according to the number of published papers and/or the themes of doctoral dissertation filed via a form that requires solely positivist paradigm (Bognar, 2012), then we should wonder about the direction in which the pedagogical research is heading. Suzić (2017) highlighted a few useful tips, in order to warn about the problems of publishing pedagogical papers connected to qualitative research.

> *"Qualitative researches derive meaning from multiple sources, but also look for an account of the phenomenon by examining and describing the history of it, and by presenting the current status of the subject matter in relation to the author's course of action...Qualitative research is only useful if the background information is provided concisely and straightforwardly."*
> *(Suzić, 2017, 136)*

Futurology methods of research represent an additional challenge for researchers. In addition to being insufficiently represented in all areas and fields of science, insufficiently known and inadequately applied in research of pedagogical terms, most of them still belong to the qualitative paradigm (Dubovicki, 2017). An interesting fact that also points to this is the lack of reviewers from the area of futurology. This paper also raises the question about the "expertise" of the reviewers for papers which used futurology research methods. Suzić (2017) also writes about the similar situations when it comes to the reviewing of the papers which demonstrate higher statistical and methodological procedures. It is desirable (and necessary) to carefully select the reviewers because it is common practice that reviewers are often chosen "from home" and for more or less known reasons. Another problem with the selection of reviewers is related to papers written in the languages of minorities, so such papers (written in the Balkan languages) are often a priori "condemned" to reviewers from those areas who may not be the best and/or most competent, but there is no other choice. Keeping all this in mind, we can also think about the right choice of categorization of individual papers published in such magazines (Hannes, Heyvaert, Slegers, Vandenbrande & Nuland, 2015). On the other hand, similar problems appear less in the reviews of papers that primarily use statistical indicators.

3. Discussion

It should be emphasized that a paper does not a priori use qualitative methodology (nor quantitative) since the methodology of each work is determined regarding the set hypothesis/research question. Unfortunately, that is not always the case. Mentors often give their graduates already finished instruments (most often surveys) which they then use in their research so that the applicants do not have to go back to pilot studies (check reliability) on some newly-built instruments (Dubovicki, Mlinarević & Velki, 2018). Also, the value of some papers should not be determined by the type of methodology and choice of research instruments.

Contributions to this topic are also provided by instructions from certain journals or conference organizing committees (in the form of templates) which require participants to respect the default "mold", often written in the form of: Introduction, Methods, Hypothesis, Research Results and Interpretation, Discussion, Conclusion and References. Some researchers see a solution in the use of mixed methodology, which is becoming more and more popular. The majority of today's researchers (Burke, Onwuegbuzie & Turner 2007) point out that methodology is still divided into: qualitative, quantitative, and research using mixed methodology. Burke, Onwuegbuzie & Turner (2007) present a brief history of mixed methods and point out that it is necessary to respond to the issues that have emerged recently due to the increased number of researchers who conduct their research using mixed methodology. Kumsa, Chambon, Chung Yan & Maiter (2014) also emphasize the importance of methodological validity that we need to pay attention to in the participatory research. In our paper, we examine the messy processes in the preliminary phase of their research project and the invaluable insights we took into developing a creative methodology. Mason (2006) emphasizes the importance of 'qualitative thinking' as a useful starting point for mixing methods, but says that it is ultimately more useful to think in terms of multi-dimensional research strategies that transcend or even subvert the so-called qualitative-quantitative divide. Gorard and Taylor (2004) emphasize the importance of data obtained by combining the method, pointing out that the lack of one research method can be compensated by complementing the other by contributing to the credibility of the obtained results. Soltis (1984) writes that about the importance of exploring and studying the pedagogical phenomena using different scientific paradigms, but also the openness of the researcher towards personal rational assessment regarding the set research claims. When it comes to the research of pedagogical issues, Matijević & Topolovčan (2017) in advocate the synthesis of qualitative and quantitative approaches that can be formed on the basis of: additive interconnection, triangulation and transformation with the help of transforming qualitative data into quantitative and vice versa. The quality of the collected data depends on the appropriateness of the methods used, the quality of the individual data collection instruments and the process of utilizing those instruments. Evidence should be collected from multiple sources to enable triangulation (Baškarada, 2014).

Braun & Clarke (2006) note that the criteria for the evaluation of qualitative and quantitative research should be equally rigorous. There is a question of assessing the quality of qualitative research and of having a set of criteria that are suitable for all qualitative approaches (Reicher, 2000; Braun & Clarke, 2006; Hammersley, 2007). Some researchers (Spencer, Ritchie, Lewis & Dillon, 2003; Hannes et al., 2015) objected to such generic guidelines precisely because of the specificity of particular sciences and specific challenges within which research is being conducted. It should be kept in mind that no research approach should be exclusive, and that no research technique should be idealized. Although the paper is focused on the affirmation of qualitative research techniques in pedagogical research (and even representation in relation to quantitative ones), it is important to warn researchers of some of the

shortcomings. Twining et al. (2017) state that qualitative research often collects very much data, and researchers therefore need to be extremely skilled in the interpretation of the said data. In addition, data gathering should focus on answering the research questions. That process is often difficult since the researcher simultaneously collects and analyses the data, so it is important to avoid being superficial in doing so.

4. Conclusion

In order to influence the changes of the current situation, and improve the even representation of qualitative and quantitative methods in pedagogical research, it is certainly necessary to revise the existing patterns for the selection of topics for graduate, master and doctoral theses, in which the candidates should most often opt for quantitative methodology. In addition, it is necessary to approach the new editorial philosophy and politics of pedagogical journals that need to be open to different approaches and scientific paradigms (Bognar, 2012).

The global challenge in the development of pedagogical methodology is the correlation of research with practice and the influence of changing condition, emphasizing the theoretical foundation and holistic approach of the researched issue. A new approach to methodology should at least be creative - directed at the freedom of the researcher and adaptable to the "field" situation. These changes should also be present during the education of students within the methodological courses at the faculties.

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SEEING, READING AND LISTENING TO GENDER INEQUALITY/EQUALITY IN VIDEO CLIPS

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Abstract

Sexuality pervades the media, an important tool to access information, in the promoting dialogue and in non-formal education for adolescents and young people (Andrelo & Almeida, 2015; Gallego, 2000). As much as objectivity in communication is proclaimed, the messages conveyed by the media are hardly neutral, developing regimes of authenticity with multiple conflicting meanings about sexuality and gender. Many media narratives, from a consumer perspective, are constructed from successful formulas, acting as proposals for the interpretation of reality and social behaviours, present in stereotyped forms of socially dominant values, norms and behaviour models (Andrelo & Almeida, 2015; Belloni, 2005; Lobo & Cabecinhas, 2013; Teixeira et al., 2010). Music has a prominent place in the media and music videos play a relevant role in its dissemination. During their educational training adolescents and young people should be alerted to certain types of social constructions and video clips may be the means to do so. So, starting from the didactic approach of the following video clips: "As Long As You Love Me ft. Big Sean," "Try," "*Havemos de lá chegar,*" and "Scratch My Back" carried out by 65 7th and 12th year students, whose thematic axes focus on affectivity (paternal, parental, erotic and sexual , friendship) and on love, on interpersonal relationships that are established in the work environment and on violence in affective and/or romantic relationships. The discourses analysed found that stereotyped conceptions about the feminine/femininity/being a woman and the masculine/masculinity/being a man persist.

The discourse presented also refers to: i) psychological differences and personality characteristics; ii) moral attributes of behaviour and personal skills; iii) placing women in a situation of dependency and inferiority; iv) perpetuating the roles traditionally attributed to men and women and unequal relations of power; and v) promoting heteronormativity.

The idea that it is necessary to work on the issues of sexuality and gender conveyed in the discourse contained in video clips is corroborated, so that they are not received passively, because the discourse is fraught with subjectivity.

Keywords: Sexuality, gender, media, gender equality, video clip.

1. Introduction

Learning to be a citizen implies developing skills, attitudes and values that help each person to know their rights, responsibilities and duties, enabling them to play an active role in the community of belonging. Active and multiple citizenship implies that each of us is endowed with social and civic skills to know how to relate to the other (Vieira et. al, 2010).

School should be a privileged space for learning, living and exercising citizenship in a wide range of dimensions, of which we highlight, in the study presented here: education for gender equality, education for the media and education for sexuality. Knowledge of self and of the other is interpenetrated with gender and citizenship issues, which must be an integral part of curriculum development from the first years of schooling (Cardona, Piscalho & Uva, 2011). School should be a space where students, in addition to acquiring technical and scientific knowledge, should express, among other things, "the human qualities of responsibility, solidarity and respect for others" (Fonseca, 2012, p.5).

The media are part of our daily lives and are an important tool in accessing information, in promoting dialogue, in the development of essential analytical skills, in the training of informed and critical citizens, and can play a relevant role in the non-formal education of adolescents and young people (Andrelo & Almeida, 2015; Gallego, 2000). It is important not only to access the media, but also to

understand, comprehensively and intensely, the realities they present, the techniques they use to construct these realities, their narratives and the underlying values (Manovich, 2001; Warnick, 2002).

The media are neither innocent nor impartial; they are workshops of positive and negative representations whose discourse is influential and, as such, must be used in the construction of a culturally inclusive citizenship. Adolescents and young people in being educated should be alert to certain types of social constructions, and video clips may be the means to do so. Many video clips are loaded with sexual content, sexuality being the vehicle of promoting an identity and/or attracting different audiences.

Taking into account that video clips facilitate the learning of content and values, it is important to promote the critical analysis of the discourse conveyed by them, so that all people can enjoy the benefits they can provide in a consciously and profitably.

2. Design

2.1. Investigating what and what for?

Considering that Education for Citizenship, Sexuality and the *media* constitute an unquestionable challenge for the teachers' educational practices, our intention was to know the following using a set of video clips as an object of study: "From a didactic approach to the video clips most viewed by adolescents and young people, what images of sexuality and gender do they gather?"

Having identified these images, it was also important to understand:

– What gender roles and stereotypes are emphasized in the video clips most viewed by young people?

– How are gender differences and (in)equality expressed?

This study focused on two main aims:

i) To analyse the repertoire of representations of sexuality and gender present in the discourse of four specific video clips;

ii) To integrate into the researcher's professional skills, as a teacher of elementary and secondary education, a didactic approach to audio-visual media in common use in young people's daily lives.

Because it is understood that video clips constitute privileged means of capturing young people's expectations, and that, as such, they influence their behaviours and attitudes, the following specific objectives emerged from the central question formulated to guide the research process:

1. To contribute to improving professional the researcher's skills, in approaching critical and reflexive reading of the media's discourse in the context of the classroom.

2. To analyse gender stereotypes that appear in the video clips most viewed by students in the 7th and/or 12th year of schooling.

3. To determine whether the students identify with the models that the protagonists of the video clips present and with the values they promote.

4. To promote the knowledge of these "products" to female and male "consumers" as well as to teachers.

5. To identify possible contributions from video clips to gender (in)equality.

6. To raise awareness, based on the contributions of the video clips analysed, of the existence of the values of gender equality.

7. To promote the creative and responsible use of media to express and communicate ideas and to use them effectively for civic participation (MEC, 2011, p. 50943).

2.2. What were the stages of the research?

This study was developed in 5 distinct stages:

Stage I – Extensive survey of the literature to establish the theoretical framework regarding the issues of education for citizenship, for the media and sexual education, sexuality and gender in the media and to constitute the methodological framework.

Stage II – Approaching the phenomenon of video clips watched by adolescents and young people, designing and applying a questionnaire survey to students of the 3rd cycle of elementary education [years 7 – 9] and secondary education. In addition to the initial exploration of the video clips, which enabled an approach to the phenomenon, the video clips most viewed by the adolescents and young people involved in the study were selected.

Stage III – Content analysis of the most viewed video clips in order to find elements that are conducive to identifying gender stereotypes and designing of visualization scripts.

Stage IV – Visualization of the video clips in class, applying the visualization scripts.

Stage V – Analysing, taking conclusions and developing theoretical implications.

2.3. Investigating with whom? Where? When?

The study involved students of the 3rd cycle of elementary education [years 7 - 9], (27 students in 7th year of schooling) and secondary education (38 students in the 12th year of schooling), attending an elementary and secondary school, in the Centre-North Region of Portugal. The choice of this group of students was related to the levels/years of schooling attributed to the teacher. It was therefore a group with wide age range (from 13 to 18 years), which had differences inherent to their stage of development, was heterogeneous in its composition, in its interests and concerns.

To implement this study, the teaching unit dedicated to the Education for Health and Sexual Education project as defined by the respective Class Councils' guidelines, was favoured.

3. Methodology

This study falls within the scope of the interpretative paradigm since it is intended to understand and deepen the knowledge of a given situation in a given context (Carmo & Ferreira, 1998; Coutinho, 2011). Subjectivity is an inherent characteristic of a study of this nature, since when working on questions of sexuality and gender, with a strong idiosyncratic connotation, the researcher/teacher will try to interpret and understand aspects related to each of the participants' way and of feeling.

The research was intended to combine the two views on the topic under study: the researcher/teacher's analysis and the perception that participants (adolescents and young people) have as viewers of video clips.

To this end, the researcher used techniques and research instruments of an essentially qualitative nature (video analysis guides and reports) and used qualitative and quantitative questionnaires in order to select each of the video clips in the study.

The techniques and data collection tools used are described in Table 1.

Table 1. Data collection techniques and instruments.

Techniques	Data collection instruments
Survey	Questionnaire applied to the students
Observation	Researcher's records
Documentary	Visualization guides
Analysis	Reports of the researcher/teacher

Each guide, based on the methodology of Díez Gutiérrez (2004), presents a set of activities, divided into four big blocks: "learning to look" – exercising the critical eye to help construct a certain perspective of reality, "understanding and analysing" – to deconstruct meanings, "interpreting and evaluating" – to activate intentional critical judgment and to give voice to one's own words about the reality being analysed and to evaluate, and "transforming" – by elaborating alternative proposals to the stereotyped messages.

4. Analysis of the discourse delivered by video clips

A careful analysis of the discourse conveyed by each of the video clips allowed us to identify affectivity (paternal, parental, erotic and sexual, friendship) and love, interpersonal relationships established in the work environment and violence in affective and/or amorous relationships as the main thematic axes.

It was found that, from a linguistic point of view, "As Long As You Love Me," "Try" and "Havemos de lá chegar" approach the theme of affective relationships, more specifically, love. Overall (image, lyrics and music), "As Long As You Love Me" is a teenage love song, in which the one who is in love speaks of the troubled relationship with the person they are in love with. "Try" brings up violence in the context of interpersonal relationships, more specifically in intimate relationships and "Havemos de lá chegar" addresses the theme of love, it talks about people, relationships, encounters and disagreements, fights, getting back together and a whirlwind of emotions. As for "Scratch My Back," the narrative focuses on interpersonal relationships in a work context.

In the video clips, there is kissing, caressing (touching of bodies, hugging, holding hands) and games of seduction in projecting sexual images (Teixeira & Marques, 2016).

The in-depth knowledge of each video clip allowed a connection to be established between the social events portrayed and the apprehensions, expectations and behaviour patterns followed by the youths involved in the study. They were also able to recognize and identify gender stereotypes associated

with physical and psychological traits and roles conveyed by the female and male characters, placing the woman in a situation of dependency and inferiority.

It is observed that the discourse expressed, implicitly or explicitly, places the body in the centre of the visual attention. It standardizes patterns of beauty and attributes unequal visibility and appreciation to it according to whether it is a man or a woman, making it out to be a central place in constructing femininity (Natt & Carrieri, 2016) and masculinity (Díez Gutiérrez, 2015).

It is up to women to be young, lean, beautiful, sensual, to meet the requirements of contemporary beauty and physical attraction (Mota-Ribeiro, 2002a, 2002b; Castro, 2003; Campos, Cecílio & Penaforte, 2016; Teixeira & Marques, 2016). Wearing skirts and dresses, tight and intimate clothes, is part of their language of seduction (Teixeira & Marques, 2016).

Men should be tall, thin, young and muscular. If they intend to appear powerful, they must wear suits or long-sleeved shirts, since clothing must be "commensurate with business know-how" (Natt & Carrieri, 2016, p.120).

The discourse conveyed confirms women as the main victim of gender inequality, ratifies the subordination of women in affective relationships, love and work and women as victims of violence, as indicators of inequality. It also makes the unequal visibility and valorisation conferred on men and women explicit. It alludes to the vertical segregation to which women are subject to in relation to their hierarchical position and reinforces the idea of the existence of male and female professions.

It is recognized, therefore, that the discourse presented in the video clips analysed, especially in terms of images and verbal and non-verbal interactions, accentuates gender inequality and attests to the (re)production of stereotyped views of sexuality and gender.

5. Final considerations

This study helps to corroborate the idea that there is an urgent need to deconstruct issues related to sexuality and gender conveyed in the discourse of video clips in the classroom, so that they are not received passively, enabling adolescents and young people to have a more informed, critical and responsible intervention. The National Strategy for Equality and Non-Discrimination – Portugal + Equal argues that the issues of equality between women and men, of violence against women and domestic violence, of sexual orientation, of gender identity and expression, and of sexual characteristics should be integrated into both the materials and the educational frameworks.

The video clips analysed do not exhaust, nor do they explain, in their entirety, the gender issues brought to the fore. The analysis of the discourse conveyed by these video clips, and so many others, reflects each person's way of being and feeling, which consubstantiates its inherent subjectivity. Each of the participants interpreted the message conveyed from their own filters and their emotional interference, which may have led to changes in their perception of a given reality (Moran, 2007). As Moran (2007) argues, new experiences require deep analysis, so that one does not fall into the error of standardizing, fixating, crystallizing and stereotyping contents (Shaffer, 1994 cited by Nogueira & Saavedra, 2007), relative to previous experiences.

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A PERCEPTUAL-COGNITIVE PROGRAM TO TRAIN SOCCER PLAYERS' DECISION MAKING

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Abstract

Elite sport is all about making the right decision, at the right time, under pressure and in any context (Vickers, 2007). Many tools are available to train decision-making skills. One used commonly in elite level sports is video feedback. However, with young players, this tool is rarely used due to time constraints and athlete-coach ratio. Nowadays, an alternative to video feedback is used in the form of a perceptual-cognitive exercise (Zentgraf, Heppe, & Fleddermann, 2017). This exercise has significant effects on decision-making skills when used during warm-ups, but cumulative effects have not been measured (Holding, Meir, & Shi, 2017). Also, perceptual-cognitive exercise has mainly been studied in experimental contexts, leaving few considerations for athletes and coaches' reality.

Therefore, this study aims to help a coach integrate perceptual-cognitive exercises in his training program. The first objective is to describe the clinical supervision process offered to a youth coach. Sub-objectives involve (a) understanding the different phases of the clinical supervision and (b) measuring players' performance as indication of change. The second objective is to describe players and coach's perceptions about quality and effectiveness of such program.

One female coach participated in the study, as did her 27 young female players (M=12,25 ± 0,28). They completed a six-week perceptual-cognitive program, twice a week. To jot down the supervision process, a log-book was used by the researcher during 16 weeks. Players' performance was measured with *Stivi* software for response time and decision accuracy during practice (n=13). Decision accuracy in game was measured with observation grids, three times: week one, six, and three weeks post intervention. As for actors' perceptions, focus groups were used with players' (n=2x8) and an individual semi-structured interview was used with the coach (n=1).

Findings indicate that the clinical supervision process presents three phases. In the programming phase, results show that building sequences alone for perceptual-cognitive exercises is complex and time consuming, and thus unlikely to be attempted by the coach alone. In the interaction phase, the six week program was easily integrated to the training schedule. Also, the coach noted positive changes in her players, such as search for information at play and verbal support to partners holding the ball. Also, results show a slight decrease for response time and increase for decision accuracy. Finally, during the evaluation phase, performance measures enabled an objective analysis of advantages and limits of the proposed program.

Keywords: Clinical supervision, cognition, decision-making, perception, sport.

1. Introduction

Top athletes are those able to make the right decision, at the right time, under pressure and in any context (Vickers, 2007). One tool commonly used to coach decision-making skills in elite level sports is video feedback. However, time constraints and high athlete-coach ratios limit its use with younger athletes. Zentgraf, Heppe, and Fleddermann (2017) reviewed the effects of perceptual-cognitive exercises with the potential to replace video feedback. The exercises are done by watching short video clips of the sport trained, occluding the clip at a crucial moment and asking the athlete to make a decision as fast as possible. However, they aren't widely spread because of their lack of realism and considerations for retention and transfer of decision-making skills (Broadbent, Causer, Williams et Ford, 2015).

In the last 10 years, researchers have modified the exercise using different strategies. For example, Gabbett, Rubinoff, Thorbun, and Farrow (2007) coupled perception and action by adding a motor response to the exercise to successfully train anticipation skills of softball players. On the other

hand, Hohmann, Obelöer, Schlapkohl, and Raab (2016) compared 3D images to 2D images with results on decision time and decision accuracy. Unfortunately, both strategies need large screens and complex equipment not easily accessible for youth coaches. Anyhow, Spittle, Kremer, and Hamilton (2010) showed that the size of the screen doesn't affect results on decision-making skills. Thus other strategies should be explored if to be used by youth coaches.

Recently, Lorains, Ball, and MacMahon (2013) improved decision-making skills of Australian football players by simply using above real-time video clips. Playing videos one and a half times faster appeared to be more "game like" than normal speed to the athletes. However, the strategy showed no effects with younger and less experienced athletes. Differently, Holding, Meir and Shi (2017) used the perceptual-cognitive exercise during warm-ups to train specific reactive-agility in rugby. Since cumulative effects have not been measured, effects of this strategy remain unclear.

2. Conceptual framework and objectives

To our understanding, no studies have worked with the coach to help him implement the perceptual-cognitive exercise in practice. For a coach, adding a new exercise to his training routine obliges him to change his practice. To this end, clinical supervision is known to have positive effects leading to transformative practice (Brunelle, Stoloff, Roy, Desbiens, & Spallanzani, 2008; Stoloff, Spallanzani, & Brunelle, 2016). Together a coach and a supervisor go over three phases of intervention: programming, interaction and evaluation (Brunelle, Drouin, Godbout et Tousignant, 1988). The programming phase includes context, program and omen variables used to plan the intervention. The interaction phase is the core of the intervention since the coach is in action, as well as his players. It includes all process variables. The evaluation phase is used to analyze the product of the intervention. Specifically, coach and supervisor evaluate the quality and the effectiveness of the practice put in place by the coach.

In sport, a coach's effectiveness is based on athlete's improvement, reflecting the level of learning. According to Schmidt (1993), learning is a result of practice and observed by a change in the athlete's performance. Those changes are then confirmed by skill retention and transfer (Schmidt, 1993). Retention is the ability to maintain a certain level of performance even after a prolonged pause in practice. Transfer is the ability to use the skills learned in different or new contexts. In sport, decision-making skills often use decision accuracy and response time to measure level of learning of perceptual-cognitive skills (Vickers, 2007). The skills learned during practice must then transfer to competition (Vickers, 2007).

Therefore, this study aims to help a coach integrate a perceptual-cognitive program during practice. The first objective is to describe the clinical supervision process offered to a youth coach. Sub-objectives involve (a) understanding the different phases of the clinical supervision and (b) measuring players' performance as indication of change. The second objective is to describe players' and coach's perceptions about quality and effectiveness of such program.

3. Methods

One female coach participated in the study, as did her 27 young female players (M=12,25 ± 0,28). Being on two different teams, the players practiced together and played each other in regular season. They all completed a six-week perceptual-cognitive program, twice a week using Samsung Galaxy E Lite tablets. The program used was *Stivi* software, specifically built for this study, enabling perceptual-cognitive exercises on tablets without Wi-Fi connection for easy use on the field.

Done before practice, exercises consisted of 30 video clips, four to six second long, showing game footage of the two teams. Each video was occluded at a critical moment for decision-making. Players chose the decision they thought correct by clicking on boxes presented on the tablet's screen. They were instructed to do so as quickly as possible.

For all data collection, institutional ethics approval was provided (approval number CER-18-246-07.08), and informed consent was obtained from participants and their parents before the commencement of the study. To answer our first objective, a log-book (LB) was used to jot down the 16 weeks supervision process. As indication of change, athlete's decision accuracy and response time during practice were measured (n=13). In addition, in-game decision accuracy was assessed with an observation grid related to passing, dribbling and shooting skills, coding 20 minutes episodes, during games between the two teams at three occasions: week one, six, and three weeks post intervention. To answer our second objective on actors' perceptions, focus groups (FG) were used with players (n=2x8) and an individual semi-structured interview (SSI) was used with the coach (n=1).

All quantitative data was collected though *Stivi* software, then analysed with *SPSS24*. ANOVA analysis of mean decision accuracy and response time during practice was used to describe changes for short-term learning and retention. To describe performance transfer to competition, ANOVA analysis related to proportional success of passes, dribbles and shots were used, allowing identification of changes in athlete's performance. All qualitative content was transcribed then analysed with *InVivo10*, by content categorization, then validated by triangulation from LB, FG and SSI throughout the intervention.

4. Findings

4.1. Objective 1: Describe the clinical supervision process offered to a youth coach

The programming phase represented one of planning and familiarisation of the perceptual-cognitive exercises. It combined three stages: 1) identification of decisions to be trained, 2) filming sessions and 3) the building of the video clips (approximately, 20 hours) needed for the perceptual-cognitive exercises (LB, p.1-3). Each stage was in collaboration with the coach, except the third one, which was driven by the supervisor who was accustomed with the occlusion technique. The coach validated the video clips to insure concordance with decisions trained. In this case, these were: decisions with the ball, decisions when regaining ball possession and first touch orientation of the ball (LB, p.1.). This phase was the longest phase of all and unlikely to be attempted by the coach alone (SSI, p.2).

The interaction phase enabled to apply and test the perceptual-cognitive program. Types of decision trained where chosen by the coach according to the goals set at every practice. In all, decisions with the ball were trained six times; decisions when regaining ball possession twice and first touch orientation five times (LB p.4-14.) Results show a slight increase for decision accuracy (Figure 1), averaging 44,8% for sessions 1 to 3 and 51,7% for sessions 10 to 12. Simultaneously, results show decrease for response time (Figure 2) during intervention, averaging 4,607 seconds for sessions 1 to 3 and 3,893 seconds for sessions 10 to 12.

Figure 1. Changes in mean decision accuracy during practice.
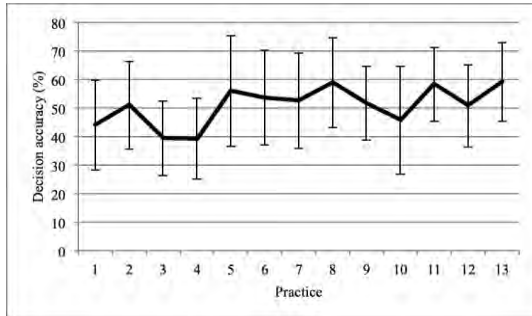
Figure 2. Changes in mean response time during practice.
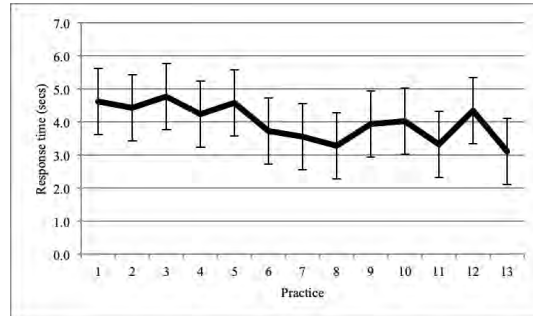
Changes were found for in-game decision accuracy regarding dribbling with variation of efficiency (61,9% > 51,5% < 63,3%), and regarding shooting skills, with an increase of efficiency (15,4% < 25,0% < 41,7%) (Figure 3), compared to relatively stable performance for passing (56,2% < 59,1% < 57,9%).

Figure 3. In-game decision accuracy for passing, dribbling and shooting skills.
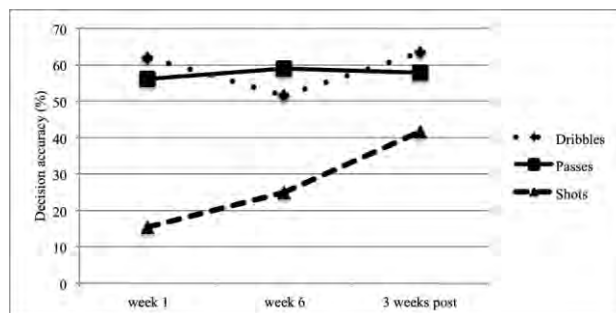
Finally, the evaluation phase was one of reflection and critical thinking about the whole supervision process. It enabled analysis of advantages and limits of the proposed program, thanks to objective data concerning 1) general information (durations, effectiveness, 57,6% of athlete's presence during intervention), 2) athletes' performance throughout the learning and retention phases, and 3) coach's ease in preparing and using such program.

4.2. Objective 2: describe players and coach's perceptions about quality and effectiveness of the program

Overall, as shown in table 1, the coach perceived positive changes in players' decision-making during and after the perceptual-cognitive program. Beyond those effects, she also perceived that the program was easily integrated to the training routine and acted as a modeling tool during training. In parallel, players perceived perceptual-cognitive exercise as beneficial for their performance on the field. Doing the exercises during warm-up allowed them to practice decision-making skills subsequently used on the field. The cognitive exercises helped them realize different errors they were making and inspired them to correct them during practice.

Table 1. Perceptions of coach and athletes threw the three phases of clinical supervision.

Phase	Participant	Theme	Citing
Programming	Coach	Time consuming	Way too many hours! SSI, p.2.
Interaction	Coach	Effect on the players	It's super interactive […]. It's like a game and they are clearly in the generation for this. SSI, p.4. Girls were able to challenge each other on their own. SSI, p.5.
		Implantation in training routine	Using the tablets didn't slow down the training routine. SSI, p.4. With the tablets, they could do the exercise twice a week. If I didn't have it, I would be happy to use video feedback once a week or maybe every two weeks. SSI, p.3.
		Modeling	They were able to associate both [training situations and perceptual-perceptual-cognitive exercise] easily. SSI, p.3. In terms of coaching, it was much easier because we had clear examples. SSI, p.6.
	Players	Exercise before practice	It allows you to practice what you just saw on the tablets. FG1, p.3. If we make errors during the exercise, we can correct them on the field. FG2, p.2.
		Realization	It's useful because it helps you learn from your errors. FG1, p.1. When we use the tablets, we have time to think. Then we chose how to apply it in the game. FG2, p.1. Sometimes we don't know where to pass the ball. The tablet helps us know. FG1, p.2.
Evaluation	Coach	Effect on the players	They think much more. They look around, they talk to each other. SSI, p.6. Girls lose the ball much less. Possession of the ball is much better. SSI, p.7.

5. Discussion and conclusion

To our knowledge, this study is the first to focus on the process to implement a perceptual-cognitive program with a youth coach, helping her to change her practice. This study was also the first to describe players' and coach's perceptions about quality and effectiveness of such program. The first objective (describe the clinical supervision process offered to the coach) showed that the programming of the perceptual-cognitive program is tedious, complicated and therefore unlikely to be attempted by the coach alone. Consequently, tasks such as filming and building of video clips should be taken on by a third party like consultants, federations or clubs.

Results during the interaction phase confirm that a perceptual-cognitive program can be easily integrated to players training routine. Perceptions of the coach and players where positive and don't show signs of resistance to change, such as observed by Brunelle and al. (2008) or Stoloff and al. (2016). This acceptance of change could be explained by the coach's perception of the exercise as a game, added to the level of implication of the supervisor in the programming phase making it more feasible.

Variations in decision accuracy, response time and in-game decision accuracy were subtle, nevertheless interesting. Results concerning decision accuracy and response time remind us of the findings of Lorains and al. (2013) and Gorman and Farrow (2009), where results show similar effects for in-game decision accuracy. Presently, subtle variation for decision accuracy and response time during training could be explained by insufficient length of intervention or low level of athlete's attendance throughout the six week program mostly due to family vacations, inevitable considering athlete's age group and period of the year. In-game decision accuracy results would have been more significant with increased number of occurring events or observation time during matches. In line with Romeas and al. (2016), future research should consider using small-sided games, which augments the occurrence of dribbles, passes and shots.

During the evaluation phase, coach and players perceived that the program had a positive impact on the players' decision-making skills. Also, the exercise was time effective and easy to implement to the training routines. Therefore, the perceptual-cognitive program used during warm-ups seems a suitable and effective addition to video feedback in a youth coach's reality.

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QUANTIFICATION OF CRITICAL THINKING SKILLS AFTER WITH COMPUTER QUIZ GAMES IN AN INTRODUCTORY SCIENCE COURSE

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Abstract

Critical thinking skills, in general, and specifically, within the framework of introductory science courses in engineering and science majors, are increasingly a focus of education reforms. This prioritized goal comes along with the ongoing efforts to phase out traditional teaching and steadily replace it with interactive engagement learning and teaching methods. To respond to such goals without being disruptive in the traditional teaching and learning process, we have developed computer quiz games (CQG), implemented for the purpose of enhancing students' interactive engagement and learning gains in Introductory General Chemistry for Engineering Majors in the English as a Second Language (ESL) environment. The effectiveness of CQGs was quantified using the post-test vs. pre-test approach via FECAT (Freshman Engineering Chemistry Assessment Test) test with Hake's Gain between 15% and 35%. In the second phase of the analysis, we relied on the mapping of distinct categories of FECAT questions to Bloom taxonomy and we classified all FECAT questions into Higher Order Thinking (HOT) and Lower Order Thinking (LOT) skills. We present how HOTs and LOTs get modified and, to a varied degree, improved, with the application of computer quiz games. The results of the application of CQGs were also compared with the application of the paper-based quizzes containing the same questions, offering an insight into the influence of simple computer games on students' hierarchical critical thinking skills.

Keywords: Critical thinking skills, game-based learning, computer-based learning, higher order thinking.

1. Introduction

Effective teaching and active learning are essential for college graduates on their path of taking place in today's workforce. Related to active learning is the need to develop, use and sharpen critical thinking skills, along with the ability to solve complex problems (Gokhale, 1995; Scott, 2009). This has led to identifying critical thinking as one of the goals for the academic programs in the higher learning institutions (Van der Werff, 2016, Donald, 2002, McDonald *et al*., 2014). One of the approaches in quantifying critical thinking skills is to divide the tasks in front of students into lower order thinking (LOT) and higher order thinking (HOT) skills. Ramos *et al*. (2013) discuss how students' level of higher order thinking (HOT) skills affect their performance. Our interest is in elementary, first-year college chemistry course, and note that the work in chemistry has been preceded by Rodrigues and Oliveira (2008), and Tiruneh *et al.*, 2017, who pointed out that the level of critical thinking could be a predictor of the students' performance in physics.

Factors contributing to the problem of learning introductory chemistry are a low level of preparedness from secondary education, low motivation and limitations of the traditional method of instruction students have likely being exposed to before and during college. In Khalifa University (KUST), the Chemistry Department has concerns about the performance and the failure rate in the first-year chemistry course offered to all engineering and science majors. Interviews (Ling *et al*., 2015) with KUST students and chemistry faculty suggest that students have low motivation and interest to learn chemistry in a traditional classroom and few activities available to them to pull them away from teacher-centered classroom activities. Ideally, one would respond to such needs by developing a fully interactive engagement based course. Given the internal institutional obstacles, such as lack of administrative and technical support to develop and implement fully interactive engagement course, the best alternative was to develop teaching

and learning tools that can augment the ongoing traditional teaching. After carefully examining other efforts attempted at KUST, and in the country and the region (UAE, Gulf Arab countries), such as Collaborative Workshop Physics (Hitt *et al*., 2014), and Problem Based Learning (Balawi *et al*., 2015), we opted for the activity that will the following features:

(a) Minimally disruptive to ongoing traditional chemistry lectures;
(b) Supportive of the need to promote learning of the concepts, as opposed to rote-based learning, which often accompanies passive attendance of traditionally delivered lectures;
(c) Implementable on contemporary wireless digital communication devices, such as: laptops, tablets and smartphones;
(d) Can be presented as a game-based learning activity.

The preceding design criteria led us to develop computer-based quiz games (CQGs). The details of the CQG activity are broadly compatible with all four criteria listed above. Furthermore, going through the CQG activities on weekly basis enhances critical thinking skills (Kapp, 2012), given that our CQGs satisfy almost all gaming criteria (the presence of the system, one or more players, contains a challenge, follows fixed rules that a player needs to learn to best the game, it is interactive, contains feedback in the form of quantifiable outcome and may have emotional reaction).

2. Objective

The objective of this report is to investigate the effect of CQGs on students' performance with respect to the students' critical thinking skills (HOT and LOT) through a chemistry achievement test called Freshman Engineering Chemistry Assessment Test (FECAT), previously elaborated on (Ling, 2018).

3. Methodology

The present study applied a true experimental design called "Pretest-Posttest" (Gribbons & Herma, 1997; Trochim, 2001) to compare students in treatment (traditional lecture teaching with CQGs) and comparison groups. The comparison (a form of control) is in the form of paper-based quizzes, PQ, where the questions on the paper quiz are the same as those on CQG, but not subject to steps of the gamification process, such as digital interactive environment, or ability choose questions on an individual basis). All the students from each class are randomly assigned to control and treatment groups. Randomization controls all the possible extraneous variables (Adesoji & Babatunde, 2008; Campbell & Stanley, 1963) and enhances validity for possible statistical significance tests.

More specifically, the content of FECAT has been discussed elsewhere (Ling, 2018), We show some example questions later here, in Fig. 2, in order to illustrate the level of difficulty.

3.1. Participants

The total of 121 students (63 students for TG and 58 students for CG) participated in this study. In terms of gender, the respondents in TG consisted of 36 (57.1%) male and 27 (42.9%) female students. As for the CG, there were 37 (63.8%) male and 21 (36.2%) female students. We put some effort in making both groups equal in size at the beginning but some students are "disqualified" during or at the end of the semester because either they do not take a sufficient number of CQGs or they do not take the posttest.

3.2. Treatment and control

Each Computer Quiz Game (CQG) has nine questions in total, and students are allowed to choose 5 of these questions, one at the time. The text (the content, often a combination of text and either chemical image or a formula or a chemical reaction) of each question is revealed only after the student selects it. The initial guidance on what to select is only based on the fact that there are three questions of each category (three "easy", three "medium", and three "hard").

The point values per category are 100 points, 200 points, and 300 points. Beyond a fundamental need to have a constraint in a game-like environment, the idea behind limiting the number of choices is to motivate students to rely on their self-assessment of what kind of questions are they comfortable answering, thereby motivating them to strategize during the game and practice various types of questions ahead of the game; the latter activity clearly meant to be a learning opportunity. The paper quiz contains 5 questions only (so, no choosing is possible), but each week we prepared at least 5-6 different versions of the paper quiz (version A - 1 easy, 3 medium, 1 hard; version B - 2 easy, 2 medium, 1 hard; version C - 1 easy, 1 medium, 3 hard, etc.) This way, a form of randomization is present although no student choice is possible.

Figure 1. (Left) a screenshot of the paper quiz; (right) a screenshot of one question of computer game quiz.
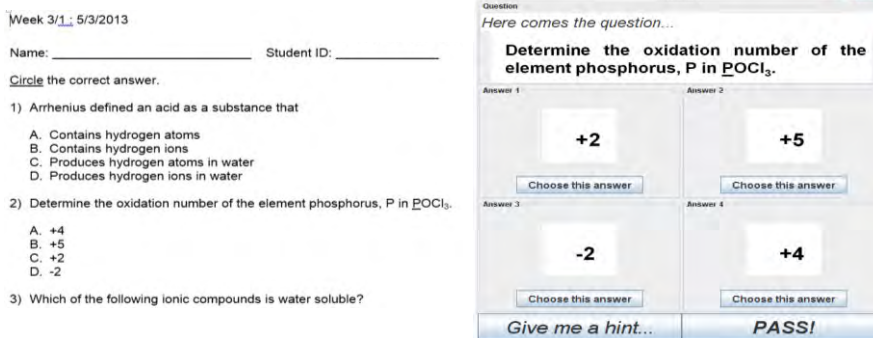
3.3. Research instruments

Students' level of thinking skills were divided into higher-order thinking skills (HOT) and lower-order thinking skills (LOT) and assessed through a chemistry achievement test (called Freshman Engineering Chemistry Assessment Test), FECAT by using the classification of Bloom taxonomy. The LOT skills are measured from the questions related to knowledge as well as comprehension and HOT skills (require critical thinking) are measured from the questions related to application, analysis, synthesis and evaluation. There are 15 LOT and 21 HOT questions. We wanted to assess students' HOT skills (more questions) rather than LOT skills (fewer questions). FECAT was also administered at the end of the semester, so it serves as the research instrument in the assessment of learning gain. In order to design a suitable achievement test to address the research questions, issues of validity and reliability have been considered, and addressed at the tie of initial data gathering and analysis (Ling, 2018).

Figure 2. Examples of LOT and HOT questions from FECAT. A full FECAT test available upon request.

3.4. Research procedures

Research procedure is explained to students, and a practice session was held at the start of the second week of the semester. Actual quiz games were administered every week from the second week of the semester until the last, with the exception of the midterm weeks and the final week. We have ensured there is no overlap between the 90 questions (10 weeks x 9 questions each week) on CQGs/PQs and the FECAT test, and also, that neither CQGs/PQs nor FECAT overlap with weekly homework or other assessment instruments. FECAT was administered in the very first and the very last week of the semester, and the Hake gain

$$\text{Hake's Gain}, <g> = \frac{<\text{Posttest Score}> - <\text{Pretest Score}>}{100 - <\text{Pretest Score}>}$$

was computed (Hake, 1998, 2006, 2008; Hitt *et al.*, 2014; McKagan *et al.*, 2016) to calculate the learning gain. In addition to the overall Hake gain, which we have pursued as one of the research questions of interest from the outset of the study, we have computed the Hake gain for HOT and LOT set of questions.

4. Results

Figures 3(a) and 3(b) show the histogram of FECAT by comparing between pre-posttest for TG and CG of students' thinking skills as indicated by the types of questions (based on Bloom taxonomy) in FECAT. We found that the average performance for TG shifted from about 40% to 70%, slightly larger compared to CG, shifts from about 40% to 60% for students' HOT skills. In terms of students' LOT skills, the average performance of about 40% in pre-test to 70% in post-test was visible in both groups (Figure 5.9) with some quantitative differences between the two groups.

Figure 3. Comparison between pre-posttest for TG and CG of students' HOT (L) and (LOT (R) skills as indicated by the types of questions in FECAT; the number of students within the performance percentile.
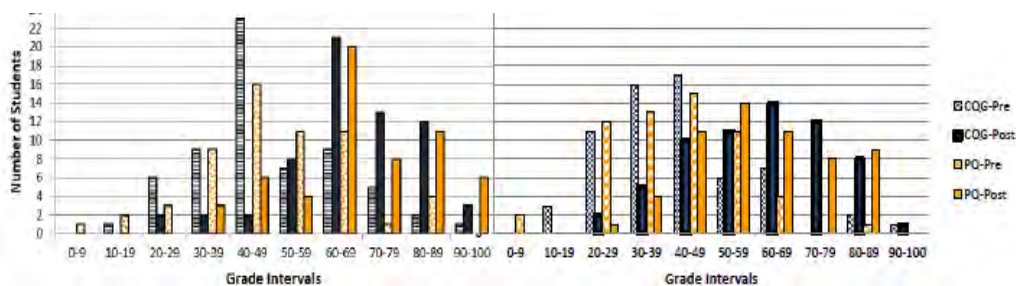
We adopted Hake's gain expression (Hake, 1998, 2006, 2008; Hitt *et al.*, 2014; McKagan *et al.*, 2016) to assess the student learning gain. We found that both groups had positive Hake's gain, likely because of a similar motivational factor, as shown in Table 1 below. In a separate semester, we have conducted the Hake gain determination without administering any computer quiz games or paper quizzes, which we consider a true control group. The Hake's percent gain in that semester is substantially smaller for both groups, written here as percentage in (HOT, LOT) format - (CQG (33.6, 36.3), PQ (31.5, 37.2) and Control (19.1, 22.7) The pretests score on FECAT in both semesters (with and without the application of CQG and PQ) were nearly identical, since no major changes in the profile of students' population occurred.

5. Discussions

The results indicate that the students increased in their performance percentile group between the beginning (pre-test) and end of the semester (post-test). Besides, we found that both TG and CG have positive close Hake's gain for HOT and LOT thinking skills. According to Hopson (2001) and Fatokun *et al.,* (2016), and McFarlane *et al.,* 2002, technology-enriched and/or game environment classrooms have a positive effect on student acquisition of higher-order thinking skills.

Students' HOT skills are enhanced by the learning activities in class through the in-depth thinking process (similar to the finding by Lateef *et al.,* 2016). Both CQG and PQ are learning activities applied in class for a whole semester, so, we suspect that this might be the reason students with PQ also show almost the same value of Hake's gain. Three factors: identical motivating factors, imbalance of make-up of groups and high standard deviation might be the reason for the better result in CG.

6. Conclusion

Supplementing CQGs as an active learning strategy during the teaching and learning process can help students to develop HOT skills such as applying, analyzing, synthesizing and evaluating. CQGs help to enhance students' higher-order thinking skills and problem-solving skills. This study indicates that both CQG and PQ help to improve students' level of thinking skills and provide an alternative way of supplementing the traditional teaching over the true control group where neither CQG nor PQ is implemented at all. The implementation of CQG together with traditional lecture is suitable and effective for the university freshman students, particularly for students with education and culturally diverse background in UAE as well as students in other countries that have a similar background. We hope that this study can be a guidance to many other chemistry instructors and education authorities, particularly those dealing with the students who have a similar background.

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EVALUATION OF AN ONLINE LEARNING RESOURCE FOR NURSING STUDENTS PREPARING FOR AN EMERGENCY DEPARTMENT CLINICAL PLACEMENT USING KIRKPATRICK'S MODEL

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Abstract

Clinical placements in the Emergency Department (ED) can offer nursing students a unique learning experience to develop their knowledge and skills in managing the critical care patient. However, the complexity of this clinical placement can be daunting leading to increased stress and anxiety. This can have implications for student learning and clinical performance creating feelings of unpreparedness for the challenges of emergency nursing. Analysis of students' concerns was obtained through an explanatory sequential mixed methods study identifying key areas. Following this, an online learning resource "Are you PreparED" was developed. This educational resource is a repository of useful information relevant to the role of the nursing student in the ED and is focused on the key areas of concern identified by the students.

Evaluation of the online learning resource was structured using the first two stages of Kirkpatrick's model. Following completion of an online survey, students provided feedback on several aspects including: design, usability, relevance and accuracy of information. In addition, comments were obtained regarding their perceived learning, knowledge acquisition and intent to apply to the clinical setting. Perceived levels of preparedness following use of the online learning resource was also explored.

The goal of this study was to provide a valuable online learning resource for nursing students attending a clinical placement in the ED. Evaluation of the resource was paramount to assess quality and establish that learning had occurred, and educational goals met. Suggestions offered by the students provided a valuable source of information for further improvements to this online resource.

Keywords: Online resource, evaluations, student nurses, emergency department, preparedness.

1. Introduction

This paper will explore the evaluation of an online learning resource developed to assist nursing students in their preparedness for a clinical placement in the Emergency Department (ED). Following the development of the ARE YOU PREPAR**ED** website, student evaluations were undertaken using the Kirkpatrick's Model of Evaluation Framework to identify learner satisfaction and perceived learning and preparedness.

2. Background

The ED clinical placement provides nursing students with a unique opportunity to link theory to practice in a critical care setting. Students are faced with a number of new challenges in the context of a busy, fast-paced and rapidly changing acute care environment. Patient care is increasingly complex and unpredictable with increased patient acuity and high patient turnover. Holbury and Newcombe (2016) acknowledge that the ED is an unpredictable and often highly emotive environment. They note that some nurses thrive on this type of clinical setting and need to be expert in the assessment, recognition and management of patients across the lifespan with life- threatening illness or injury. In addition, nurses are required to process large amounts of information in order to facilitate clinical decision making in this time-pressured environment.

Therefore, the ED clinical placement offers nursing students the opportunity to have exposure to a wealth of learning opportunities, many of which they may not have experienced while on previous clinical placements (Williams & Palmer, 2014). Nursing students are able to engage with the multidisciplinary ED clinical team in order to build confidence in their theoretical knowledge and clinical skills in the care and management of the acutely unwell patient. The aim of this unique clinical placement is for students to develop a specialised skill set in the areas of patient assessment, fast decision making, prioritisation of care and responding to the deteriorating patient (Purling & King 2012; Williams & Palmer, 2014).

However, for some nursing students the anticipation of practicing in this acute care environment can be intimidating, anxiety provoking and stressful. The literature suggests that students often form preconceived ideas about what to expect from a clinical placement in the ED. This can lead to students questioning their abilities with a perceived lack of preparedness (Morrell & Ridgeway 2014). Areas of concern are wide ranging and include: knowledge and clinical skill deficits, fear of making mistakes, ineffective communication, feelings of inadequacy, fitting into the team, level of support and mentorship, dealing with conflict and having the inability to recognise and respond effectively to a deteriorating patient. Studies show that educational preparation of nursing students in this acute care area is becoming increasingly challenging with many nursing students failing to meet industry expectations (Purling & King, 2012).

Students allocated a clinical placement in the ED are generally in the latter stages of their nurse education, and therefore under pressure to demonstrate sound knowledge and clinical competence (Porter, Morphet, Missen & Raymond 2013). The expectation from both academic faculty and healthcare industry is that students will be adequately prepared for the challenges of working in an acute care clinical area and able to respond effectively to critical care incidents. The overarching expectation is that nursing students will be well prepared for the realities of practicing as a graduate nurse in an increasing complex healthcare environment (Dimitriadou et al 2015; Watt & Pascoe 2013). Despite this, it is evident from the nursing literature that this is not necessarily the case with students often floundering when faced with the challenges of working in an acute care setting. The evidence suggests that students are lacking confidence in their knowledge and clinical abilities and experience difficulty in making sound clinical judgements in the management of the acutely unwell patient (Doody, Tuohy & Deasy 2012; Duchscher 2009; Woods et al 2014). This has far reaching consequences, as these negative experiences may influence decisions about whether to pursue a career in emergency nursing. Future projections indicate an increased need for critical care nurses both nationally and internationally due to a diminishing workforce (Halcomb, Salamonson, Raymond, & Knox, 2012). Together with the ageing population, unprecedented population growth and declining nursing workforce there is a need to recruit and retain nurses with critical care expertise.

In light of this, it is clear that undergraduate nursing education needs to take heed and find innovative ways to adequately prepare students for acute care clinical placements and the realities of their future professional role. While this issue is without doubt complex and multidimensional, it is generally agreed that nursing student unpreparedness may have far reaching consequences when it comes to providing high quality patient care, especially in specialised areas such as the ED (Halcomb et al, 2012; Williams & Palmer, 2014).

To address the issue of preparedness, an explanatory sequential mixed methods design study was undertaken to identify areas of concern by nursing students in attending a clinical placement in the ED (Creswell & Plano-Clark 2018). Both the quantitative and qualitative findings from this study provided a platform for the development, implementation and evaluation of on an online learning resource titled 'ARE YOU PREPAR**ED**'. Whilst there are a number of useful online learning resources available for healthcare students globally. The focus of these resources is largely aimed at medical students and has an emphasising on specialised clinical skills. Examples include electrocardiogram (ECG) interpretation, patient history taking, clinical assessment and laboratory data interpretation. While some of this information is extremely important, these resources are somewhat limited for nursing students. In addition, the notion of preparing students for their clinical placement appears to be lacking. Levett-Jones et al (2015) suggest that nursing students' clinical placement experiences can be a critical turning point and may even affect their professional aspirations. It is this lack of online resources specifically aimed at preparing nursing students for clinical practice in the ED that has facilitated the development of this website. Following development of the online resource, student evaluation is essential in order to ensure learning effectiveness, knowledge acquisition and intent to apply to the clinical setting (Maycock et al 2012).

3. Design and development of the website

As previously identified, the development of the ARE YOU PREPAR**ED** online learning resource was based on the need to increase student preparedness prior to attending a clinical placement in the ED. Analysis of both qualitative and quantitative data from students at 3 universities in Western Australia informed the structure and content base of the website (figure 1).

Figure 1. Website development and evaluation process.
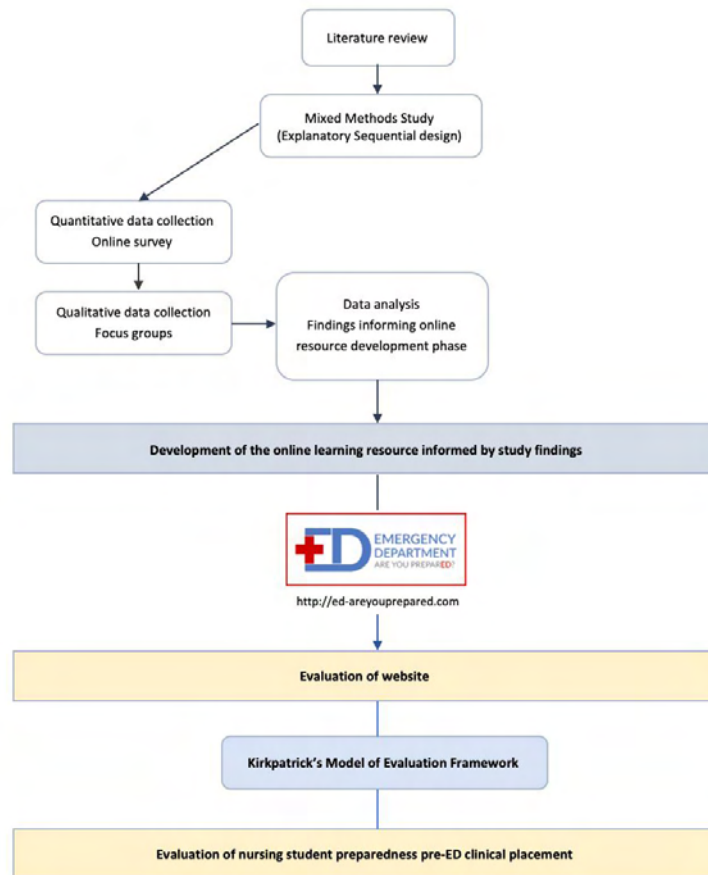
Following a successful grant application, an expert web designer was engaged to create and develop a visually appealing and easy to navigate site (Maycock et al 2012). It was essential to ensure that the website was clear, easily understood, relevant and up to date (Ng, Archbold, Mayer and Mulla 2015). The website homepage contains an introductory video and instructions on how to navigate the site. The content was structured using a modular format located within four broad topics: 'Orientation to the ED', 'Patient Care', 'Clinical Skills' and 'Professional Issues'. As suggested by Elkman (2018) the content is predominantly text-based and included photographs, videos, helpful tips, nursing blogs, links to external websites and self-directed learning. Students are given the opportunity to engage with the material and acquire meaningful knowledge contextualised to nursing practice in the ED. Trademarking of the ARE YOU PREPAR**ED** was obtained to protect copyright of the website.

4. Evaluation

When looking at evaluating a website it is essential to identify what is being evaluated, how it is expected to work and how the evaluation results will improve the resource. Cook and Elleway (2015) suggest that evaluation can be seen as the process of judging the value of something, they also note that this can also include theoretical dimensions. In the context of the ARE YOU PREPAR**ED** website, it was essential to firstly evaluate the design, usability, relevance and accuracy of information offered. An expert panel consisting of senior academic staff members, researchers and experienced ED clinical staff to assess the online learning resource for content and construct validity. This involved critical appraisal of the site

and constructive feedback in relation to visual appeal, ease of navigation, currency, relevance and accuracy of content and perceived usefulness (Ng et al 2015). The expert panel were also asked to provide suggestions for improvements so that modifications could be made. Following this, the website was launched and all final year nursing students across the three universities were asked for feedback using an online survey. The theoretical framework used to guide the evaluation of the online resource was Kirkpatrick's Model of Evaluation.

4.1. Kirkpatrick's model of evaluation

Kirkpatrick's Model of Evaluation has been utilised for well over forty years, and this model has gained an overwhelming popularity for use as a framework to support systematic evaluation. Primarily used within the business sector, the model provides strategies for evaluating organisational training programs. However, use of the model has expanded and been adapted into other disciplines including tertiary education and clinical practice as a means for assessing and appraising education outcomes and intervention studies (Praslova 2010; Smidt, Balandin, Sigafoos & Reed 2009).

The model presents four sequential levels which measure impact of the educational intervention. The 1st level 'reaction' refers to learner satisfaction with the intervention. Evaluation at this level can generate valuable information about relevance of content, perceived usefulness, learning tools and modes of delivery. This can provide an insight into how participants perceive their level of motivation and desire to engage. While this information may be useful for the purpose of modifying material, this information is subjective and does not guarantee learning.

At level 2, 'learning' emphasis is on determining if the educational intervention has met the learning outcomes and the extent to which users perceived learning has occurred. This can include increased knowledge, skills, confidence and commitment to apply into practice

Level 3 'behaviour' and level 4 'results' then move beyond individual satisfaction and learning. The focus moves to organisational change through positive behaviour and transfer of learning into the workplace. The ultimate goal of levels 3 and 4 is to achieve a level of workplace performance that has met individual learning needs, as well as the goals of the organisation (Moreau 2017; Reio, Rocco, Smith & Chang 2017; Rouse 2011). In relation to the online learning resource evaluation was limited to levels 1 and 2 of Kirkpatrick's model.

5. Conclusion

Attending a clinical placement in the ED can be an overwhelming and daunting experience for nursing students. This paper has explored the development of the website ARE YOU PREPAR**ED**, an online resource to assist nursing students with their preparedness for attending a clinical placement in the ED. Effective evaluation of the resource was undertaken to ensure the design, usability, relevance and accuracy of information. In addition, evaluation of the resource using the Kirkpatrick's Model of Evaluation framework assisted in identifying not only learner satisfaction with the resource, but how the students perceived their knowledge skills and confidence after using this online learning resource. Furthermore, students perceived levels of preparedness were appraised. While primarily designed for nursing students, this online learning resource has the potential to be of benefit in preparing other healthcare professionals for a clinical placement in the ED.

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MATHS ANXIETY: FURTHER COMPLICATED BY SPREADSHEET SHOCK?

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Abstract

This paper offers an augmentation to the work of Smailes and Heyman (2018) and Farjadpour and Fresneda-Portillo (2018). Smailes and Heyman (2018) considered techniques for teaching mathematics to non-mathematicians (e.g. business programmes) whilst Farjadpour and Fresneda-Portillo (2018) considered mathematics anxiety. What was particularly salient about the latter study was that it involved undergraduate mathematics students. This struck a particular chord with the first presenter: if mathematics anxiety occurred in students choosing this as a specialism, what additional impacts could be occurring within Business based cohorts? Are there further complexities that require consideration within these cohorts? For example, past experience indicates that the advent of technologies, in this case spreadsheets, can be both a blessing and a curse. Hesse and Hesse-Scerno (2009) posit that spreadsheets have changed the world and suggest that they have potentially saved some mathematics based business curricula. Spreadsheets are now a universal business tool that needs to be learned (Pan et al., 2018). What are the potential relationships between mathematics anxiety and spreadsheet confidence? Do similar factors that impact on mathematics anxiety impact on spreadsheet confidence? This paper illustrates that indeed there are a number of similarities between the two and suggest the impact of technologies is such that techno-math literacies supersedes numeracy capability as a concept (Geiger, Goos, & Forgasz, 2015). Furthermore, additional dynamics linked to confidence are exposed that merit further qualitative investigation.

Keywords: Mathematics anxiety, perceived study abilities, technology impact, higher education.

1. Introduction

A lack of confidence in learning mathematics is a long-standing phenomenon. It is now almost 50 years since Richardson and Suinn (1972) designed an instrument for the measurement of mathematics anxiety which in both its original and adapted formats is still commonly utilized today.

Pelch (2018) acknowledges that mathematics anxiety is a difficult area of research due to the multiplicity of interrelated factors involved. Investigations within the literature include examinations of what may occur in early and later stages of schooling, demographic and geographic influences, links to self-efficacy and the impact of technology to name just some of the areas of interest. For example, Farjadpour and Fresneda-Portillo (2018) used an adapted Mathematics Anxiety Scale to assess the impact of gender, ethnicity, parental support in mathematics, number of siblings amongst other factors.

The lack of a mathematical skills base, often referred to as mathematics literacy continues to be a global issue due to the impact in the economy of a country (Geiger et al., 2015; Johnson, 2012; Matthews, Hodgson, & Varsavsky, 2013; Deloitte 2013). However, due to the exponential growth of information technologies, in particular, of mobile technologies, it is proposed that mathematical literacy can no longer be treated separately. Geiger et al. (2015) recommends techno-maths literacy as a more appropriate nomenclature.

The authors would argue that this is particularly case within higher education. Evidence from employers backs this up. Grant, Malloy, and Murphy (2009) noting that within business IT abilities are as *"customary as pen and paper"* (p.145). It is clear that the most common IT ability associated with mathematics is spreadsheet use and preferred over specialist statistics software (Pan et al., 2018; Brennan & Vos, 2013; Johnson, 2012).

The advances in technology have also changed the landscape of employer expectations. For example, data analysis once considered a specialism is now viewed as a generalist function involving spreadsheet skills is implied (Tufte, 2004).

In this context, a module, known as Business Analysis, is the main mathematical component delivered to all (approximately 800 students, 400 per semester) undergraduate Business and Management programmes. This unique combination of confidence in both mathematics and spreadsheet use are known issues of interest. Mathematics anxiety is a well-established factor, and the teaching strategies employed are continually practised and reviewed in an attempt to minimise impact of student learning, e.g. flipped classroom methodology (Smailes & Heyman, 2018).

As documented by Verhoeven, Heerwegh, and De Wit (2016) IT capabilities of students are not as anticipated. Although many students have used a spreadsheet, their previous experience is basic and appears to be limited to data entry, basic formulas and perhaps graphical construction. In the very early stages of teaching there is a sense that mathematics anxiety is exacerbated by spreadsheet shock. This latter point also being picked up by Gorman (2008) whom comments that the necessity to learn Excel can become an additional obstacle in learning statistics – the vast majority of the business analysis curriculum.

Spreadsheet shock is a self-generated term used to express how many students, claim to be familiar with spreadsheets but within two to three weeks of teaching, realize how little they actually know, or that they may incorrectly assumed was simple. A common example of the latter is that many students find that constructing a graph from scratch is more complex than previously led to believe.

The most notable issue in considering both mathematical and spreadsheet confidence is the influence of gender. This factor provides a focus to several investigations, the majority of which, note how females report lower levels of confidence in both than males (Pelch, 2018; Nunez-Pena, Suarez-Pellicioni, & Bono, 2016; Verhoeven et al., 2016; Plenty & Huebeck, 2013; Tarasi, Wilson, Puri, & Divine, 2012; Joyce, Hassall, Montano, & Anes, 2006). As noted by Matthews et al. (2013) amongst others this element is well researched due to its impact on both enrolment and retention within Science, Technology, Engineering and Mathematics (STEM) subjects.

This paper aims to extend research by Farjadpour and Fresneda-Portillo (2018) by considering a sample of business and management undergraduate students and determine factors impacting both mathematics anxiety and spreadsheet confidence.

2. Methodology

A questionnaire was distributed to business and management students shortly before the commencement of the teaching programme. Fourteen questions employed by Farjadpour & Fresneda-Portillo (2018) were adapted slightly to take in account the context of the business and management curriculum. Six supplementary questions were included referring to spreadsheet knowledge. An additional section of ten questions was added to in respect to self-efficacy (Bandura, 2006) – a seminal author in this field. As recommended by Bandura (2006), for all mathematical, spreadsheet and self-efficacy questions the traditional Likert scale was replaced by a wider numerical scale, in this case a percentage level of confidence, where 0 indicated no confidence through to 100 full confidence. An extra Likert based question was included on how anxious facing an exam would as anxiety is an known entity that can be independent from mathematics and/or spreadsheet confidence (Pekrun, Goetz, Titz, & Perry, 2002). As noted by Farjadpour & Fresneda-Portillo (2018), there are a number of demographic sensitivities which need to be considered when collecting data, therefore any questions relating to demographic elements such as parents, siblings, mathematical support mechanisms were carefully designed to take any sensitivities into account.

3. Results and analysis

University attendance recording systems indicated that there were 382 students registered in semester 1, 147 responses were received yielding a 38.5% response rate. Responses rates from gender and nationality broadly represented the student population. The variable of interest, spreadsheet confidence is an average of the six questions presented within the questionnaire. The mean for the whole sample was $\mu = 56.75$ and the standard deviation $\sigma = 22.78$. Sample skewness was found to be -0.013 and the kurtosis -0.769. Furthermore, the median is 57.80, very close to the mean and implies that the distribution is symmetrical. After studying the Q-Q plot which additionally suggested that the variable spreadsheet confidence is normally distributed, and thus, the mean and standard deviation are representative parameters of the sample.

The main factors to be investigated alongside spreadsheet confidence were self-efficacy, mathematics anxiety and test anxiety. The latter factor was ranked, and maths anxiety sample results cannot be deemed as following the normal distribution. As a consequence, non-parametric statistics are applied from now on. Firstly, the Spearman's correlation coefficient is applied to test the null hypothesis of monotonic (the more of one variable, the more of the other and vice versa) relationship between variables (Table 1).

Table 1. Non-Parametric correlations (n = 147).

	Spreadsheet Confidence	Mathematics Anxiety	Self-Efficacy
Mathematics Anxiety	0.559***		
Self-Efficacy	0.274**	0.384***	
Test Anxiety	0.442***	0.491***	0.145

*p < 0.05, **p < 0.01, ***p < 0.001

Table 1 illustrates all the variables of interest preserve a monotonic increasing relationship except for Test Anxiety and Self-Efficacy. The relationship between Mathematics Anxiety and Spreadsheet Confidence as well as with Test Anxiety are confirmed. On the other hand, Self-Efficacy is significantly correlated with both Spreadsheet Confidence and Mathematics Anxiety but not with Test Anxiety.

The null hypothesis linked to gender (i.e. no differences between males and females) was tested using the non-parametric test for independent samples (Mann Whitney) was applied to Spreadsheet confidence, Mathematics Anxiety, Self-Efficacy and Test Anxiety (Table 2).

Table 2. Mann Whitney test –Factor: Gender (n = 147).

	Mann Whitney U	Z	p-value	Median Males	Median Females
Spreadsheet Confidence*	1978.5	-2.411	.016	62.92	50
Mathematics Anxiety*	1972	-2.437	.015	79.32	72.71
Self-Efficacy	2202	-1.520	.129	69.15	73
Test Anxiety**	1783.5	-3.320	.001	3	2

*p < 0.05, **p < 0.01, ***p < 0.001

Table 2 demonstrates that there is a significant difference between males and females in respect to Mathematics Anxiety, Spreadsheet Confidence and Test Anxiety. In all three cases, males exhibit higher levels of confidence.

Farjadpour & Fresneda-Portillo, (2018) established a relationship between the number of siblings and mathematics anxiety and hence was examined within the business and management cohort. To assess this the sample was divided into two groups. Group A respondents whom had two siblings or less and Group B defined as those with three siblings or more (Table 3).

Table 3. Mann Whitney test – Factor: 3 or more siblings (n = 147).

	Mann Whitney U	Z	p-value	Median Group A	Median Group B
Spreadsheet Confidence	1800.5	-.889	.374	60.83	52.75
Mathematics Anxiety*	1561	-1.983	.047	79.14	70.75
Self-Efficacy**	1352	-2.939	.003	72.50	64.60
Anxiety**	1380	-2.924	.003	3	2

*p < 0.05, **p < 0.01, ***p < 0.001

Table 3 determines that there is a significant difference between Group A and Group B in regards to Mathematics Anxiety scores, Self-Efficacy and also on Test Anxiety. In all cases, the scores of Group A are higher than those scores on Group B. The results imply that students with two or less siblings feel less Mathematics Anxiety, have higher levels of Self-Efficacy and are less anxious in respects to test situations.

4. Conclusion

In line with the mathematics and engineering cohort there are distinct gender differences in respect to mathematical anxiety. Evidence from the business and management cohort suggests that this also extends into test anxiety and spreadsheet confidence where males illustrate higher levels of confidence than females. However, there is not enough evidence to suggest that gender differences occur in respect to reported self-efficacy. Findings in respect to the number of siblings do not concur with the mathematics and engineering cohort, it is indicated that for business and management students children from larger families (three or more siblings) have lower levels of mathematical confidence and self-efficacy. This does not appear to be the case in relation to spreadsheet confidence.

Connections were established between the four factors of particular interest i.e. self-efficacy, test and mathematics anxiety and spreadsheet confidence. In general levels of spreadsheet confidence were much lower than that of mathematics and levels of self-efficacy. In all permutations there were positive correlations found e.g. the more confident a person exhibited in mathematics the higher their spreadsheet confidence was and vice versa. Overall, there is an indication that as suggested by Geiger et al. (2015) educators need to consider both factors in unison i.e. techno-mathematics. The findings reveal additional potential links to self-efficacy. There is an intention to implement a further qualitative research strand to scrutinise the interrelationships between techno-maths literacy, self-efficacy, gender and family size from a more personal perspective.

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SOCIOCULTURAL AND INTERACTIONIST APPROACHES TO SECOND LANGUAGE ACQUISITION: ARE THEY COMPATIBLE?

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Abstract

Second/foreign language research within the sociocultural-theoretic (SCT) tradition has tended to proceed orthogonally to that in the more conventional interactionist paradigm. SCT researchers, although of course broadly interested in progress in the language in the same way as interactionist researchers are, in practice tend to ask different questions and to use different methods to obtain answers to them. Since the goals of educators with an SCT orientation and those with an interactionist orientation are at least similar, and the phenomena involved in people learning/acquiring/developing in a language are presumably the same whatever the theoretical terms used to describe them, this author suggests that there is a need for a unified account that allows constructs like the zone of proximal development (ZPD; Vygotsky, 1978), on the one hand, and interlanguage (Selinker, 1972), on the other, to be seen in terms of each other. This paper is intended as a small step towards constructing such an account.

Beginning with diagrammatic representations of the ZPD developed by the author and a colleague (Lavin & Nakano, 2017) in an attempt to clarify the spatial nature of the ZPD, this paper will explore how the ZPD could potentially be spelled out in more concrete terms and reconciled with the concept of interlanguage. Further, leveraging the concept of imitation frequently appealed to in SCT, it will be suggested that development could be operationalised in terms of a learner's performance in a range of linguistic output activities, and the outline of such an approach is sketched out.

Keywords: *Zone of proximal development, sociocultural theory, interactionist approach, imitation, interlanguage.*

1. Introduction

Second/foreign language research within the sociocultural-theoretic (SCT) tradition has tended to proceed orthogonally to that in the more conventional interactionist paradigm. SCT researchers, although of course broadly interested in progress in the language in the same way as interactionist researchers are, in practice tend to ask different questions and to use different methods to obtain answers to them.

This is illustrated neatly in a well-known edited volume on second language acquisition (SLA) theories (VanPatten & Williams, 2007b). The editors start (VanPatten & Williams, 2007a) by stating ten observed phenomena that they believe an ideal theory of second language acquisition should explain (pp. 9–12). Those observations are:

1. Exposure to input is necessary for SLA;
2. A good deal of SLA happens incidentally;
3. Learners come to know more than what they have been exposed to in the input;
4. Learner's [sic] output (speech) often follows predictable paths with predictable stages in the acquisition of a given structure;
5. Second language learning is variable in its outcome;
6. Second language learning is variable across linguistic subsystems;
7. There are limits on the effects of frequency on SLA;
8. There are limits on the effect [sic] of a learner's first language on SLA;
9. There are limits on the effects of instruction on SLA;
10. There are limits on the effects of output (learner production) on language acquisition.

Theories and approaches addressed in VanPatten and Williams (2007b), generally a chapter at a time, are behaviorism, Monitor Theory, Universal Grammar, the concept-oriented approach (as an example of functionalist approaches), the Associative–Cognitive CREED, skill acquisition theory, Input Processing, Processability Theory, Autonomous Induction Theory, the interaction approach, and sociocultural theory.

Each chapter in the volume follows a similar format, concluding with a section where (a subset of) the observations are repeated, and it is explained in what way the theory or approach addresses the observation.

Not all the theories or approaches claim to be complete models of second language acquisition; for example, Input Processing simply "aims to be a model of what happens during comprehension that may subsequently affect or interact with other processes"; thus, it is relevant only to five of the 10 observations above, and the remainder are not mentioned in the concluding section of that chapter. In fact, with the exception of the Associative–Cognitive CREED, none of the theories and approaches even attempts to account for all 10 of the observations. Nevertheless, reading through the volume, it is apparent that most authors accept the general veracity of the observations as well as the general terms of reference, notwithstanding some differences in emphasis.

Lantolf and Thorne's (2007) answers, however, are full of redefinitions and qualifications where they do not actually contradict the observations.

Under Observation 1 ("Exposure to input is necessary for SLA"), for example, they avoid using the term "input", stating that "participation in culturally organized activity is essential for learning to happen." They go on to mention that, in addition to interaction with others, "the artifacts that others have produced" are also important. They also mention "vicarious" participation (Ohta, 2001), imitation through private speech of others' linguistic behaviour.

Under Observation 2 ("A good deal of SLA happens incidentally"), they start by saying that "a bit of clarification is in order," and argue that "what is called incidental learning is not really incidental." Their argument hinges on the idea of goals and subgoals: While learning a dialogue, or learning a set of useful expressions, for example, may not be a higher goal of a learner, it may be a legitimate subgoal which, in combination with other subgoals, leads him/her towards a higher goal, for example being able to hold an extended conversation with a native speaker.

Under Observation 8 ("There are limits on the effect of a learner's first language on SLA"), Lantolf and Thorne say that "L1 meanings continue to have a pervasive effect in the L2 learning." Likewise, regarding Observation 9 ("There are limits on the effects of output (learner production) on language acquisition"), Lantolf and Thorne cite research by Merrill Swain and others showing that "social speech produced in the L1 and the L2 also impacts on L2 learning" (p. 219).

From the above, it is clear that ideas that are considered to constitute a broad consensus in mainstream SLA sit rather uncomfortably within an SCT framework. In what follows, I shall sketch an outline of how one part of a mainstream SLA framework, interlanguage, could be reframed in terms of the SCT notion of the zone of proximal development (ZPD). The structure of the remainder of the paper is as follows: After a brief description of the concepts of interlanguage and of the ZPD, I show how the ZPD can be represented diagrammatically. Finally, I show how ideas from processability theory (Pienemann, 1998, 2009) could be mapped onto such a representation.

2. Interlanguage

Interlanguage is a term coined by Larry Selinker (1972) to explain the insight that the target language (L2) system within a successful language learner's head cannot have been taught to the learner in any complete sense, since the amount of knowledge, much of it implicit, possessed by any fluent speaker is too large to be taught. Thus, the language system must have in an important sense been created by the learner anew, based on inputs from the learner's L2 linguistic environment. The nature of that internal system at any given time can be called that learner's interlanguage. For Selinker, part of the proper focus of SLA would be to describe the nature of that interlanguage and, rather than describing a learner's L2 talk and writing as a jumble of errors, viewing it "as being highly systematic and, thus being emblematic of complex acquisitional and developmental processes" (Selinker, 2014, p. 222).

A goal of the interlanguage research programme is to describe development in learners' capabilities in terms of interlinguistic change. However, it is a feature of much research in an interlanguage framework that changes are described in their own terms, sandwiched between references to the notion of interlanguage, but the specific changes and the putative interlanguage systems are rarely linked in any systematic way. There is still little in the way of an overall picture either of a specific interlanguage at any point in time or of an interlanguage developing over time.

3. The zone of proximal development

The Zone of Proximal Development (ZPD) is often defined as "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance" (Vygotsky, 1978, p. 86). The notion is these days frequently appealed to in language teaching/learning research. In many cases, the ZPD is appealed to

as the general framework within which the research is occurring, and the specific findings are outlined, but the relationship between those findings and the framework is not spelled out, except in the general sense that guidance given was sensitive to perceived learner strengths and needs. In other words, we rarely get a clear specification of what (in the author's view) the ZPD of the learners was before the intervention discussed and to what extent the knowledge/skills/abilities gained as a result of the intervention were maximized, i.e. encompassed the whole of the (previous) ZPD.

4. Clarifying the spatial metaphor of the ZPD

Pointing out that reference to the one-dimensional concept of "distance" within the traditional definition of the ZPD is not really compatible with the two- or three-dimensional notion of zone, Lavin and Nakano (2017) suggest that a ZPD needs to be represented with some internal structure (see Fig. 1) to be very useful for descriptions of skills and the effects of interventions, considering (a) that much work within a ZPD framework is focused on microgenetic change; and (b) that a single, short intervention is unlikely to effect movement from, say, a "can barely do with copious support" state to full internalization. A major attraction of SCT is that it can capture development that may not be reflected in test scores; thus, it is important that our diagrammatic representations of the concept can show changes of a smaller nature. Guk and Kellogg (2007) give an apt example of why that might be necessary when they observe that, in an interactive classroom, teacher-fronted talk tends to be located near the outer boundary of the ZPD while student collaboration talk tends to be located nearer the inner boundary.

Figure 1. A schematic of the ZPD, incorporating the notion of different areas within the zone denoting things that are close to being internalized and those that can only barely be done with help.
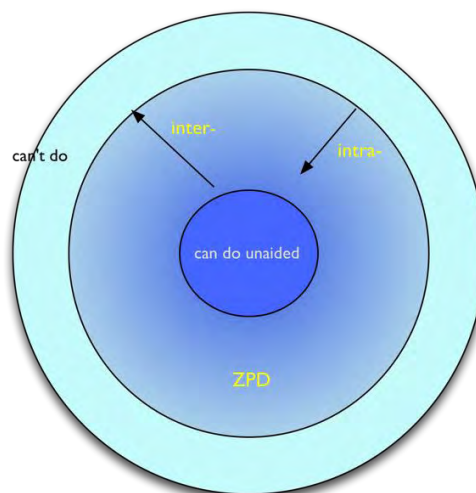
Figure 1 uses colour gradation to suggest that the outer and inner parts of the ZPD are different but is agnostic with regard to details of the internal structure, e.g. how many areas or sub-zones should be shown. It seems unlikely that it would be possible even in principle to determine objectively a "correct" answer to this question. But it seems reasonable for researchers to show as many such sub-zones as their findings, filtered through their theoretical viewpoints, tacitly assume. For example, Aljaafreh & Lantolf's (1994) pioneering study on ZPD-sensitive L2 writing tuition uses the "regulatory framework" shown in Fig. 2 to show support designed to be the minimum necessary for the capabilities of a specific learner with regard to a specific error. This scale is described operationally and is used to diagnose a learner as being at one of five levels posited by the authors. In turn, those levels are conceptualized as representing three stages: other-regulation, partial self-regulation, and self-regulation. In the paper, the authors make reference to some errors being "high in ZPD" and others as being "low in the ZPD". The former could fairly be represented in the innermost part of the ZPD in Fig. 1, the latter in the outermost part, with a middle sub-zone showing features for which partial self-regulation has been achieved.

Figure 2. Regulatory Scale - Implicit (strategic) to Explicit (slightly adapted from Aljaafreh & Lantolf, 1994).

0. Tutor asks the learner to read, find the errors, and
correct them independently, prior to the tutorial.

1. Construction of a "collaborative frame" prompted by the presence of the tutor
as a potential dialogic partner.

2. Prompted or focused reading of the sentence that contains the error
by the learner or the tutor.

3. Tutor indicates that something may be wrong in a segment (e.g., sentence, clause, line) -
"Is there anything wrong in this sentence?"

4. Tutor rejects unsuccessful attempts at recognizing the error.

5. Tutor narrows down the location of the error, repeating or pointing to
the specific segment which contains the error.

6. Tutor indicates the nature of the error, but does not identify it
(e.g., "There is something wrong with the tense marking here").

7. Tutor identifies the error ("You can't use an auxiliary here").

8. Tutor rejects learner's unsuccessful attempts at correcting the error.

9. Tutor provides clues to help the learner arrive at the correct form
(e.g., "It is not really past but something that is still going on").

10. Tutor provides the correct form.

11. Tutor providers some explanation for use of the correct form.

12. Tutor provides examples of the correct pattern when
other forms of help fail to produce an appropriate responsive action.

5. Mapping interlanguage onto a ZPD framework

Let us take a look at an actual theory of interlanguage development and how it could be represented in terms of the ZPD. Processability Theory (PT; Pienemann, 1998, 2009) proposes that there are specific universal stages in the development of L2 syntactic ability, and that it is possible to diagnose from learners' (unplanned, spoken) production what stage they are at. To a large extent, the stages are defined in terms of the size of the domain within which information can be exchanged; thus, number marking within a phrase such as "two books" is less advanced than number marking in a sentence such as "He speaks". The framework is used to explain observed developmental sequences such as the following (Pienemann, 2009, p. 14) for question formation:

Stage 1: He live here? (SVO Question)
Stage 2: Where he is? (WH+SVO)
Stage 3: Where is he? (Copula Inversion)
Stage 4: Where has he been? (Aux-second)

(Note that the question listed in Stage 3 is a correct target form, but a learner at this stage could not produce correctly a question like the one shown in Stage 4.).

If we attempt to map this onto a ZPD framework, in the case of a learner who is considered to be at Stage 2, we come up with something like what is shown in Fig. 3. Stage 1 is already fully internalized and is therefore not part of the ZPD. Stage 2 can benefit from various kinds of teaching to increase automatization and confidence and is therefore by definition part of the ZPD. Stage 3 is the next stage, and various kinds of pedagogical activities (including simply the provision of multiple examples in the input available to the learner) can be of benefit. PT holds that each stage is a prerequisite for the next one and that teaching two steps beyond the current stage has no effect; therefore, Stage 3 represents the outer bound of teachability or, in other words, of the learner's ZPD, and Stage 4 is outside the ZPD because it is not amenable to instruction.

6. Conclusion

In this paper, I have outlined briefly a reason why representing mainstream SLA theory in terms of SCT may be desirable and how that might be done. Space considerations preclude a fuller explanation of how this will benefit the field as well as potential answers to possible objections to such an enterprise, which will be the subject matter of a forthcoming paper.

Figure 3. Pienemann's (2009) four stages of question formation mapped onto a ZPD framework.
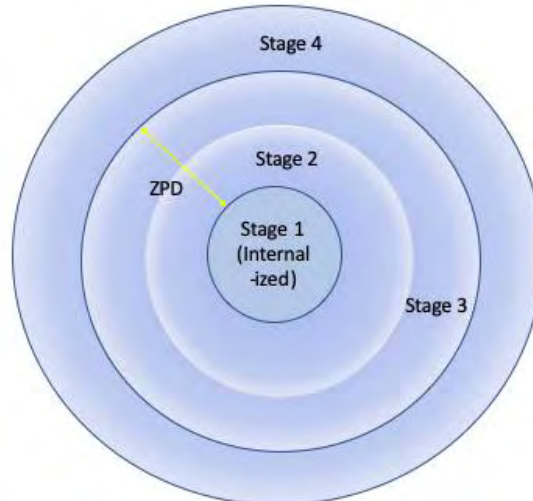
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HUMAN BEING DEVELOPMENT
THROUGH HOLISTIC AND COMPLEX APPROACH

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Abstract

Several authors from different disciplines indicate that past and present school education systems are not adapted to a human being's natural development. Instead of accompanying the young human being through the phases of his natural development, the school imposes a training that is out of step in terms of requirements, which tends to restrict several aspects essential to his good development and later to his good functioning. Through the insights of several authors from various disciplines, this paper aims to propose theoretical and multidimensional approaches to justify the implementation of a holistic and complex curriculum in order to offer equitable, inclusive and quality education to young human beings. It concludes with practical implications and recommendations based on these proposals.

Keywords: Human being, development, curriculum, complex, holistic, education.

1. Introduction and warnings

This chapter aims to propose theoretical and multidimensional foundations for the implementation of a holistic and complex curriculum. The holistic and complex curriculum can be understood as a general framework for equitable, inclusive and quality education for all young people around the world. First, it includes a global, inclusive and dynamic vision. Second, current knowledge of the requirements for the proper development and functioning of a human being makes it possible today to define new guidelines for rethinking our education systems towards the implementation of education and training programmes that enable each small human being to get to know himself better and to achieve his potential in an optimal way. Our objective is to put into perspective the knowledge generated by several authors in order to synthesize their approaches and draw the guidelines for this new direction, which is necessary and more respectful of human development. This paper is more the proposal of a working basis on which experts in the different fields mentioned in the text can continue the reflection and co-construct with us this holistic framework. We are aware that the exercise is dangerous, but more than ever, we believe it is essential to redefine a humanism and an education that truly places the human being in what he is and has most naturally and in the optimal conditions for him to achieve it.

2. Define new framework for educational thinking

2.1. Education in crisis and quality education

Several authors from different disciplines indicate that past and present school education systems are not adapted to a human being's natural development. Instead of accompanying the young human being through the phases of his natural development, the school imposes on him a staggered training in terms of requirements that tends to restrict several aspects essential to his good development and later to his good functioning (Chomsky, 2002; Legendre, 2001; Marcotte, 2006; Morin, 2000). "The world's report card is not good" wrote Barroux (2015) about the report of UNESCO, the United Nations Educational, Scientific and Cultural Organization, in its 2015 Education for All (EFA) Global Monitoring Report. The six education goals set in Dakar in April 2000 have not been achieved. Thus, the debates on the post-2015 targets for education highlighted the commitment to achieving universal quality education for all, which was reflected in the new 2015-2030 agenda by the establishment of sustainable development goal #4 (Ensure quality education and lifelong learning opportunities for all).

2.2. New framework for educational thinking

If major international organizations such as the International Bureau of Education (IBE) or UNESCO wish to focus their orientations on the quality of education, it is necessary to rethink the educational framework based on elements that truly place the young human being at the heart of the system

as stated and recommended by a large number of authors (Baillargeon, 2006; Chomsky, 2002; Marcotte, 2006; Perrenoud, 2003). Official bodies want to improve education systems (e.g. that young people, especially in less developed countries, learn more and better). Admittedly, education contributes to the development of the person because it gives access to a greater articulation of thought, to broader information, to the increased capacity for spoken and written expression. However, we must go further by thinking that education also does this but by prioritizing the multidimensional development of the person to make him or her an autonomous person capable of making his or her own choices in a fully conscious way, and not by thinking only of making him or her a functional citizen and well integrated into the economic and political system of society. Current knowledge of the requirements for the proper development and functioning of a human being makes it possible today to redefine guidelines for rethinking our education systems towards the implementation of education and training programmes that enable each small human being to achieve greater fulfilment of his or her potential. However, following the recommendations of these same authors, this new framework must be structured around several essential characteristics and oriented towards a realistic and respectful goal of human development in order to truly offer an equitable, inclusive and quality education, possibly accessible to all young human beings.

3. Key features

Given the holistic nature of the new framework, it should attempt to articulate together the interdisciplinary knowledge that provides the opportunity to appreciate human development in all its complexity. This knowledge of the proper development and functioning of a human being makes it possible to draw the guidelines for this new orientation, which is necessary for an education that is in synchrony with the developmental needs of human beings. No other educational alternative can take advantage of these elements.

3.1. Lack of human conception

A study published in 2011 reveals that future teachers in Quebec do not have a clear understanding of what it means to be human, or even the major stages of its development (Navel, 2011). This study, which would benefit from replication in other countries and has a larger scale to validate the scope of the results, still demonstrates a lack of conception of the human being on the part of the teaching profession that trains these same human beings. This leads us to believe that, too focused on the didactics of their subjects, teachers are not familiar with the material they are working on.

This perceived state of crisis in education (Legendre, 2002) seems to stem from the difficulties it has in defining itself and clearly establishing the main functions of each level of education in society. This lack of clarity on the concept of "education" is probably one of the major causes of this crisis since the target (why) and the way (how) have not been well clarified (Giordan, 2002).

3.2. Complex understanding

Over the past few decades, scientific discoveries have made it possible to document with remarkable precision the stages of healthy human development (physical, psychological, social, moral...) and the conditions that promote it. To be able to take all these elements into consideration, it is necessary to rethink reform and thinking in order to link knowledge (Morin, 2000). Since knowledge is ephemeral since it is constantly updated, it is necessary to rethink knowledge in a complex perspective in which the learning method is as important as the precise knowledge of a fact (Morin, 2000, 2001; Nietzsche, 1878). Morin (2000) therefore invites us to redefine the way we work. At present, both education and modernity tend to fragment and compartmentalize knowledge, as well as to empower technology with regard to existential and human concerns. Consequently, it is necessary to link knowledge scattered in each discipline to "teach the human condition and earthly identity" according to him, which would also have the advantage of developing in the student the faculties of understanding of others among others. Thus, education would no longer be reduced to the transmission of established knowledge, in an often deterministic conception of the evolution of societies, but rather in what Morin prefers to call "the mode of production of knowledge", or "knowledge of knowledge". In addition, knowledge must be relevant in its context, in the global (the relationships between everything and parties), it must be multidimensional and complex to take into consideration all the disciplines that explain it.

3.3. Multidimensional approach

A complex understanding of the human being and its requirements for good development and functioning requires that we consider the human being in his multiple dimensions at the same time. This is why it seems relevant to us to situate the requirements of the human being on several dimensions through a brief exploration.

Socially, a human being has very high demands in terms of development. From the presence of the mother at birth to the interactions of her adult life with her life partner, friends or co-workers, human beings constantly need others to live, learn and evolve (Benedict, 1934). As each of these stages progresses,

the young person is responsible for these different social capital that allow him/her to establish habits (Bourdieu, 1994) while being strongly influenced by his/her living environment. However, from a humanizing perspective, this process is insufficient because if it encourages young people to functionally integrate their society (as it is) and does not necessarily allow them to create a critical space towards that same society (Dupuy, 2010). It is now a question of focusing on knowing and respecting people's needs and not on maintaining the societal order they inherit.

On the psychological level, several authors have demonstrated the implications of a respectful approach to human development on the psychological dimension of the human being (Dolto, 1997; Maslow, 1943, 1971; Rogers, 1980). Moreover, they have shown that the proper development and functioning of a human being has requirements that must be respected for the human being to develop properly, to be good and to function to his or her full potential. Examples include the pyramid of needs (Maslow, 1943), treating the child as a person in his or her own right and emotional experience (Dolto, 1997), or learning centred on the individual (Rogers, 1980). Some of Maslow's latest research even indicates that a human being may develop physical pathologies simply because he or she is unstable or does not feel psychologically well (Maslow, 1971).

On the educational/cognitive level, Piaget has demonstrated that human beings develop naturally through several stages (Piaget, 1983). In addition, other authors have shown that young human beings have natural needs in their development that must be met if their development potential is to be properly and naturally realized (Dewey, 1938; Rousseau, 1762). There currently seems to be a disconnect between what young people naturally need for their development (basic or natural needs) and what society (through culture) and school (through training) offer them, which have other aims.

On the cultural level, the work of Lévi-Strauss (1958) has shown the dissociations and complementarities that exist between nature and culture. Culture is an essential dimension of human beings that allows them to develop in harmony with their environment. Language is one of the best examples of this, since it helps to build the child's identity by facilitating his or her integration through communication in his or her cultural and social context, it helps the child to name, to put concepts on what he or she is experiencing, and thus to better know and understand himself or herself (Dolto, 1994).

Biologically, it is relevant to mention the 14 basic needs of Henderson (1947), a nurse who identified an ordered list of needs that must be respected by humans to determine whether they are sick or biologically healthy (e.g., drinking, eating, sleeping, moving, eliminating). It should be noted that the last five needs on Henderson's list concern needs that are very strongly related to the other dimensions of human beings mentioned above: communication with others, acting according to one's beliefs and values, occupying oneself with a view to fulfillment, recreation and learning.

Finally, on the moral and ethical level, Fraiberg's (1967) work has demonstrated the gradual development of the morals and conscience of the very young. At first, his knowledge of the good or bad nature of some of his actions depends on the parents' reaction. It does not yet have an integrated self-control system that we call "consciousness" that begins to manifest itself modestly at the age of four to five. Moreover, human beings have demonstrated their extraordinary capacity for adaptation, but also for understanding and creation. With the appearance of the neocortex, it has acquired several mental functions (e. g. self-awareness, language, rationality, will, autonomy, creativity, morality, responsibility) that multiply the human being's ability to know and transform reality (reality). Of all the mental processes, reason has played a central role. It is an emerging property of the neocortex that has allowed it to evolve from animal to human and that serves to increase the effectiveness of humans in solving their many problems and satisfying their many needs, desires and aspirations (Marcotte, 2015). Some authors have shown that human beings are capable of reason and evolve in their process of consciousness (Koninck, 2004). He was able to demonstrate morale and adopt an ethic to meet his requirements for good development (Marcotte, 2006).

These dimensions were intended to be just a few examples of the current knowledge available to us about human beings in order to better understand them and help them to develop in each of their dimensions. The holistic approach therefore makes it possible to take a global and more specific interest in all these dimensions of the human being. It allows both to separate them to isolate them but also to understand them in a combined way. The progress made so far has only partially improved human conditions. Indeed, modernity has proved to be very creative when it comes to developing new technologies. However, the relevance of developing these technologies can be questioned if human beings are unable to live happier or to achieve their full potential.

3.4. Humanist education

Several authors recognized for their expertise in various disciplinary fields now see a way out of the educational and global crisis: to offer young human beings a humanistic education that will make it possible to humanize them and not only to educate them. Maslow (1971) stated with certainty that education must help a person to become the best human being possible according to his or her potential. He regretted that the humans of his time shared fewer and fewer values, pointing to the need to identify fundamental and unifying values before young people were integrated into adult life and its centrifugal and possibly

separating forces. He called for an education of humanistic orientation that succeeds in developing a better human being through self-accomplishment and the transcendence of the self. More recently, Chomsky (2002) also supports a humanistic education that tends to "stimulate and strengthen the creative impulses specific to each individual". Drawing inspiration from the philosophies of progressive or alternative schools, Dewey's ideas and Russell's thinking, the linguist justifies his choice by highlighting the negative and perverse effects of the current school model, which imposes authoritarian practices that do not favour understanding, talent or creativity. According to Chomsky, every human being has an instinct for freedom. The role of education is for him to form in a perspective of freedom, creation, citizenship, equality, sharing and solidarity, rather than control, obedience, domination and accumulation of material profit.

4. Holistic and complex curriculum recommendations

1) Curriculum must aim a humanizing education that places the human being at the centre of its aims

A large number of authors from different disciplines have proposed ways to update this desire to set up a humanist education (Chomsky, 2002; Maslow, 1971; Morin, 2000; Piaget, 1983). However, we need to go one step further and be able to generate a systemic and systematic approach in order to be able to integrate these elements in a clear and realistic way for better human development. This better understanding of the human being and its requirements for good development and functioning is necessary to propose an educational approach capable of providing education on the human being, by the human being and for the human being.

2) Curriculum must be multidimensional / transdisciplinary.

Marcotte (2015) specifies the different dimensions of human development that must be part of a new humanizing curriculum framework: moral, cultural, social, mental, sexual, aesthetic, emotional, sensual, instinctive, ecological, physical development. These are the new "subjects" to which the traditional learning of reading, writing and counting must contribute. Morin (2000) had already proposed seven essential skills for the education of the future that cut across some of Marcotte's dimensions: teaching the human condition, earth identity, confronting uncertainty, understanding and finally the ethics of humankind. In either case, these elements with multiple dimensions can only be explained in a complex way, adapted to the ages of the clientele and through the varied knowledge that exists on these elements. According to Morin (2000), a transdisciplinary approach is essential to help students understand contemporary problems in all their globality and complexity.

3) Curriculum must be able to fit into a variety of historical, geographical, cultural, economic, social, educational, political and other contexts. (Morin, 2011).

The curriculum must be able to consider a multitude of educational realities depending on very diverse political, social, cultural and economic contexts throughout the world. In this respect, it is necessary to have a systemic vision of the curriculum. A curriculum, when it is established in a given society, must necessarily be imbued with the characteristics of that context. Lévi-Strauss (1958) explained that "any society is first of all made up of its past, its mores, its uses: a set of irrational factors against which theoretical ideas, which are supposed to be rational, are attacked (...)". Although any curriculum system must take into account the school and socio-cultural environment in which it is embedded, it must not, however, bow to unfounded ideological and religious demands to divert it from its objective of the humanist development of children and adolescents.

4) Curriculum must aim at quality education for all human beings on the planet.

UNESCO has particularly emphasized the right to quality education by specifying: "To have the right to quality education is to have the right to relevant and responsive learning. But in this diverse world, learning needs vary from one community to another. Therefore, to be qualified as relevant, learning must reflect what each culture, each human group defines as the conditions necessary to live with dignity. We must accept the existence of a multitude of different ways of defining quality of life and, therefore, an extreme diversity of ways of defining what the content of learning should be." (UNESCO, 2015). Therefore, this global agenda post-2015, "ensuring equitable, inclusive and quality education and lifelong learning for all by 2030", must be reflected in the curriculum (UNESCO, 2015).

5) Curriculum must be an open system that is constantly updated.

A good curriculum must be able to be regularly updated and follow the most up-to-date trends in education through research syntheses on all aspects related to education: the development of the different dimensions of students, pedagogical strategies, didactics, etc. In this regard, Opertti and Duncombe recall that "nowadays there is a growing consensus on a more global vision of the curriculum, inspired by the need to create inclusive education systems at all levels, from their design to their implementation. This holistic vision aims in fact to democratize learning opportunities, by integrating the different aspects of educational policies that deal with access, but also with outcomes. The interdependence between equity and quality in education is a key element, and inclusion and transversal relationships are at the heart of this vision that links curricula, schools and teachers." (Opertti & Duncombe, 2011).

5. Conclusion

A candle loses none of its flame by lighting another candle. (James Keller)

This work aimed to propose theoretical and multidimensional foundations for a holistic curriculum to provide equitable, inclusive and quality education for all young people on the planet. We have shown that there is knowledge about the requirements for the proper development and functioning of a human being that now makes it possible to redefine the guidelines for rethinking our education systems. These aim to set up education and training programmes that enable each small human being to better realise their life potential. We are aware of the difficulty of synthesizing all the knowledge in the field, an exciting project for the research community. This chapter nevertheless wished to propose a first and modest contribution to the need to use a holistic approach that integrates current knowledge for better human development.

In conclusion, we hope that the ideas discussed in this chapter will lead researchers to work on synthesizing current knowledge for the optimal, natural and holistic development of the human being. We also invite teachers and practitioners to rethink their courses and interventions so that they can align themselves with these holistic perspectives for human development. As James Keller said about the candle, we invite colleagues and other actors to join this collective work where their disciplinary, technical and human expertise will be welcome.

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OUR TEACHERS: COLLECTED MEMORIES OF PRIMARY EDUCATION IN DERBYSHIRE SCHOOLS FROM 1944 - 2009

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Abstract

This paper presents findings from narrative interviews undertaken with 24 narrators who attended primary school in the decades from 1944 - 2009. Deductive themes were first selected by examining the quantity of content and relevance to the study. Four deductive themes were drawn from the narrators' recollections: *Our Teachers; The Lessons We Learned; Our Friendships and the Games We Played* and finally *The Books we Read.* The focus of this paper is on the findings from one of the deductive themes: *Our Teachers.* Once the stories had been transcribed, they were analysed for inductive themes. These were identified as: *Pupil-teacher relationship*, noted across each of the decades. A *gendered workforce*, reflected in each decade, except 1999-2009. *Teacher personality* was common across all decades. *Corporal punishment* was common in the decades from 1944-1987, but not present after 1987. Finally, *Teacher professionalism* was a prevalent theme in most decades except 1999-2009. Key findings related to the connections that come with the relationship the teacher forms with their pupils. Teachers who break the mould are well remembered by pupils. The nature of the primary school workforce has changed since 1944, and is now female dominated. Because of changes to legislation, the role of the teacher has evolved, the changes in professional behaviour are noted in the narrators' stories, from decade to decade.

Keywords: Memories, education, teachers, schools, narrative.

1. Research context

In this paper, I share findings from one of the deductive themes from a larger piece of research, which utilizes narrative inquiry to understand people's personal perspectives on the phenomena of their experience at primary school. The overarching aim of the research was: *To understand the changing nature of primary education in Derbyshire schools through the stories of those who have experienced it over 65 years from 1944 – 2009.* There were 24 participants, male and female, four from each decade, 1944-1954, 1955-1965, 1966-1976, 1977-1987, 1988-1998 and 1999-2009. These participants attended different types of primary schools: two from state schools, one from a church school and one from a private school in each of the decades. There were four research questions:

1. How do narrators from different decades discuss primary schooling?
2. What were the key themes identified from the stories?
3. How do narrators' stories reflect the policy, literature and social context of the era?
4. How do stories of primary school help us understand educational identity?

The research questions provided a platform to explore the application of narrative to understand how narrators from different decades discuss primary school, in relation to a number of themes. Additionally, the research questions presented an opportunity to understand further, how the stories reflected the political and social context of the time, as well as gaining a better understanding of the educational identity of the narrators. The names of the teachers have been changed for ethical purposes; the names I have given to the teachers are reflective of the personalities described by the narrators.

This paper presents findings from some of the narrative interviews undertaken with the 24 narrators. The narrators all gave permission for their names to be used in the research study, when a narrator is cited, the dates in brackets denote the decade that they attended primary school. Deductive themes were first selected by examining the quantity of content and relevance to the study. There were four deductive themes drawn from the narrators' recollections: *Our Teachers; The Lessons We Learned; Our Friendships and the Games We Played* and finally *The Books we Read.* The stories were then analysed for inductive themes, presented later in the paper. The focus of this paper is on one of the deductive themes: *Our Teachers.*

2. Our teachers

Teachers are at the heart of every school. Many of us remember our favourite teachers, we remember why we liked them and we remember those we liked less well. In the narrators' stories, we see teachers described in many ways and we can see why and how they are remembered. In this research strand, we see how the role of the teacher is varied and how teacher behaviours change over the decades, often alongside the changes in policy and legislation. We see a shift in the teaching profession reflected in the societal expectations and changes over time. The stories demonstrate the influence teachers have on pupils' lives, how their words and deeds have a lasting memory with the narrators. There is a clear picture of how the role of the teacher changes as we move through the decades and how the profession has changed since 1944. I first present the inductive themes, and extracts from the narrators' stories highlighting these themes, with discussion in relation to the social and political context woven through the paper.

3. Inductive themes

Once the stories had been transcribed, they were analysed for common themes. These were identified as: *Pupil-teacher relationship*, noted across each of the decades. A *gendered workforce*, reflected in each decade, except 1999-2009. *Teacher personality* was common across all decades. *Corporal punishment* was common in the decades from 1944-1987, but not present after 1987. Finally, *Teacher professionalism* was a prevalent theme in most decades except 1999-2009.

3.1. Pupil-teacher relationship

There has been much research which illustrates why effective relationships are key for good learning to occur (Muller, 2001; O'Connor, Dearing and Collins, 2011; O'Connor, Collins, and Supplee, 2012) this relates to forming attachments for academic and social adjustment and how good classroom relationships can provide a stable platform for progression through the school years. Effective teachers engage in practice which creates a positive climate for learning (Shelton, 2016). Coe, Aloisi, Higgins and Major (2014) discuss the importance of the quality of interactions between teachers and students, the expectations of teachers and the need to create a classroom that is constantly demanding more, whilst still recognising student self-worth.

In the 1950s and 1960s, school was very different for children to the classrooms of today. During the 1950s, there was a teacher recruitment crisis, with more children being born post-war, these were the 'baby boomers'. Classroom sizes were larger than in most classrooms today, the narrators in these decades often reported on a distance between the pupils and the teachers, which give an indication to the nature of classroom interactions.

Jean (1944-1954): "They were nice but they were very remote, they were the teacher, they were treated with respect and we were just the children that they taught."

A key part of the positive interactions is how the narrators remember their teachers showing an interest in them. Andy and Tony both recall the teachers they liked, because of the interest shown in them, Bruner (1991) referred to canonicity and breach, the idea of breaching the canon relates to the ways that narrators remembered where their teachers had broken away from the archetypal teachers they knew. These teachers 'breached the canon' of the time and this is likely to be why they were remembered so well. In the recollections of those narrators from 1944-1976, those breaching the canon were likely to be the teachers that were well liked. Narrators from the more recent decades tended to report on breach of canon of those teachers whom were disliked:

Andy (1955-1965): "And then we went up to Mr Marvel's class, I think he was the best and most up to date teacher there. And he was really nice and and I remember us being in that classroom and being very happy there. He was the one who always took us to football and cricket and things like that..."

Tony (1966-1976): "I always used to like Mr Wright. He did songs and we did maths with him. He cared about us."

Getting on with teachers is important for healthy development and progress through school, some pupils are quick to learn this and play the games of the classroom (Waters, 2013), conforming to the expectations laid out by the teacher.

Chloe (1999-2009): "I liked having good relationships with my teachers and felt that it was advantageous to have teachers who liked you and wanted to push you to achieve your best."

There are of course relationships that are loss positive as experienced by Emily.

Emily (1977-1987): I think my year 3 and year 5 teacher got me and enjoyed me, my year 4 teacher did not, my year 6 teacher seemed pretty indifferent."

3.2. Gendered workforce

Leading up to the 1950s, the teaching profession was male dominated at both the primary and secondary phases. This was evident in the descriptions the narrators gave of the schools, with some, for example, making reference to the *headmaster*.

David (1944-1954): "There were four teachers, a headmaster and a secretary…"

Jean (1944-1954): "A lot more men then, than there are now, the headmaster was male.

Val (1944-1954): "There were only two teachers... One in the juniors and there was one in the infants and old Mr Jones was the Headmaster…"

David and Kevin (1955-1965): "Strange enough I liked Mr Gamble, headmaster, I found him interesting."

Simon (1966-1976): "And the headmaster seemed like he was ancient…"

Jon (1977-1987): "He went on to be headmaster…"

With much discourse over the last 20 years on the feminisation of the primary school, the gendered nature of primary schools has changed in the current educational context. Whilst males do not dominate the primary workforce today, it is still a gendered workforce, but now female dominated, with 82.4% female teachers at primary school level in the UK, a proportion that is steadily increasing (British Educational Suppliers Association, nd).

3.3. Teacher personality

The personality of teachers was a theme that resonated across all the decades. This was evident in the way the narrators described their teachers and is reflected in the names that I have given to the teachers in protecting their identity. This theme correlates to the pupil-teacher relationship theme because those that created a classroom climate for learning, which was conducive to the narrators enjoying school, were remembered for that. Conversely, those who ruled by making children fear them, or those who could not manage their classrooms well were remembered for being unkind or 'off the wall'.

Remembering his teachers' personalities, *Nic (1966-1976):* "Yeah the teachers were, with the exception of one or two, slightly eccentric characters not in the way of dangerous or abusive, but you know, looking back to the standards of the 60s the regime was reasonably liberal and teachers were quite sensitive."

And *Suzanne (1977-1987):* "Loved them, absolutely loved them at the time, really, you always knew that there were ones that were slightly stricter than others and you knew who they were but they were all really lovely and they had a lot of time and clearly in hindsight really dedicated to what they were doing."

Amy (1988-1998): "So yeah. I remember that my teacher was really creative, and I remember I wanted to be her when I was older, and we did quite a lot of fun stuff mixed in with that."

Theresa (1988-1998): "I remember Miss Wild who looked like she'd been electrocuted, because she was so nice but really strange. Miss Super, because she was younger and the cool teacher and played netball…"

Nathan (1999-2009): "…Mrs Noun … my English teacher, and she was also the leader of the school play, I was always a really, really shy kid... Mrs Noun was probably the one who involved me in things the most, who told me to audition for this school play… she was kind of the one who brought me out my shell a little bit, and helped me to express myself a little bit more."

Nathan's story shows how teachers can have a positive impact on our lives, they can influence us to aspire to things we did not know we were capable of achieving. Good teachers are at the heart of effective schools and quality of instruction is at the heart of all frameworks of teaching effectiveness (Coe et al, 2014).

3.4. Corporal punishment

During the 1940s, 50s and 60s, class sizes were large due to the numbers of babies born after the war and there was crisis in teacher recruitment. To keep children in line, teachers were often very strict, it was common for a child to be rapped over the knuckles, on the buttocks or on the palm of the hand with a ruler (Castleow, nd).

Corporal punishment was commonplace in schools, children were often 'controlled' by fear. Corporal punishment gave teachers the opportunity to exercise their power with items such as slippers, canes and rulers. There were no common rules across schools, so misdemeanours would be tantamount to five lashes of the cane for instance, whereas other might get five lashes for much more serious transgressions.

Andy (1955-1965) tell us: "Mr Cordial who was very genial, I remember him always having a smile on his face even when he used corporal punishment. He didn't hurt you on the backside, he never used a cane he used a ruler. A relatively minor misdemeanour was one ruler used on your palm half a dozen times. Next stage was to use about four rulers and bend them back and let them whack down onto your

palm. Then next stage demeanour was hand over, and the edge of the ruler hit on your knuckles – that used to come keen but I loved him, I really liked Mr Cordial."

Tony attended a church school; he recalled how the nuns could be harsh.

Tony (1966-1976): "I think two or three particular nuns who were teachers at the time… you knew you'd steer clear of really, because they would be dragging you off into the headmistress's office, who was a nun - and she wouldn't stand there and take any explanations from you at all. She'd just dish out the cane, or whatever."

The strictness of the nuns is a clear and lasting memory for Fran, she remembered their harshness vividly and her descriptions depict a hard, frightening classroom where the nuns ruled with severity, chastisement and canes. I felt a strong sense of justice when Fran recalls the time she stood up to the nuns, although she was met with an even more frightening threat.

Fran (1944-1954): "I was told off all the time for talking, and I was threatened with the cane and I happened to say I don't think nuns should use canes, and they told me "Fran, if you say that again I've got five canes and I'll use them all on you"…. I did suffer the most terrible, awful nightmares where even when I woke up I could not get rid of this feeling of fear. I'm still very anxious and I'm sure it's goes back to that fear."

David and Kevin (1966-1976): "… if you'd done something wrong fair enough, Mr Brandish'd give you a slap and that'd be it and it didn't carry on..."

Rosemary (1966-1976): "…the teacher, her name was Mrs Good-hand, but we called her Mrs Bad-hand because she was very, very stern. She would smack you around the back of the head, we did as we was told."

Corporal punishment was permissible in schools in England until it was banned in state schools in 1987. The professional nature of teaching has increased over time with standards produced for professional behaviour. The introduction of The Teachers' Standards, in 2007 and updated in 2011, define the minimum level of practice from trainees and teachers from the point of being awarded qualified teacher status, and are applicable to all teachers who are appraised under the 'The Education Regulations' (Department for Education (DfE), 2011). One of the standards states that teachers must 'establish a safe and stimulating environment for pupils, rooted in mutual respect' (DfE, 2011: 10). Our contemporary classrooms, and the teachers who teach in them, are therefore now bound by a professional code of conduct. Positive behaviour management techniques are promoted and encouraged by school leaders and inspectors.

3.5. Teacher professionalism

Teaching has developed as a profession since 1944. Le Grand (1997) suggests that there was a so-called 'golden age of teacher control' from 1944 to the mid-1970s. During this time, parents of children in state schools were expected to trust the professionals and accept that teachers knew what was best for their children (Whitty and Power, 2000). This is in stark contrast to the education system as we know it today in England. The government makes key decisions about schools, and teachers are highly accountable to the Office for Standards in Education (Ofsted) and for the delivery of the curriculum, exam results, children's progress and school improvement. Up until the 1970s the state did not seem to want to intervene, even though effectively it paid teachers' salaries. From the mid-1970s to the current day there has been increasing intervention from the government in education. Arguably, the autonomy afforded to teachers has diminished, with greater compliance expected in relation to outcomes, testing and curriculum delivery.

Teacher professionalism has evolved with the Teachers' Standards (Department for Education, 2011), teachers are bound by a professional code of conduct that must be evidenced leading up to qualification and upheld throughout their career. Examples of unacceptable teacher behaviour can be evidenced by stories told by some of the narrators attending school prior to 1970.

David and Kevin, (1955-1965): "Mrs Gamble used to send you down to the shops for her fags. You were basically her lackey." In our education system today, it is hard to believe that children would be sent to the shops to buy cigarettes for their teacher. Emily also shares a story that would now be defined as unprofessional behaviour.

Emily (1977-1987): "Least favourite was Mrs Loathsome, she was bat shit crazy. Brushed her teeth in the middle of lessons, ate 'Crunchies' while we all did silent reading, had a heater facing her desk and the classroom was bloody freezing in the winter." Again, Bruner's (1991), canonicity and breach can be seen in these recollections. The younger narrators, those attending school from 1988, also remember teachers who did not fit the mould, but stories of unprofessional behaviour are not evident in their narrations, it is likely that this is a result of The Teachers' Standards (2011).

4. Conclusion

It seems evident that what the narrators remembered are the connections that come with the relationship the teacher forms with their pupils. The narrators tell us about the people these teachers were, their personality and what it was about them, as people that they liked and disliked, when they were pupils in their classes. The narrators are fond of those teachers who helped them to learn, those whom showed an interest in them and those whom they looked up to. Teachers who break the mould are also well remembered by pupils, the narrators particularly remembered those teachers who are eccentric, unkind or different. The nature of the primary school workforce has changed, males do not dominate the primary workforce today, but it is still gendered, it is now female dominated, as reflected in the statistics presented. The stories told by the narrators demonstrate how teaching has changed considerably since 1944 and this is reflected in the recollections. The nature of behaviour management and therefore the classroom interactions has changed in schools since 1987, when the ban on corporate punishment was first introduced. Because of changes to legislation, the role of the teacher has evolved and the memories of how teachers are recalled seem to change over time. Of course, it is important to recognise that time plays a role in the way we remember, our stories can lose richness of detail and stories are often embellished as they are told and retold. However, regardless of this, it is clear that teachers are remembered for their personalities, the relationships they form with pupils and their classroom interactions, all fundamental to support student progressiona and achievement.

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ENGLISH FOR SPECIFIC PURPOSES – CHALLENGES
FOR POST-GRADUATION OUTCOMES

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Abstract

The current level of global economy and the continuous increase of international communication in various fields involve a wide landscape of career opportunities and imply well-prepared professionals. Most students, future specialists, need to become proficient in a foreign language, usually English, in order to meet a predictable range of communicative needs. Thus, the demand for English for Specific Purposes (ESP) is expanding in technical universities. This requires a special language teaching approach, that combines English language teaching and the students' professional concerns. The present paper explains an experiment that consists of teaching ESP in an academic context, but under unusual circumstances. The professional purpose is not only the shaping of future engineers or economists, but also the desire to make language learning interesting, attractive and useful. The novelty of the experiment consists of moving the language classes from the usual classroom into the place where the students perform their practical activities. The new professional environment, which increasingly involves certain accomplishments, is a real provocation for students, more and more interested in terminology acquisition. The students' universe has no limits regarding the power of information conveyed in the foreign language. The lexical material supposed to be acquired is easily kept in mind because the new linguistic material is linked to actual facts and situations from the surrounding environment. Students become more creative and more confident in their professional capacity. Moreover, the course, taught under such circumstances, requires flexibility from the teacher in his choice of methods and techniques, but also the obligation to stick to the requirements of the curriculum.

Keywords: Communication, terminology, practice, language proficiency, professional environment.

1. Introduction

The current level of global economy involves a wide landscape of career opportunities and implies well-prepared professionals. This is why graduate students of technical universities should become successful members of the global workforce. Most students, future specialists, need to become proficient in a foreign language, usually English, in order to meet a predictable range of communicative needs. In a global economy, English is, obviously the queen, and knowledge of English is increasingly a prerequisite for a high-paying job and a career in a growing variety of fields. The best environment to achieve this purpose is the language course offered by the universities the students belong to.

2. Design

A rising number of scientific university programmes in Europe include workplace experiences as elements of educational provisions. Students realize more and more that the opportunity to engage in such activities promote their learning and prospect their post-graduation outcomes. Educators, on the other hand, are engaged in challenges to provide useful and productive experiences for their students. This tendency is even more obvious in agricultural universities, where, however theoretically the teaching process is conceived, "learning by doing" is the best method that the university programme can offer. Students always keep in touch with the most provoking challenges of society and, when it comes to global ambitions, most of them wish to be prepared to get a place in a global environment. According to the British linguist David Graddol, there will be two billion people speaking or learning English within a decade. Everywhere, today and obviously tomorrow, English will be present in the lives of all people around the world. It is the most frequent tool for operating in most fields: banking, politics, diplomacy, science, travelling, internet. The display of computer technologies — especially the Internet — have expanded the use of English to the

remotest corners of the globe, and the new generations from Seoul to Athens to Santiago de Chile are all growing up with a knowledge of English. Moreover, as corporations become truly multinational, English tends to become their official corporate language, regardless of the company's location. As the European Union expands and becomes more multi-lingual, it too has shifted more and more to English. The ultimate insult to continental powers is that, even though the UK stay out of the EU, its language is and will be English.

3. Objectives

According to Tuula Lehtonen, "...the ability to communicate is paramount." "Languages play a role both in recruitment and at work and (inter)cultural knowledge and communication skills are important." Undergraduate students who are preparing for careers in the global economy by taking courses in English, are aware of all these facts and they know how useful thorough knowledge of English for Specific Purposes (ESP) is. They are in the process of developing expertise that will enable them to succeed in their future internships and future jobs. They need to master communication skills in English. Young people are aware that English is a world language, the dominant language of science, computing and academia in general. In technical universities ESP is taught in an academic environment where the aim is not only the formation of future specialists in economics, agriculture, or horticulture, but also the desire to make students enjoy English classes for the way teaching takes place, for the manner of delivering information and for the passion for this language transmitted during classes. Moreover, we consider that teaching ESP leaves room for creativity, opens gates towards improving general knowledge, towards a universe where there are no limits regarding the power of information conveyed in English. Because practical work is very important for students of the University of Agricultural Sciences and Veterinary Medicine, we started an experiment which involved moving out of the usual lecture room for English into the students' work placement: green houses for students of Horticulture, banks, tourist information centres and consultancy centres for students of Economics, breweries and milk processing factories for students of Food Processing.

4. Methods

The participants in the experiment were students of Biology, Finance, Business and Management. The experiment was very provocative and complex. After sending their Cvs, the students were delighted to be accepted by companies which might represent their future workplaces and were surprised to have the chance to learn English at the same time. Their concern for learning English was different: they became more motivated and learned faster.

4.1. Students of finance, business and management

English has long been the language of finance. As financial markets become ever more global and round-the-clock operations, the importance of English keeps increasing. The English classes with students of Business and Management moved out from the usual classroom into a bank during the students' placement. Before their placement, the students had acquired the new terminology and then practiced it in various ways to reinforce the new vocabulary. Here are some of the words that all the students were supposed to know:

Account: There is a *checking account* and a *savings account*. The *checking account* (or *current account* in British English) allows taking out money anytime. The *savings account* allows saving money and also earning interest. *e.g. They needed to transfer some money from the savings account to the checking account so that they could pay for the new GPS they wanted to buy balance.*

Balance is the money someone has in an account. This is the difference between what someone spends (debits) and what someone receives (credits). *e.g. He always checks his balance before completing a transaction.*

Credit: Credit is the money a bank lends someone. Credit can also refer to the financial reputation someone has when considering borrowing money from a bank. A *credit card* is a card that allows spending more money than someone has, but then interest must be paid. The word *credit* can also be used in a general sense: to give someone credit, means to acknowledge his efforts or worth. *e.g. The credit of our company was good, so we didn't expect the bank to reject our loan application.*

Debit: Debit means money taken out of the bank account or money someone owes. A *debit card* allows the use of money in someone's account by paying in stores or online. This card can also be used for getting money from a cash machine or ATM. This word can be used as a verb: *to debit money* means to take out money from an account. *e.g. They always use debit a card, so that not to be tempted to spend more money from the account. The bank debited the money from his account.*

Loan: A *loan* is money borrowed from a bank or another institution or person. The bank *lends* (gives) the money, and the customer *borrows* (receive) it. The bank is the *lender*, and the customer is the *borrower.* e.g. *They needed a loan to buy a building for their company, but they couldn't find a lender.*

Debt: A *debt* is an amount of money that is owed. The word can be used in a general way: A person who is *in debt* to someone, owes him a favor or is grateful for something. e.g. *They could not pay their debt, so they had to sell part of their land.*

While in the usual lecture room, the students wrote sentences with the new words in order to use them in new contexts and carried out role-play activities in order to reinforce the new vocabulary, but this time it is a real life situation. Things really happen. A group of eight students, accompanied by their teacher of English, do their placement in a bank. The professional target is twofold: learning about banking and improving the English terminology necessary for working in a bank. The student is sitting at his desk, a real desk, in a bank, a real bank, and there is a customer, a real customer, in flesh and blood, in front of him. It is an information desk for foreign customers and the student in question has to speak English. An employee of the bank is sitting by his side, prepared to help or step in. The teacher of English is also there, close to the desk, watching carefully, taking notes and preparing the next terminology session, according to the gaps and requirements that he notices. Every 20 minutes the student is replaced by a colleague of his, so that during three hours all the eight students in the group perform this activity. The bank offers a room, which becomes the actual classroom, where students gather after performing the "bank clerk" role. From this point on the teacher can discuss all the words, expressions, idioms, that he noticed his students need discussing. He adds a whole list to what has been previously taught. An employee of the bank attends this meeting as well in order to give extra information and to answer the students' questions. Thus, the actual work performed by the student during his placement goes hand in hand with learning English. During this activity other words and expressions needed to be discussed. The students understood the actual meaning of a lot of terms, which they had previously just heard or learned by heart. Here are some of the new terms that needed to be discussed:

Interest Rate: If you borrow money from a bank, you'll need to pay it back. In addition to this, you'll need to pay *interest*. The amount of interest is decided by an *interest rate*, which is calculated for a given period of time. If you have a savings account, the bank will pay you *interest* for being able to use your money over a certain period of time.

To overdraw: To overdraw is to try to withdraw more money than you have in your account. In this case, you generally have to pay some extra fees. It's advisable (a good idea) to pay attention to your balance so you don't *overdraw* money. *e.g. They were careful not to overdraw money from their account, because the penalties are quite high with his bank.*

Direct Debit: This is an arrangement to make regular payments of different amounts, usually for utilities (services like electricity and water) or credit card bills. By using *direct debit*, you avoid having to make monthly transactions. e.g. *The company uses a direct debit for its mobile phones bill.*

Safety Deposit Box: A *safety deposit box* is a safe that the bank rents for people to store their valuable items. *e.g. After he came back from the US, he decided to keep his important documents in a safety deposit box.*

Mortgage: A *mortgage* is an agreement by which someone can borrow money from a bank to buy a house. The bank becomes the owner of the house until the debt is paid up. e.g. *Many people need to take out a mortgage to buy a house.*

Collateral: This is something, like a house, that's used as a guarantee (assurance or backup) when taking out a loan. If the borrower cannot pay the debt, the bank becomes the owner of the *collateral.* e.g.: *They did not have any collaterals, so they decided to take out a mortgage.*

Appraisal: Appraisal is the evaluation of the value of a property, usually done by a bank representative. An appraisal is usually carried out before taking out a mortgage. *e.g. He wanted to use his land as collateral for the loan, but first the bank needed to appraise its value.*

Payoff: This is the complete payment of a loan. *e.g. He was feeling relieved that he had completed the payoff of the debt.*

Learning banking vocabulary will not only help students when working in or doing business with a bank. They will also feel more confident when doing any kind of business in English, which means that they will be successful business people.

4.2. Students of biology

The ESP experiment with students of Biology started in the classroom, with a discussion on environment and pollution. The checking of the vocabulary acquired in high school was important because some of the students may not have learned the simple science words in high school and they could have difficulty understanding more advanced vocabulary connections. Only after this stage more complicated

science materials can be presented. Usually students get involved easily because talking about environment is a topic they enjoy. This subject of science involves the usage of many biology terms, which essentially need to be comprehended correctly. People involved in the science field encounter innumerable jargons during their study, research, or work. Moreover, since science is a part of everyone's life, it is something that is important to all individuals. Here are some words the meaning of which the students proved to know:

Bacterium: a single celled, omnipresent organisms appearing in spiral, spherical or rod shape.

Biomass: Total mass of living matter present in a given habitat, expressed as volume of organisms per unit of habitat's volume or weight per unit area.

Biotechnology: Use of living organisms, tissue or cells for the manufacture of drugs or products intended for human benefit.

Blade: The broad, flattened, conspicuous part of the lead called lamina that is distinguished from the petiole or stalk.

Bark: Tissues of the vascular cambium forming tough layer on the outer region of the woody stems and roots.

Budding: Type of asexual reproduction involving formation of new cells from protrusions arising from mature cells. Yeast reproduces via budding.

Development: Changes pertaining to the growth and differentiation of plant cells into various tissues and organs.

Embryo: The immature sporophyte formed after fertilization from the zygote in the archegonium or ovule.

Family: Category of classification above the genus category and below the order category.

Fruit: In angiosperms, the ripened ovary wall produced from the flower, usually containing seeds.

Ecology: Branch of biology involving study of interactions of organism with the environment and with each other.

Petals: The colored segments of the corolla of the flower, which most often are involved in drawing in pollinating agents.

Photosynthesis: Photosynthesis is a plant activity which includes the synthesis of complex organic substances, peculiarly saccharides, from carbon dioxide, water, and inorganic salts, utilizing sunlight as a source of energy and with the help of chlorophyll and associated pigments. Plant Anatomy: Study of the internal structure of the plant.

Plant Physiology: The study of plants, which involves processes such as nutrition, reproduction, and other functions.

Plant Taxonomy: The science that refers to the identifications, description, naming, and classification of plants according to their unique characteristics.

Root: Organ of the plant situated below the ground and absorbs water and mineral salts. Buds, leaves or nodes are absent in root.

Transpiration: In botanical studies, the process of emission of water vapor from the plant leaves is known as transpiration.

After the classical lecture hall the students were moved to laboratory, where they performed their practical work. Laboratory environments are excellent settings for ESP Biology students. They are less intimidating places to communicate with other students versus large group discussions with the entire class, they provide an excellent way to use the vocabulary in a more casual setting and a way to work with peers in a less pressure-filled environment. The laboratories we used were the Microbiology Laboratory, the Floristry Laboratory, the Tree Growing Laboratory and the Viticulture Laboratory. All the groups of students were international because they included Erasmus students from many European countries, thus the language used was exclusively English. Alongside with the Biology trainer the ESP teacher was present and offered the necessary explanations. Here are some of the words the students learned, or words the meaning of which was cleared out in this relaxed environment:

Achene: A simple, single-seeded, dry, indehiscent fruit comprising one seed attached to only the base of the pericarp.

Aerobic Cellular Respiration: Part of cellular respiration, and plays a significant role in producing energy required to carry out different functions of the plant. It requires oxygen for the process.

Biennial: Plants requiring two seasons to complete their life cycle. The first season growth is purely vegetative and the second one bears fruit.

Biomass: Total mass of living matter present in a given habitat, expressed as volume of organisms per unit of habitat's volume or weight per unit area.

Food Chain: Natural chain of organisms, in which each organism of the chain feeds on members below it in the chain, and is consumed by organisms above it in the chain.

Gene: Basic unit of heredity, involving sequence of nucleotide containing necessary information for the structure and metabolism of an organism.

Gene Bank: It is a way of preserving plants and seeds for their germ plasm.

Genetic Engineering: Introduction of genes from one DNA form into another, by artificial means is called genetic engineering.

Peduncle: It is the stem which holds either a bunch of flowers or a solitary flower.

Pericarp: It relates to the matured and diversely altered walls of a plant ovary.

Plasmodium: Body of slime mold, which is a large mass of living substance with hundreds or thousands of karyons. Plasmodium ingest fungal spores, bacteria and other tiny protozoans.

Recombinant DNA: DNA molecule created either by crossing over in meiosis or under laboratory environment (in vitro). It is formed when DNA from at least two organisms is taken.

Taxis: The movement of a cell that is triggered by external stimulus, towards or away from the stimulus source, is known as taxis.

Transgenic Plant: A plant which contains DNA inserted by some form of genetic engineering is known as transgenic plant.

Zygosporangium: Large multinucleate sporangium produced by the fusion of two compatible hyphae in Zygomycete fungi.

Zygote: Diploid cell conducted by the fusion of two gametes.

Whenever possible the students took field trips to places like the Botanical Garden from Cluj and to various forests in Transylvania.

5. Conclusions

The endeavours to conceive this ESP experiment outside the lecture room proved to be successful. Due to the new circumstances of studying the foreign language students became more interested and highly motivated. The lexical material supposed to be acquired was easily kept in mind because the words and phrases were linked to actual facts and situations. Students become more creative and more confident in their professional capacity. The intercourse with their international peers brought them self confidence and opened gates to a desire for an international experience. The students will also feel more confident when doing any kind of business in English. This methodological challenge made the teaching of English not only interesting and attractive, but also very useful. The new methods conceived and applied provide different learning opportunities, which address the needs of learners, who realize that the ability to communicate is paramount.

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CRITICAL THINKING IN DIGITAL NATIVES: A DOCTORAL RESEARCH THROUGH A NEW TAXONOMY

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Abstract

How to define and how to measure critical thinking (CT)? This paper presents the first findings of a PhD research project that, in its first part, has seen an in-depth desk analysis and aims to outline which traits of CT are needed by "digital natives" in the context of the fourth industrial revolution. Starting from the need to clarify whether it makes sense to speak about "digital natives" and analysing the changes in the labour market and society, increasingly influenced by digital disruption, this research work intends to underline the importance of CT in a world that appears more and more shaped by technology. The domain of CT, in facts, will allow people to distinguish itself from machines, recreate a balance "pro human" and reduce possible environmental problems. The desk research has led to outline 10 characteristics of CT (merged into a taxonomy of the major CT fields) in the areas of school, work and society, "translated" into a questionnaire submitted to a sample of Italian students. The sample has been chosen among philosophy students and others that do not study this subject, to assess whether the teaching of philosophy contributes to the development of CT. Since it is difficult to predict clearly the future of work, preparing students for future life means giving them self-mastery. The guiding hypothesis of the research, therefore, is that the development of CT can help young generations to promote their own "agency" that supports them in continuous evolution environments (both scholastic and not) and allows them to make their talents bloom, starting from the freedom of action and choice. So the promotion of people's potential becomes as central as the development of a "capability approach", to allow each person, both individually and collectively, to develop their own makings and have reasonable chances of leading a productive and creative life.

Keywords: Critical thinking, digital natives, fourth industrial revolution, agency, capability approach.

1. Introduction

The important technological and digital changes of the last decades have led to a real industrial revolution that appears to be characterized by strong uncertainties, but also by an equally clear message. «The fourth industrial revolution – Schwab says – does not only change what we do, but also what we are: those who do not embrace change are likely to come out defeated» (Schwab, 2016b). Thus, there are not only critical issues, but also opportunities that involve both production systems and education. The latter needs to be ready for the changes that can become challenges not to undergo the digital transformation, but to govern it.

In education research, since a few years some researchers have been talking about learning "across spaces" (Looi, 2009) which, associated with new generation technologies (smartphones and tablets, but even wearable technologies), returns scholastic experiences no longer subject to space-time limits. It is therefore possible to learn and train in different environments, virtual or real, that we can consider almost "non-places" or "liminal places", no longer limited to school classrooms. In fact, new technologies carry, in the classic learning places, codes and languages typical of the instruments used *extra moenia*. In this rapidly evolving context, "digital natives" (Prensky, 2001) are learning. Grown up using a wide variety of technological devices since early childhood, they may have acquired particular skills, abilities and, consequently, possible new learning strategies. The Prensky's fortunate definition has had also some criticisms from those who questioned the real presence of a "digital generation" (Bennett et al., 2008) or argued that digital natives are actually just a myth (Kirschner, De Bruyckere, 2017). The hypothesis is that "iGen" students know digital world not in a homogeneous or innate manner. They limit themselves to a mostly passive and opportunistic use of the new digital tools, proving to be able to use technology, but without a real knowledge to support one's own learning, highlighting, in this way, just a familiarity and not a technological awareness (Iannella A. et al., 2017). The PISA-OECD surveys show that Italian students are below average for "web surfing oriented activities", so much so that the Ministry of Education calls

them "lost in navigation" (MIUR, 2016). If that of digital natives is really just a myth, it follows that even learning projects based on it (for example using only a technology-assisted didactics) would risk making their education slower and more difficult, as the overexposure to stimuli would impede the effectiveness of learning (Kirschner, De Bruyckere, 2017). The core issue is not only having access keys to surf the Internet, but also knowing how to surf intelligently and profitably. «Many young people [...] do not have the ability to direct their own reading, to make judgments about the relevance of a web page or the quality of an argument. They click on what moves and are not selective [...], they do not go directly to the information they are looking for, whereas they should show themselves to be critical consumers of online information, whose quality is far from being uniform» (MIUR 2016, p.11). Nevertheless how can they be or become "critical consumers"?

1.1. Critical consumers *alias* critical thinkers

Once in front of media contents, digital natives often risk being "grasshopper minds" (Pedró 2009, p.18): they have an inclination to leap quickly from one topic to another, they are not constant and impatient if sources of information are not immediately at their fingertips. They have difficult to lingering over a subject and they are inclined to give priority to images, videos and music over text (*Ibidem*). Instead, situations and complex problems require more attention and, above all, a more complex reasoning, a more careful thought that can reformulate the issues and deepen into them, avoiding conclusions «too rushed, in which the ambiguities of language are not resolved or in which our personal inclinations are too much influential» (Colasanti, 2012, p.21). The digital natives' thought should then be "disciplined", so that students can question the validity of arguments, discover possible errors of reasoning and logic, analyse the reliability of a source, identify implicit or explicit assumptions of an argument or an information (Ranieri, 2007). The "iGen" young should therefore be critical thinkers inclined not simply to think. The simple, natural process of thinking, in fact, if not reasoned, educated or trained, can be biased, distorted, partial, misinformed and even potentially prejudicial (Scriven and Paul, 2004). Instead, the critical thinker is able not only to think, but also to try to "get it right". He can articulate an opinion clearly and honestly, he takes into account other people's ideas and he is able to take care of others' thoughts. He is then able to seek, clarify and appropriately judge the assumptions to develop his own point of view; can intelligently argue from given bases; can suppose and integrate an idea (even with originality and imagination). All of this «with dispatch, sensitivity, and rhetorical skill» (Ennis 2011, p.5).

Although it is difficult to trace a shared definition of CT, among the descriptions that in recent years have had the greatest follow-up, there is undoubtedly the Facione's one, who undertands it as follows:

«We understand critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. CT is essential as a tool of inquiry. As such, CT is a liberating force in education and a powerful resource in one's personal and civic life» (Facione 1990, p.2).

CT, however, cannot be restricted to predefined frames or locked up within the rigid boundaries of a definition (even the Latin etymology of the term refers precisely to the idea of border that in Latin was called "*finis*"). CT is, in fact, free thinking that feeds on questions and problems and therefore, rather than being limited within the confines of a definition, can be described through categories with less rigid outlines that embrace not only the world of school that digital natives inhabit today, but also the labour environments they will inhabit tomorrow.

1.2. The importance of being critical thinkers in a changing world

The digital transformation's changes obviously do not concern only the educational institutions, but also the labour market in which new skills are sought. The 2016 data of the World Economic Forum tell us that 65% of children entering primary school today will ultimately end up working in completely new job types that do not yet exist and that, obviously, will strong undergo digital influence. Those who now sit behind school desks must therefore develop transversal skills to be used in a labour market that, at this moment, appears only conceivable. Future workers should have skills useful for facing the challenges of an environment that is changing rapidly and, likewise, requires people new knowledge and skills to adapt and deal, in a competent manner, with highly diversified situations. Even if the ability to think and reason independently can seem superfluous if all we are looking for is quantifiable in "business" terms (Nussbaum, 2011), even the world of work needs critical thinkers.

The European Commission report, "10 trends. Transforming education as we know it" (2017), remembers us that humans are not the only ones learning and that, to gain novel insights, we will increasingly compete with machines. «Advances in high-performance computing are enabling an artificial intelligence revolution whereby machines can learn and take on ever more complex tasks» (EU 2017, p.3). People could find themselves increasingly competing with robots (no longer only on routine tasks and low-skill jobs) and so we have to revalue and strengthen the skills that once already had been central to human

species' success, such as creativity, problem solving, negotiation, adaptability, working together, cross cultural communication, empathy and emotions, critical thinking. Precisely to this latter competence, the European Political Strategy Center dedicates particular attention considering it a fundamental pillar also to face the consensus' creation through fake news.

CT also occupies a central position in the recent report of the World Economic Forum, "Towards a Reskilling Revolution. Industry-Led Action for the Future of Work" (2019), which highlights how employers consider most important today, as well as expected to be trending by 2022, not only digital skills (like technology design and programming and systems analysis and evaluation), but also "human" ones. Among these, we can find exactly CT that, like creativity, initiative, leadership, is not expected to be automated in the near future.

At the same way, the International Labour Organization, starting from the assumption that technological changes will bring flexibility and autonomy, but also an unclear future with uncertainty and insecurity, speaks about "core skills" on which young workers (high-, medium- and low skilled) will need training on: adaptability, social intelligence, creativity, imagination, social and communication skills, critical reasoning.

The domain of CT, therefore, together with other cross skills, will allow human beings to distinguish themselves from robotic and technological devices that in the coming years, with the digitalization of organizations, could replace most of the jobs tasks. The mind, therefore, looks just like the adaptive "tool" that can deal with the complexity and the problematic nature of the environment and try to reduce or translate it (Dewey 1961, Morin, 2000).

2. Objectives

Taking note of the fundamental importance of CT for the fourth industrial revolution students, who will have to apply their knowledge in changing and, for the most part, unknown world, this research project was born with two macro objectives:

a) To study digital natives in their learning environments, verifying whether they use CT both in learning and in using digital devices.

b) To verify if, in digital natives, CT is more developed and encouraged through the study of philosophy.

In this context, the teaching of philosophy is understood as the promotion of the counterfactual that can train students' ability to imagine other possible worlds. In this way, they could find solutions to problems, concrete or abstract, following a path that starts from reflection and arrives at to advance explanations and alternatives, through the discussion and the presentation of one's motivations. Philosophy is considered here as "criticism of criticism" that invokes experience and takes the form of a wisdom capable to influence the conduct of one's life (Dewey, 1968).

Education, indeed, has to maintain a social nature by making students active subjects and protagonists of the processes of learning and forming one's own critical conscience. Already in 1897, Dewey claimed that it would not be possible to predict precisely how civilization would have been like in the years to come. Equally impossible, therefore, it is prepare students for a precise order of conditions. Preparing them for future life, therefore, means giving them self-mastery (Dewey, 2004, p.6).

The guiding hypothesis underlying the present research is that CT can help young generations to promote their own "agency" (Sen 1998, 2001, Nussbaum 2012) that will support them in continuous evolution environments (both scholastic and not) and allow them to change, rethink and retrain their own talent starting from the freedom of action and choice. The agency would allow a necessary cognitive flexibility with the motivation to learn by combining "thought" and "action" and "doing" with "thinking how to do as best as possible" (Costa, 2016).

3. Methods

The first part of this research project has seen an in-depth desk analysis aimed to examine both existing Italian and international literature and to analyse studies already conducted about these topics. This first approach has led us to understand how young generations move in their learning environment; use their digital tools for learning and organize times and spaces between online and offline boundaries. It allowed even an analysis on the labour market and social requests regarding CT.

Through the studies conducted, a taxonomy has been realized on the greatest descriptive areas of CT. The taxonomy, composed of 10 indicators (Analysis; Beware of sources; Cognitive and emotional self-regulation; Curiosity; Dialectical approach; Empathy; Imagination and open mind; Reflexivity; Respect; Self-correction), represents an overall view of CT within the fourth industrial revolution and encloses the areas of school, work and society. It has been used also as a road map for the quantitative field research. In fact, it led to the creation of a questionnaire submitted to a sample of Italian students, enrolled

in the fourth year of high school and chosen between "Liceo" (with philosophy class) and technical institutes (without it).

The questionnaire – which also measures other factors such as digital natives' technological equipment, time dedicated to the use of media content, integration between digital devices and learning method – was used together with the "Questionnaire on the perception of their own skills strategies" (QPCS) (Pellerey et al., 2010). This tool, recognized and validated, encourages the reflection and the awareness of certain specific skills having root in personal qualities, connected with being able to give meaning and perspective to one's own experience and activity. «On the one hand its use allows focusing attention on some aspects of the educational processes often underestimated, or at least not adequately highlighted. On the other hand it allows young people to foster awareness of their knowledge regarding certain fundamental qualities of their act both in the study and in the work» (Pellerey et al., 2013, p.51).

4. Conclusions

In the "revolutionary" context of Industry 4.0, the promotion of people's potential becomes, starting from the educational field, increasingly central as the development of a "capability approach", to allow each person, both individually and collectively, to fully develop their own makings and have reasonable chances to lead a productive and creative life (Alessandrini, 2014).

Is therefore necessary an action to encourage the development of CT in digital natives, urging their active participation and their operational involvement.

Since innovation requires flexible, open and creative intelligences (Nussbaum, 2011), it is essential that students cultivate CT as a continuous quest for a global approach to reality and the problems associated with it. In the new "ecosystems" of work (Alessandrini, 2017), what is useful to learn at a certain moment can be quickly overcome. What remains is the ability to read and think critically about what we are facing, because we do not know what we will need to know in the future, but we do know we will need to be skilled in finding out (Elder, Paul, 2007).

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FRENCH IMMERSION TEACHER AND STUDENT PERCEPTIONS ABOUT SCIENCE INSTRUCTION IN A SECOND LANGUAGE SETTING

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Abstract

In Ontario, Canada, the vision for French Immersion (FI) education is grounded in the federal linguistic duality approach, which perceives knowledge of Canada's two official languages (French and English) as an important part of Canadian history as well as a notable asset in terms of student interaction and employability on an international spectrum (Ontario Ministry of Education, 2013). In Ontario, students enrolled in English language schools have the option to be taught academic subjects in both French and English. In response to requests for instructional support from FI Science teachers, representatives from the Council of Ontario Directors of Education (CODE) approached Laurentian University researchers to embark on a project that would contribute to building the capacity of teachers who teach Science in French in the Junior and Intermediate grades (7-10). The current study utilized a mixed methods approach to evaluate teacher perceptions about teaching science to second language learners, teacher beliefs about their own science teaching efficacy, as well as students' adaptive learning engagement in science. A total of 37 grade 7-10 FI teachers and their respective 324 students from across Ontario, Canada, participated in the project. Data were collected through telephone interviews, completing *the Science Teaching Efficacy Belief Survey* (for teachers) and the *Student Adaptive Learning Engagement in Science Survey* (for students). The findings show that most teacher participants generally felt that they taught science effectively, and were continually striving to find new and innovative ways to engage their students in science classes. However, these teachers faced challenges with respect to finding suitable science resources that are suitable for teaching science to second language learners. Findings from students were mixed in terms of their self-efficacy and self-regulation, for those who expressed a genuine interest in science, they were more likely to be confident in their ability to succeed in FI science classes. The paper present the findings of the current study and postulates on the potential impact of these self-perceptions from students and teachers in the FI science classrooms, as well as some suggestions for improving FI Science teaching and learning.

Keywords: French immersion, science, teacher efficacy, teacher perceptions, student perceptions.

1. Introduction and literature review

In keeping with the two official languages of Canada, the education system comprises of both English language schools and French language schools. Students from English speaking homes who wish to study French can enroll in French Immersion (FI) programs offered in the English schools. These programs differ in terms of the number of subjects or hours of the day, when students can learn in French or English (Cummins & Carson, 1997). Various subjects that are taught in French are the same as in the regular English stream, except that they are taught in French, a second language for mostly English-speaking students. According to Laplante (1997), students' limited proficiency in French constrains what can be taught and learned in various subject areas. French Immersion teachers are tasked with incorporating the content objectives as well as the second language objectives in each lesson. Turnbull et al., (2012) pointed to the challenges faced by FI teachers who teach complex subjects like science and math when students' language proficiency is limited. The challenges they noted include: a) school administrator and parental expectations that their children will cover the same subject matter as students enrolled in regular English-medium programs; and b) classroom materials that have been developed for native speakers of French that tend to be too advanced for beginning language learners. These concerns are still valid to this day, and the current study is an effort by the Ontario Ministry of Education to respond to FI science teachers' concerns. In July 2017, representatives from the Ontario

Ministry of education approached Laurentian University to discuss a project that would strive to build capacity for these teachers. The larger project involved conducting research, developing and administering professional development workshops for FI teachers, and developing FI science teaching resources as informed by research. This paper presents the research findings about teacher perceptions and personal beliefs about teaching French Immersion Science, and students' perceptions about science learning and their engagement in a second language context. We found it important to gain an understanding of the teachers and students' perspectives about science teaching and learning in FI because research has shown that teacher and student perceptions and personal beliefs about the subject affects their classroom practices and comportments (Lyons, 1990).

Numerous studies suggest that teachers' specific subject beliefs tend to be compatible with their instructional strategies (Gallagher, 1991; Laplante, 1996; Rowell & Gustafson, 1993). In turn, as mentioned, it is widely accepted that student intrinsic motivation and self-regulatory practices can be directly linked to student engagement and achievement (Velayutham, Aldridge & Fraser, 2011). Taking into consideration these findings, it is noteworthy to mention that a teacher's own beliefs and motivation has a considerable impact on their science instruction. Furthermore, student motivation towards science learning also plays an important part in their learning. It is important to consider the multiple roles that language plays in learning scientific concepts. Rivard, Cormier & Turnbull (2012) reported that many science teachers often note that textbooks and pedagogical resources in science tend to be too difficult for French Immersion students and that the curriculum is too overloaded to allow for the teaching of language arts concepts (reading and writing strategies) in content instruction of scientific concepts. Some researchers, however, note that the incorporation of more language arts practices in science will help student comprehension and learning of these concepts (Cormier & Turnbull, 2009; Lyster, 2007). Researchers have widely studied the modalities of teaching various content subjects in French Immersion (Turnbull, Cormier & Bourque, 2011). Some researchers have particularly conducted studies that resulted in their validating certain successful approaches to enhance student learning in FI Science. Rivard, Cormier & Turnbull (2012), for example, present strategies that they have developed to create rich conversational spaces in FI Science classrooms. They propose that developing reading skills is crucial in science instruction, especially in FI classrooms. The four key concepts that support their rationale are the following: the nature of science, classroom realities, the immersion context, and creating discursive spaces. Laplante (1996) suggests that some teachers have successfully utilized thematic teaching approaches, which merge science instruction to language arts concepts in the French Immersion classroom. This would include presenting content-based science concepts while utilizing approaches related to reading and writing instruction (ex. literature circles on a current event in science, etc.). Turnbull, Cormier & Bourque (2011) further suggest that an experimental approach that integrates literacy into science instruction and learning is beneficial to helping students in a French Immersion setting to master scientific concepts.

Science represents a way of understanding the world that transcends other basic subjects taught in schools. Cormier and Turnbull (2009) indicate that: "Science is a way of knowing the world and, like religion, philosophy, law, fine arts, and music, helps humans acquire knowledge about the world" (p. 89). In turn, the rapid and constant evolution of science in general creates a context to which science teachers must constantly adapt while teaching curriculum concepts. Several studies have addressed different facets of science teaching and learning, and presented some important considerations for teachers. A multi-national study on the Relevance of Science Education (ROSE), found that students generally agree that Science and technology are important for societal growth, and mostly understand that there are benefits to learning about science (Sjeborg & Schreiner, 2010). Other important findings that could help to inform current science instruction practices are that some students find it difficult to be motivated to learn science because they consider that their science classes do not present enough relevant and current events to link to scientific concepts, do not allow sufficient opportunities for debate and teach too many theoretical scientific concepts that require rote memorization. More importantly, some students consider that they do not possess the necessary cognitive skills to grasp science concepts.

2. Objectives

The objective of this study is to determine teacher and student perceptions about science teaching and learning in a French Immersion context. The goals of the study are to determine:
a) Teachers' perceptions about FI science teaching.
b) Teachers' self-efficacy and beliefs about science teaching.
c) The relationship between teachers' self-efficacy and beliefs, and their perceptions about teaching FI science.
d) Influence of students' perceptions about science on their engagement in FI science.

3. Methods

A mixed methods research design was utilized in order to gain a more in-depth understanding of the phenomena. Data were collected through telephone interviews with teachers, the Science Teaching Efficacy Belief Instrument (Riggs & Knochs, 1990), and the Student Adaptive Learning Engagement in Science Survey (Velayutham et. al., 2011). The participant recruitment process involved sending invitation letters to teachers in School Boards that offer science in French in grades 7-10 across Ontario. A total of 37 teachers were recruited, 30 grade 7-8 teachers, and 7 grade 9-10 teachers. The researchers scheduled a 20-25-minute telephone interview with each teacher at a time that was convenient for them. The interview questions gathered teacher biographical information as well as their perceptions about FI science teaching challenges, teaching strategies, and their own science knowledge. All the interviews were audio-recorded. The Teacher Efficacy Belief Instrument was administered in person when teachers attended professional development workshops that were offered as part of the project. The researchers then visited the classrooms of 10 volunteer teacher participants to administer the Student Adaptive Learning Engagement in Science Survey. Qualitative data analysis involved transcribing the telephone interviews verbatim. The researchers and research assistants read and re-read the transcripts to identify emerging themes. Quantitative data were analyzed using SPSS software to determine the variability in responses as well as to see relationships among the themes. A triangulation of the quantitative and qualitative data enabled the researchers to develop a richer understanding of the factors that may directly influence the perceptions about FI science teaching.

4. Findings

4.1. Teacher perceptions about teaching FI science

Findings from the study show that the teacher participants generally felt that they have some understanding of science and that they taught science effectively. The teachers were continually striving to find new and innovative ways to engage their students in science classes. Teacher responses to the Science Teacher Efficacy and Beliefs questions related to their beliefs about their own knowledge and science teaching capability generally had lower standard deviation, showing that most teachers generally agreed that they have knowledge of science and are to teach it. On the other hand, teacher responses to questions relating to their impact on student learning had a higher standard deviation, showing more varied beliefs about their capabilities in this regard. The teachers' responses were also varied in terms of their beliefs about inquiry learning in science, with almost half the teachers indicating that they would let students design their own experiments and half indicating that they would not do so.

Data from the interviews showed similar trends, and it helped to shed more light to understanding the observed trends in the quantitative data. When asked if they feel they have enough knowledge to teach FI Science, the teachers' general response was that they had enough knowledge. However, most teachers mentioned that they felt comfortable teaching some of the science strands, but they needed support with resources that would help them to teach well, *"Yes and no. I think there are certain strands that we're more comfortable with...I find that I, I do it, but I, I would like more resources..."* Most grade 9 and 10 teachers were generally confident about their level of science knowledge and ability to teach science in general, but they felt that there were some science topics where their knowledge was shaky. On the other hand a few grade 7 and 8 teachers did not feel that they had enough knowledge of science content, either because they did not major in science or were teaching science for the first time as shown in the quotations below:

> *"Um...I could definitely use a lot of work. Again, one of the questions on your survey was have I taken any courses...post-secondary courses...no I have not...Basically, I'm just basing it off of like...my main research is science and technology through Pearson the textbook."*

The majority of teachers mentioned that they use different strategies to ensure that student understood the concepts, for example, using English videos that helped to explain the concepts or using both English and French when necessary to explain science concepts as shown in the following quotations from two teachers:

> *"So we will, uhm, definitely have uh, if someone doesn't understand the vocabulary, we always go through it. I try to go away from French - English - French - English. And go more-so, French and then the definition, or alternate definition in French to give them, and then more types of vocabulary."*
> *"I, sadly have to use English resources to make sure that they to just solidify, like the stuff to make sure that they understand it...A lot of visuals, lots of, lots of hands on."*

Most teachers also mentioned using hands-on investigations, as well as practical and visual ways to help students understand the French materials. This is illustrated in the following quotation:

"Um, so I do always try to have a...some kind...especially with the French students I find they need the...the visual with it. I know there's visual learners in other areas as well, but I find it particularly useful in French so they normally have their graphic organizer or a list of vocabulary or, uh, even something up on our...we have, uh, projectors...so something up on the projector that they can refer back to throughout a lesson. Um, and we do a lot of, in the early stages, working together and then in smaller groups."

When teachers were asked if they understood how students learn science in French, they generally felt that they did. Mostly this understanding was based on their own experiences in school as French second language learners. However, the following quotation shows that the teachers struggled to understand how their own students learn or what they understood, due to their limited ability to express themselves in French:

I don't understand how they do it. I don't understand what they understand. I obviously don't truly know what they understand. Um, oh, it's really difficult, it's the language that's hard for them."

4.2. Challenges in FI science classes

Notably, all the teachers interviewed reported that a common challenge in teaching science to students who typically do not speak French as a first language is that they are spending time ensuring that students understand the scientific vocabulary, which leaves them limited opportunities for integrating inquiry-based science teaching and learning. Findings show that all the teachers generally agreed that their students had limited French vocabulary which made it difficult for them to comprehend science concepts. The following quote captures the teachers' concerns:

"Though, the concepts are hard enough on their own, they don't have the basic vocabulary they need to understand it, so they have two challenges at the same time, so trying to get them to digest all these new concepts along with a whole bunch of new words for them. So they may have already heard the English term before, just out in the world, so they have a little bit of an understanding of what the English word means, but suddenly when you put it in French, they have an extra challenge."

Some teachers were torn between focusing on students' mastering of French vocabulary or understanding of the science concepts that students were able to express in English. These challenges were exacerbated by lack of materials and resources that are suitable for the students' level of French comprehension such as textbooks:

"...finding resources that are at the student's level for French Immersion because a lot of the times the textbooks are written for Francophone students, so if they're doing any kind of reading I usually have to do it as a class and then really break down the vocabulary, so some of the time finding resources at their level is challenging."

4.3. Student perceptions about science

Data from student surveys showed that they have positive attitudes towards science. The students strongly agreed that it is important to learn science, and that they need to work hard in order to accomplish their goals. This shows that students' interests in science motivates then to work hard. Although students' responses showed beliefs that, given time and effort, they could succeed in science, the data also show that they lack confidence about their science knowledge. The higher average themes in their responses were about their ability to do the work needed to learn science. The question with the lower averages is about their ability to master the subject. The mean for questions related to task value related their curiosity and usefulness of science was lower, indicating a lack in understanding the value of science to real life. Questions related to interest in learning science had high mean values showing that there are mixed levels of interest among students.

These findings are related to teachers' observations that students struggled with FI science learning, and the fact that there are varying levels of student's abilities throughout their classrooms, and that for some students they would be better off in the English programs where the resources to support them would be available:

"I do have student that are in there because mom dad wants them to be in there and they don't understand bit of French. And then I have uhm, students that are there from the French world, that they had French, had instructions in French, from kindergarten until grade 6, and then they switch into our board, so varying level really, uhm, like I know that it, it takes away some of them kids are getting it, and then some kids are just, like in over their heads."

5. Discussion

Findings from this study indicate that the teachers generally believe that they have the science knowledge needed to teach, and that they can teach science effectively. However, they felt that their

teaching was negatively impacted by factors such as lack of resources and students' limited French language communication abilities. These findings are contrary to research that suggest that teachers' specific subject beliefs tend to be compatible with their instructional strategies (Gallagher, 1991; Laplante, 1996; Rowell & Gustafson, 1993). This disagreement can be explained by the fact that the current study context is different than that of prior studies due to the fact that the students are learning science a language that they are not proficient in and the fact that there are no science resources tailored for second language learners. The interviews helped shed light on the teacher' perceptions, as they were generally frustrated by the challenges they encountered, which is consistent with earlier studies (Rivard, Cormier & Turnbull 2012). French teachers find themselves in a situation where they have to design their own resources in order to accommodate the language proficiency level of their students. Although some teachers used English resources such as videos, they had to design their own French worksheets to enable students to express their understanding in French. Since the curriculum requires FI students to become fluent in the French language as well as achieve the expectations of the subject content, teachers faced the dilemma of whether to focus on assessing one or the other, given the fact that students lack of communication in French hampered their abilities to show their understand in of science concepts. There is need to provide FI science resources that are at the reading level of the students. As teachers mentioned in the interviews, there is need for flexibility in terms of curriculum coverage and assessment of student learning by FI science teachers in order to enable them to accommodate students who have limited French communication skills.

Acknowledgements

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ENHANCING UNDERSTANDING OF HISTORICAL TIME IN PRIMARY CLASSES: HOW TO IMPROVE THE CURRICULUM IN LITHUANIA?

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Abstract

History teaching has been raising many didactic issues recently. First, the concept of the very discipline of history has been undergoing changes, the aim of school education is being shifted from memorizing pre-defined content towards developing historical literacy based on critical thinking and development of historical research skills. Second, admitting the impact of socio-cultural context on pupil achievement, the attitude towards children's receptive skills and their development has been gaining new perspectives. This is of high importance in primary education, where a heroic story is often still dominant. At present, the discourse of primary education curriculum change emphasizes attractive communication of scientific knowledge and the demand for active research to broaden children's deep understanding. However, the development of historical literacy in primary classes still remains to be complicated since, on the one hand, it requires new landmarks – what and how to teach, on the other hand, research in this field has been very limited.

In Lithuania, there is an intention to re-new the curricula in all the fields. Therefore, it becomes relevant to analyse what skills to understand historical time should be developed in primary classes. This scientific problem is solved by carrying out a qualitative analysis of the content of primary education curriculum. Based on the chosen model of understanding historical time (De Groot-Reuvekamp, Ros, Van Boxtel, Oort, 2015), this article analyses the extent to which curriculum requirements of history teaching correspond to the goals and comprehension levels of the model of understanding historical time (A – Emergent; B – Initial; C – Continued) and what should be improved when updating the curriculum.

The research results reveal that the present curriculum requirements for the 4th year pupils are inadequately low. They lead towards the stage of acquiring understanding (A – Emergent) rather than Initial (B) or Continued (C) stages. Therefore, while revisiting the curriculum, it is important to pay more attention to the development of historical research and higher thinking skills, that would be a significant step towards gaining deeper understanding of historical time.

Keywords: Understanding of historical time, history teaching in primary classes, curriculum.

1. Introduction

The aim of history learning is now being shifted from learning facts and dates to constructing a narrative, which is based on analysing, interpreting and finding arguments for the past (Barton, Levstik, 2004; Lee et al., 1993; Lee, 2005). Under the influence of constructivist ideas, history learning is considered to be the process of investigating and creating historical knowledge, during which pupils reconstruct their previous knowledge and develop their understanding (Levstik, Barton, 2015; Cooper, 2002; Seixas, 1996). It is considered that the progress of understanding of history is reflected not by the amount of knowledge, but by deeper understanding of this knowledge and by certain cognitive constructs that are developed individually (Lee, 2005). The comprehension of time is the key ability when learning history. Evidence shows that it is related not only with the age. Primary school children are able to develop complex structures of historical thinking, when they have the context of content adapted to them, learning material prepared, and intensive activity of investigation organized for them (Barton, Levstik, 2004; Cooper, 2011). Younger children sometimes have deeper reasoning skills than older children (Lee et al., 1993; Stow, Haydn, 2000; De Groot-Reuvekamp et al., 2014), which leads us to an assumption that the basics of understanding historical time are acquired earlier that the adolescent age. However, it is not a typical practice in the primary school. In terms of developing the basics of historical literacy, the contexts of various countries differ, and research in this field is limited.

2. Context

Many authors have researched various aspects of time comprehension, and in general, the following goals of education can be distinguished: understanding the vocabulary of historical time; understanding sequence; understanding contextual features; understanding historical periods. With yet

another goal added, i.e. the goal of applying timeline, the model of developing the understanding of historical time is created, which enables us to identify, develop, and assess pupils' achievement from the age of 6 to 12 (De Groot-Reuvekamp, 2016; 2017). This model combines 5 educational goals and the implementation of these goals through three developmental stages of achievement: A (Emergent) – emergence of understanding (the very basics); B (Initial) – initial (developing) understanding; C (Continued) – growing (continued) understanding. The model is based on the following principles: children's vocabulary of time develops from broad and general expressions (*long time ago*) to indicating specific dates; and children's understanding about evolution and changes expands from specific knowledge to abstract knowledge. According to research, the transition between the three stages of understanding takes place individually, therefore, the model is not linked to children's age (De Groot-Reuvekamp, 2017, p.41-42). These insights are important when defining the guidelines of the curriculum, but is this what we are trying to achieve? In Lithuania, for instance, the teaching of history in primary school[1] is integrated into the subject of *World Studies*. The curriculum covers six areas, where the area of *The Changes in People's Living* is dedicated to history (Primary Education Curriculum, 2008). The content covers history periods of this country and the world, the topics are usually taught in a chronological manner. However, how does the curriculum set the background for understanding historical time? In this stage of the research, an attempt was made to answer this question with the aim to analyse the content of the Lithuanian Primary Education Curriculum by identifying the requirements of understanding historical time for pupils and the extent to which these requirements correspond to the chosen model of developing the understanding of historical time. This analysis will complement the field of research of understanding historical time in Lithuania with contextual data. Since qualitative content analysis has the benefit of comparing data, it can be useful to researchers who are interested in the contexts of other countries.

3. Methods

The method of content analysis was chosen for the research, which works well for describing and interpreting written artefacts (White, Marsh, 2006), contextualizing the field of problem, and raising questions related to the area of research (Bowen, 2009). The curriculum reflects national goals, the expectations for pupils' achievements, and education guidelines for teachers. It reveals the context in which education takes place. The data was collected through the analysis of the *World Studies* curriculum of the Lithuanian primary education, as the text of a public document. Since qualitative content analysis helps identify models and fill them with data (Fereday, Muir-Cochrane, 2006), the decision was made to analyse the document on the grounds of the already developed construct. The model of developing the understanding of historical time was chosen to be this construct; it is broadly described by the researchers of this area (De Groot-Reuverkamp et al., 2014; De Groot-Reuvekamp, 2017). The model was approached as the topic of understanding the time, which integrates educational goals as categories. Each category consists of three subcategories, i.e. comprehension stages in the order of progression: A (Emergent) – emergence of understanding (the very basics); B (Initial) – initial (developing) understanding; C (Continued) – growing (continued) understanding (De Groot-Reuvekamp, Harnet, 2016; De Groot-Reuvekamp, 2017). The content of curriculum was investigated by the principle of thematic analysis with the purpose of finding and identifying the units of meaning, i.e. statements which describe the knowledge and abilities of understanding time. The statements found were allocated to the categories and subcategories of the chosen construct as codes according to their meaning. The selection of codes was carried out according to the extent to which these statements correspond to the topic of developing the understanding of time and to the structure of the chosen model. Various general observations that contain no expectations for achievements were rejected, for instance, "to have sufficient knowledge of historical images" (Primary Education Curriculum, 2008, 243). The results were interpreted in the hermeneutical manner by analysing the expectations for achievements as a phenomenon of investigation.

4. Results

The content of the Lithuanian Primary Education Curriculum consists two blocks, i.e. the one for the 1st and the 2nd grades, and the other for the 3rd and the 4th grades. The investigation looked into the statements of both blocks; these statements were included in the curriculum as requirements for pupils' knowledge and abilities of understanding the time. The data is provided in Tables 1–5; they are analysed and interpreted with reference to the data of empirical research on pupils' achievements.

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[1] In Lithuania primary education starts at the age of 7 and lasts for 4 years.

Table 1. Understanding of notions.

Category	Subcategory	Statements found in the curriculum of *World Studies* subject	
		1st – 2nd grade	3rd – 4th grade
Pupils understand and use the vocabulary of time and historical periods	**A (Emergent)** – relative notions of time; notions of calendar time	To understand the notions which express the changes of time. To express the understanding of time flow and time change: to distinguish and properly use the following notions: *yesterday, today, tomorrow; in the past, at the present, in the future; a day, a week, a month, a year.*	To use the notions of time in a fluent and proper manner.
	B (Initial) – certain periods; "labels"; AD dates	No statements found	To have a general understanding of the key facts of the Lithuanian history. To distinguish several most prominent moments in the Lithuanian history (either of the two).
	C (Continued) – terminology of periods; centuries and dates AD/BC	No statements found	No statements found

Table 2. Understanding sequence (chronology).

Category	Subcategory	Statements found in the curriculum of *World Studies* subject	
		1st – 2nd grade	3rd – 4th grade
Pupils put objects of various historical periods in the chronological order	**A (Emergent)** – specific objects	To describe some facts of greater importance about your family members. To understand the links between grandparents, parents, children. To have basic understanding of historical change and continuity. To understand the notions of change and alteration.	To point to examples of man-made values, such as *castles, palaces, churches, works of art*. To sequence historical events in a chronological order by using everyday terms (*previously, now, in the future; earlier, later; some time ago, at some point, etc.*).
	B (Initial) – objects of several periods	No statements found	To know the most famous local people; to know the most important local historical monuments.
	C (Continued) – objects of historical periods	No statements found	No statements found

Table 3. Applying timeline.

Category	Subcategory	Statements found in the curriculum of *World Studies* subject	
		1st – 2nd grade	3rd – 4th grade
Pupils properly place objects, events and personalities on a timeline	**A (Emergent)** – a simple timeline from earlier to nowadays	No statements found	No statements found
	B (Initial) – a timeline with names of periods	No statements found	To understand how one period replaces the previous one. To name the periods of history (not necessarily in the chronological order).
	C (Continued) – a timeline with centuries and dates (AD and BC)	No statements found	No statements found

Table 4. Identifying characteristic features.

Category	Subcategory	Statements found in the curriculum of *World Studies* subject	
		1st – 2nd grade	3rd – 4th grade
Pupils identify / apply the features according to which they ascribe objects, events, situations or people to a certain period	**A (Emergent)** – everyday features of periods	To give specific examples to illustrate people's life in the past and in the present. To describe houses, clothes, work tools of ancient people.	To generally describe the signs of the past of one's place of living. To identify the great periods of history according to characteristic features (signs).
	B (Initial) – social and cultural features of certain periods	To describe how fire was used in ancient times, what animals were domesticated first; what means of transport and communication existed then and what exists now.	To explain what people were occupied with in ancient times (*picking, hunting, fishing*), later on when work tools were invented and animals domesticated (*agriculture, husbandry, crafts*), and in more recent times (*construction of castles, towns, roads and bridges, creation of art*).
	C (Continued) – socio-cultural, economic and political features of the country and the world	No statements found	No statements found

Table 5. Comparing historical periods.

Category	Subcategory	Statements found in the curriculum of *World Studies* subject	
		1st – 2nd grade	3rd – 4th grade
Pupils compare and contrast various historical periods according to their similarities, differences and changes	**A (Emergent)** – examples of the past / present from stories told by parents and grandparents	To give examples about the alterations of one's living place.	To compare people's lifestyles, occupations, leisure in the past and in the present.
	B (Initial) – similarities, differences and changes of people's lives during different periods	To identify, understand, assess and describe the changes in the immediate natural and social environment.	No statements found
	C (Continued) – similarities, differences and changes of people's lives during different periods	No statements found	No statements found

The results reveal that statements found in the curriculum do not include scientific notions of historical time, such as *the century, era, period*. We only see the notions of calendar time in the first block (1st – 2nd grades), whereas the expectations for using notions remained unclear in the second block (3rd – 4th grades). A question arises as to what notions older pupils should use in "a fluent and proper manner". The curriculum states that 3rd and 4th graders should acquire "general understanding about <…> facts" and "to distinguish several <…> moments". Shouldn't facts be linked to the names of periods? Children usually do that through "labelling" periods or indicating dates (Hoodles, 2002; Cooper, 2002; Wilshut, 2010). The Lithuanian research has shown that 9-year-olds use descriptions such as *a Stone Age man*, *a Roman warrior* (Žemgulienė, Balcevič, 2017, p. 154-155). As many as 76.8 % of fourth-graders were able to identify the era for the given statements, whereas 52.8 % were able to identify the century, and 29.2 % said that the knight lived in *the Middle Ages* (Žemgulienė, 2017, p. 427- 429). It means they used the "labels" for periods, and some of them used scientific notions; it corresponds to level B (Initial) and partially to level C (Continued) of the chosen model. Why these abilities are not identified as expectations for pupils' learning outcomes?

Teaching chronology is done through the content which is taught according to the principle of knowing the immediate environment first. For the 1st – 2nd graders the topics cover relationship of children, parents and grandparents, their items, lifestyles, occupations, traditions. However, the curriculum only refers to knowledge, not abilities. In higher grades the knowledge is extended to studying events and personalities related to the place of living, the country and the world. However, statements that describe abilities refer to expectations for the abilities of grouping instead of sequencing. It is a low expectation for the second block, since children as early as at the age of 6 or 7 are able to group according to the principle *earlier–nowadays*, whereas older pupils can put objects of several periods in a sequence (Barton, Levstik, 2004; Davson, 2007; Cooper, 2015). Data obtained from the Lithuanian research also revealed that the images of a warrior were correctly sequenced by 59.1 % of fourth-graders (Žemgulienė, 2017, p. 429). Why is it not an expectation for pupils' achievements?

It is obvious that the curriculum does not intend to develop the abilities of applying a timeline. The requirement to name the periods is questionable: why should pupil know about them if the curriculum does not care about their sequence? It does resemble the expectation for memorizing. Research results reveal that pupils of both blocks would be able to develop these abilities if only they are taught to do so (De Groot Reuvekamp, 2017, p. 52-53). Such research has never been carried out in Lithuania.

The abilities to identify features are developed at level A (Emergent) and level B (Initial) of the model. However, the meanings behind the statements do not reflect expectations for the progress of achievements. The statements in both blocks are related to knowledge. The statements in the first block ask pupils to describe features, whereas in the second block they are asked to explain. However, what periods should this knowledge cover? It remains unclear. The curriculum refers to the past as to "ancient times" and "more recent times", which is entirely improper when teaching the understanding of time (Stow, Haydn, 2000; Hoodkinson, 2003; 2004; Wilshut, 2010). Research demonstrates that primary school children are able of noticing changes in objects and technological advance (Levstik, Barton, 1994; Wilshut, 2010), however, they are typically able to indicate contextual features by referring to a given text rather than to contemplations of a particular period (Van Drie, Van Boxtel, 2008). Lithuanian pupils are also better at sequencing rather than explaining why they did so (Žemgulienė, 2017). Why it is not taught?

Descriptions of achievements in terms comparing historical periods correspond to level A (Emergent) and level B (Initial). However, the comparison given in the second block based on the principle *earlier–nowadays* is too low an achievement, since much younger children are capable of making such a comparison (Hoodles, 2002). On the contrary, the expectation for evaluating the social environment is too high in the first block, since it is more difficult for younger children to perceive social changes (De Groot Reuvekamp, 2017, p. 50). Nevertheless, as many as 58.6 % of fourth-graders in Lithuania made a correct link between secret teaching and the occupation by tsarist Russia (Žemgulienė, 2017, p. 431). It is, however, too difficult for the second-graders.

5. Conclusion

The Lithuanian Primary Education Curriculum provides for the teaching of all goals of the model of developing the understanding of historical time at level A (Emergent), and the some of the goals are taught at level B (Initial). None of the goals are taught at comprehension level C (Continued). Research suggests that the majority of 10-year-olds achieve level B in terms of all goals, and some of them achieve abilities of level C. However, the integrated curriculum does not provide for the development of such levels of historical literacy. The curriculum is subject to improvement in terms of all these aspects.

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EXPLORING STUDENTS' REFLECTIVE NARRATIVES ON LANGUAGE AS THE SUBJECT OF THEIR STUDIES

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Abstract

The present research lies within the realms of autobiographical self-reflection extending and developing students' skills of critical thinking on language as the subject of their studies. The importance of looking back over different stages of the learning process and identifying the cases of success and failure in one's life experience has been emphasized by many scholars, among them, Mason (1994), Moon (1999), and Bold (2012). The paper focuses on the data obtained from the semi-structured reflective essays entitled "My Language Learning Autobiography" written by 250 students of the study programme "English and another foreign (Russian, French, Spanish, Norwegian) language" taught at the Faculty of Philology, Vilnius University, during the period of 2015-2018. With more than fifteen years of foreign language(s) learning experience at school and university, the target students have demonstrated their capacity to mediate over the concept of language, discuss the necessity of the knowledge of foreign languages in the contemporary world, assess themselves as language learners and contemplate on the ways, how foreign language(s) should be taught/learnt. The research period of four years allowed us to identify an interesting fact related to the students' attitudes towards a relatively diminishing role of a language teacher. The chosen medium happened to be supportive in examining the students' personal actions as well as self-motivating.

Keywords: Narrative, self-reflection, foreign language, learning experience.

1. Introduction

The designers of the twenty-first century pedagogy have been constantly amending the list of competences necessary for the contemporary learners, smart millennials, enjoying the advantages of globalization as well as rapid progress in technology (Whitby, 2007). The priority is given to the development of metacognitive skills: as "metacognition reflects an individual's critical awareness of how they think and learn, and their assessment of themselves as a thinker and learner." (Scott, 2015, p. 10). Scott acknowledges that metacognition can be developed by encouraging learners to contemplate on the ways towards achievements or failures through integration of reflection which identifies their confusion and acknowledges difficulties. The latter insight reiterates Whitby's opinion on effective pedagogies based on a thorough understanding of how people learn.

By unpacking the meaning of *reflection* one can learn its several interpretations. This research paper refers to the definition of the term provided by Bolton (2010, p, xix), who describes *reflection* as an "in-depth consideration of events or situations: the people involved, what they experienced, and how they felt about it. This involves reviewing and reliving the experience to bring it into focus, and replaying from diverse points of view." Such a rendering coincides with Moon's insights about *reflection* as a key mental process to be intertwined with thinking and learning (1999, p. 10) through mediation over one's own abilities, critical analysis and deeper examination of one's own actions (as cited in Alexandrache, 2014, p.21). It correlates with Dewey's ideas relating *reflection* to active, persistent, and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and the further conclusions to which it tends. (1933, p. 9)

A learner's competence of being reflexive enters into several explanations, such as: "to be able to stay with personal uncertainty, critically informed curiosity and flexibility to find ways of changing deeply." (Bolton, 2010). Williams, Woolliams and Spiro (2012, p. 2) distinguish five compounds of the target competence: first, they emphasize a person's openness to different ideas, ability to see things from different angles. Second, they value one's curiosity as an ability to ask questions. Third, they stress one's patience when the cases are difficult or problematic. Fourth, they identify the importance of being honest with oneself, one's uncertainties about what wrong or right is – and one's writing needs to make this transparent to others. Finally, they mention the skill of rigorousness, which carries the meaning of being analytical and acting on the gained insights.

The development of the discussed competence components requires a thorough consideration of methodological approaches where the function of a reflective narrative becomes pivotal. Bold depicts narrative as "a means of developing and nurturing the skills of critical reflection and reflexivity" (2012, p. 2). To be more precise, writing in autobiographical style cast a learner in a researcher's role where the focus shifts towards the learner's inner world, his/her 'self' and relationship with the surrounding context.

The 1st person writings (memoirs, autobiographies, diaries) are described as tools of self-construction: they are not just accounts of what happened but "ways of moulding the stuff of the past into the models of what the writers wish to be: writing an account of one's life is an act of self-creation" (Heehs, 2013, p. 6). Reflective narratives found application in diverse human activities (nursing, teaching, counselling, travelling, etc.) for many purposes. Recently, Language Learning Autobiography as well as the Autobiography of Intercultural Encounters as a method of critical reflection has stepped in the fields of language teaching-learning or cultural discoveries (Byram & et.al). The projects by the European Council and European Commission, e.g., LLP Grundwig: Learning Partnership "PLURI-LA" (2012-1-FR1-GRU06-356503), NordPlus "DELA NOBA" (NPHZ-2013/10022) encouraged the idea of eliciting language learners' struggles and joys when in contact with new languages and cultures.

The beginning of this research also dates back to "DELA NOBA" project run in the period 2013-2015 and promoted *Language Learning Autobiography* as a tool to recognise language learning being inseparable from the learners' emotions and embodied experience. This practice has been continued up to recent days, and the current collected data allows language teachers to analyse the students' attitudes towards their encounters with foreign language learning from different perspectives.

The aim of this paper is to analyse the students' attitudes towards current foreign language teaching and learning process described in their narratives, entitled *Language Learning Autobiographies*. To accomplish the aim for this particular paper the following objectives were set:
- to identify the students' interpretations of the concept of language;
- to cast light on language learners' self-assessment;
- to detect the ways how languages should be taught from the students' perspectives;
- to distinguish the roles of a language teacher of the 21st century.

2. Context & methodology (and data characteristics)

The assignment on the reflective narrative 'My Language Learning Autobiography' has been an integral part of the course on 'Intercultural Communication', offered to the students of the study programme "English and another foreign (Russian, French, Spanish, Norwegian) language". The programme is run at the Institute of Foreign Languages, Faculty of Philology, Vilnius University. Given the fact that the target languages belong to different language families, students face an opportunity to analyse them as systems from numerous linguistic perspectives. After completion of a substantial number of subjects, in the 3rd year, they join the course on Intercultural Communication, which aims at demonstrating language as an integral part of the human cognition and lays emphasis on language and culture relationship, peculiarities of verbal/non-verbal communication, communication styles, identity issues, etc.. Students are encouraged to reflect upon their personal intercultural encounters or cultural misunderstandings they have come upon, and discuss the ways they managed to deal with them. Since reflection as an approach of learning is applied to a number of tasks of the course, students get aware of the particular writing style that enables them to disclose their personal pathways towards many discoveries, including the way towards foreign language proficiency.

To address the objectives of the research the students are asked reflect upon the four issues, such as the concept of language *per se*, favoured foreign language teaching methods, teachers' roles, and their as language learners' strengths and weaknesses. Consequently, the raised issues became the guiding pillars for their reflections and presented a semi-structure to their narratives.

For the analysis, the texts of 250 reflective narratives, written during the period of 2015-2018, ranging from 800 to 1200 words, were selected. Each narrative was numbered and labelled according to the second foreign language of students' studies. Each author of the narrative gained an informant's status. Distribution of the sample group by the languages they study fell in the following proportions: 90 students of English and Spanish, 70 students of English and French, 50 students of English and Russian, 50 students of English and Norwegian, respectively.

The analysis of the narrative texts was based on *qualitative content analysis* (Bitinas et al., 2008) which assisted in navigation through the abundancy of data presented by the informants. Due to limited number of pages for this paper the following parts will present a summary of the informants' reflections.

3. Review of the current foreign language teaching and learning process in Lithuania: students' perspective

Prior to the analysis of the reflective narratives, it should be mentioned that English, as the first foreign language, is taught in primary schools of the Republic of Lithuania since the 2nd year. The majority of the target students have been in contact with this language for longer than fifteen years. While their exposure to the second foreign language (Spanish, French, Russian and Norwegian) has been lasting just for a third year. Therefore, while exploring the informants' narrative puzzles, there has been much more evidence found on their encounters with the first foreign language, i.e., English, rather than the second one, Spanish, French, Russian or Norwegian.

3.1. Who am I, a language learner?

The target students were '*born and grew up in independent Lithuania*' (ES1). The years of their birth coincided with the period of information technologies to start stepping over the thresholds of their homes, when: '*families were getting computers, which meant interface with English*' (ESN6). '*An unlimited, albeit slow, access to the internet, opened a new era in activities,- computer games, news programmes, message boards – all of them were explored with the aid of English, the lingua franca of the Internet.*' (SP17). Further advances in ICT are described as magic tools for language learning: '*cable television kept me exposed to Cartoon Network since the age of three. As a child I was enamoured with it, spending worrying amounts of time watching TV and learning English quite organically*' (FR6). '*The wonders of digital technology, most importantly video games, gave me a considerable amount of knowledge, which now has been taken over as the language of my thoughts*' (FR63).

Naturally, '*English has become so ingrained in* their [L.Ch.] *brain via continuous exposure to the world wide web*' (EN5) that consequently, its proficiency levelled off with their native languages. Furthermore, some parents' intention to start their children learning foreign languages at an early age resulted in attending extracurricular English activities (~30 per cent of the informants): '*it was the parents who saw the value of languages and encouraged me to learn English at an early age*" (ES29). Due to the evidence given, some learners enrolled and still enrol in primary schools with a certain background of English, while others, at the same time, start learning it from scratch. A class of children with diverse language proficiency envisages complications at the very beginning of the teaching and learning process: it requires teachers' professional commitment on application of individualized teaching strategies, which is a rare practice in primary schools, and, in many cases, leads towards dissatisfaction of both sides.

Despite initial discrepancies, the majority of the informants acknowledge language learning as '*an extremely difficult*' (RU2) and '*time consuming process, requiring much effort and dedication*' (ES22), demanding one's '*perseverance*' (NOR4), '*responsibility for completion the given tasks*' (ES14) and '*self-discipline*' (ES9). Among the personal character features listed to meet the demands of a '*diligent learner*' (ES53), the informants stress the importance of one's '*open mindedness*' (FR43), the ability to '*maintain the quality of performance*' (FR15), to have '*a desire to excel peers*' (FR17) and hunger '*for international experiences to unveil thoughts of other people*' (ES19). Above all, 'never daring to give up' (NOR6) is acknowledged by the language students as a driving force towards success.

Mirroring the informants' reflections on their personal weaknesses or negative emotions towards language learning, '*impatience*', '*laziness*' and '*boredom*' prevail in many narratives. The latter emotional state happen to be typical of the millennials grown up in the digital world. Their own or groupmates' inability to produce a correct answer instantly '*drive* them *crazy*' (NR36) urging to escape from the classroom. In contrast to 'perfectionists', those, who are shy, feel embarrassed and psychologically insecure to speak in front of their demanding groupmates, face '*a constant nerve-wracking challenge of not to make a mistake or not to mix up a word*' (ES6). '*The fear of being laughed at*' (FR47) prevents nearly half of the informants from being active and productive in the classroom: '*I prefer keeping silent to speaking*' (RU2). Alongside with the fear of speaking and active participation, poor skills of time management '*due to external distractors*' (NOR42) and '*poor concentration skills*' (ES76) were acknowledged as the most typical weaknesses of the contemporary foreign language learners.

Putting all the negative aspects aside, the majority of the informants do not limit themselves to the two languages of their studies; they indicate their determination to prolong the list of their foreign languages up to six or seven as a distinctive feature of one's personality development as well as a success factor towards the future career ladder.

3.2. What is language for me, a language learner?

The answers to this question generated quite a large amount of the students' surprise, as exposure to languages for more than fifteen years never has made them consider such an issue. Their interpretations on the concept of language are vivid, though diverse, therefore, can fall into several interpretation lines.

The informants' relationship with English and another foreign language allows them to compare and contrast at least two different linguistic systems at the same time, which, consequently, leads to the perception of language '*as a living organism that constantly changes*' (FR32). Therefore, language learning is acknowledged as '*a lifelong process that needs updating every time*' (RU15). References to the contemporary dictionaries allow them to describe language as '*a system of arbitrary and conventional signs*', '*a tool of communication*' (112 informants). Further to it, language is reflected upon as '*an everyday component that unites people*' (FR59), that '*identifies one's communication style*' (23 informants) and '*depicts one's attitudes towards different life aspects*' (ES11). Language indicates the '*importance of one's social status*' (ES34) and '*different ways of thinking*' (22 informants). However, language is more than the definitions in the living dictionaries, language should be seen as a '*complicated organic system that lives and dies along with its people*' (FR11) or as '*a drop in the language ocean allowing us to see how many languages there are in the world, and spot out Lithuanian among them*' (FR52).

Creative minds of the language students reflect upon the presence of language as '*lens to another culture*' (13 informants), '*window to another world*' (RU11): "*Language permits to distinguish one group of people from another, but it brings the same community together*' (RU37). Language is seen as '*a core of society making its people together*' (ES88), '*the glue that keeps society working*' (FR17), on the other hand, '*a provider of the meaning and security*' (FR28).

From students' personal perspectives language is considered to be '*the best gift given to a person*' (7 informants), '*the feature that distinguishes us, humans, from the world of mammals*' (NOR33), or '*a human property: the more languages you know, the more human you are*' (Masaryk quoted by RU39). Language is described as: '*a means of self-expression*' (3 informants), '*a sign of one's identity*' (19 informants), '*one's personal domain reflecting a person's style and character*' (NOR25), or '*a criterion of one's education*' (NOR18) - "the limits of your language are the limits of your world' (Wittgenstein quoted by RU11). The studies of several languages at the same time allow students to feel the shifts in their personalities: '*My whole body responds to a language that I'm speaking at that moment*' (FR18) because "*learning two languages makes you switch from one language to another, and consequently, feel your inner self changing: the way you think and express yourself*' (ES24).

Despite the majority of resourceful interpretations of the language concept intertwined with quotations by prominent authors or extracts taken from the folk wisdom, there also appeared some cases demonstrating the informants' official indifference towards the subject of their studies, as they have '*never thought too much of what language is. Probably, a set of words?*' (RU19). The latter idea leads to an assumption, that every study programme has some students who are still in search for their inner *selves*; and their personal uncertainty about the subject of their studies, first, reduces the level of their motivation and, second, becomes contagious to the others sharing with them the same environment.

3.3. What do I expect of a language teacher?

Given the fact that '*language is highly linked with communication*', it is the teacher who is expected to be '*communicative and willing to establish relationship with students*'. The latter teacher's feature was identified as the most important character trait as well as qualification attributed to the image of a good teacher. Further to it, a good teacher is required to be:

- **a charismatic, warm and helpful personality**: '*making students feel at home in the classroom*' (RU17); '*creating an appropriate learning environment with no tension at all*' (ES66);
- **a role model professional, passionate about his/her subject, inspiring students to love the subject of their studies**: '*promoting the usefulness of every language*' (ES22);
- **systematic**: '*being able to provide the whole language system rather than concentrating on separate themes*' (NOR4) or '*picking up topics randomly*' (RU27); '*focusing on knowledge transfer rather than assessment*' (FR56);
- **encouraging and motivating**: '*preventing students from the fear of their mistakes*' (RU3) as well as the dread of public speaking;
- **inventive when designing classroom activities; individualizing the study process by choosing the most suitable learning strategies according to the learner types**: '*arousing natural curiosity to learn something more that would step over the boundaries of a mere home task*' (RU11),
- **selective**: '*in choosing tasks for language learners*' as well as teaching materials which should be '*relevant to students' life, not boring*' (20 informants);
- **emphatic**: '*dealing with students' mistakes in a nice manner*' (ES16);
- **strict** (though not too much) – '*strong enough to ignore students' complaints and excuses*' (RU21);
- **facilitating the whole learning process, though, escaping dominance**: '*teachers should be the guides who want to show the beauty of the language, all the opportunities that language can offer, and to convey their knowledge in the best manner they can*" (FR20);
- **constantly improving themselves**: '*unfortunately, not many teachers understand that the awarded diploma in not the top in their career ladder.*'(ES66).

Nearly 90 per cent of the informants strongly believe that foreign languages should be taught by the **native speakers**, as "*their remarks and pieces of advice appear more credible*" (FR19). There was some uncertainty about the necessity of the physical presence of a language teacher in general, '*when there are so many means around you*' (NOR44), however, this discussion leads towards the last part of the paper on foreign language teaching-learning methods.

3.4. How should languages be taught?

Learners' exposure to a foreign language over fifteen years, although passed through pains and gains, undoubtedly, has broadened their experience in how languages are or should be taught. Bearing in mind the fact that language learning is highly dependent on every student's learning style and personality, the informants admit that everyday practicing is compulsory and within the scope of their responsibility.

The learners' feedback of teaching methods present a number of ideas that could be generalized in the following way. First, at school, foreign language learners are facing a constant change of teachers and delivery of the targeted themes in 'dribs and drabs'. Only the approaching examination does bring

some system in the study process as well as psychological security for the learners. Second, every new teacher brings a set of new methods, which make the learners '*leave* their [L. Ch.] *comfort zones*' (NOR46) and '*become more adaptable*' (RU9). Third, the prevailing tendency to avoid using the native language in the lessons of a foreign language rather than applying some translation activities to '*help us feel each language*' (FR9), '*disclose structural differences and similarities of both languages*' (FR28), '*unveil the impact of the native language*' leaves the majority struggling with a number of unanswered questions, probably, for good. In some cases, the problems are solved with the assistance of a private teacher or a foreigner's consultancy. Therefore, the informants' longing for some learner-friendly environment has been voiced out in many narratives: a need for relaxing atmosphere full of interactive activities, friendly teacher's guidance where there is no room for doubt.

Visiting the country whose language is studied could be another way of gaining language proficiency: '*living abroad erases limitations of your vocabulary*' (89 informants). This idea can be implemented with the help of *Erasmus+* programme, temporal jobs in foreign countries, since '*travelling and exploring the country's culture*' (57 informants) or '*Work and Travel USA*' programme (180 informants) are described as the best ways '*to examine one's level of language proficiency*' (34 informants).

The revision of the last year (2018) narratives gives us a hint that the role of a language teacher is diminishing. One third of the informants think that learning with the help of IT provides '*live communication*', which is much more beneficial than '*teacher's old-fashioned manner of teaching from a text-book*' (FR7). They maintain they '*can use some apps, watch movies, listen to songs and sing themselves, Skype to your friends abroad, play games, refer to social media, or at least, take up an online course*' (52 informants). This particular group neglects the physical presence of a teacher and takes the burden of learning difficulties on their own shoulders. Their opponents claim, that interactive lessons at least remind them how to communicate, otherwise, '*when glued to the screens of their iPhones*' (ES61) they will finally forget about the natural manner of human communication.

4. Concluding remarks

The application of reflective narratives to foreign language teaching and learning turned out to be one of the most successful means in language education when its manifestation was evident in the following spheres:

- students' collected data provided interesting material to be analysed from different perspectives;
- students' positive attitude towards the method of introspection resulted in their sincere disclosure of themselves, as language learners, as well as other agents involved in foreign language teaching-learning process, and the methods applied to it. Bearing in mind the positive and negative sides of the feedback, there is invaluable information for the teachers to reconsider.

Reflective narratives as a method could be highly recommended to any subject teacher for self-analysis of his/her relationship with the subject, target students and the subject *per se*.

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COMMUNITY EXPERIENCES THROUGH PEER INTERACTION RITUALS OF A MONGOLIAN-KOREAN CHILD IN THE PRESCHOOL CLASSROOM

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Abstract

The rituals contain symbolic meaning about the culture of the peer group. It is likely that rituals frequently indicate the inclusion or exclusion of specific individuals by the group. Currently South Korean society began to diversify with an increasing number of immigrants and their families, which calls for a more serious discussion on school adaptation of children from multicultural families. This study examined community experiences of a Mongolian-Korean child through peer interaction rituals over time in the preschool classroom, South Korea. The theoretical framework of this study is based on interaction ritual chain and multicultural education theory. The methodology consists of a qualitative case study approach. The research classroom is a 5 years of age class has 8 boys, 12 girls, and one teacher, which has one Mongolian-Korean boy and the others are Korean children. The data were gathered through classroom participant observations 3 hours a day, twice a week for 6 months and interview with a Mongolian-Korean boy, his Mongolian mother and teacher. The data were analyzed by conducting content and meaning analysis. In the research, a Mongolian-Korean child's community experiences were related to transition to group emotions, symbol, and memories over time. The results showed that 1) in the beginning of the semester, he used to ask for help from his teacher whenever he meets conflicts among friends and have often an angry expression during free paly time. But he has changed to share positive group emotions between friends through peer interaction rituals 2) in the beginning of the semester, he was interested in 'dinosaur', which was his private symbol and he didn't want to let friends know the information about it. But he has changed to explain dinosaur to his friends and 'dinosaur' has become the group symbol 3) in the beginning of the semester, he didn't say to friends about 'Mongol', which was just his mom's hometown and his private memories. But he has changed to introduce to friends about Mongol and 'Mongol' has become group memories as a common story after project activity. These results described peer interaction rituals that contribute to make a sense of community in preschool settings and offered suggestions for creating multicultural classroom community.

Keywords: Young children, peer interaction rituals, community, multicultural classroom, preschool.

1. Introduction

There are currently 141 million immigrants living in South Korea and 2.8% of the overall population. Multicultural families are 31 million 6 thousand households and the household consisted in a Korean father and immigrant mother make up 36.6% of them. Young children from multicultural families make up 56.4% of multicultural families (KOSIS, 2017). Young children from multicultural families are more likely than non-multicultural children have struggles of preschool adjustment in South Korea (Oh, 2011). They tend to show individual and alienated play to perception of surroundings, unconditional patience, observation, imitation, and interaction through paly with limited friends (Leem, 2013). So, many researches have examined their social development and peer interaction patterns in preschool (Kim & Park, 2010; Lee, 2013; Park & Lee, 2010), but little effort to focused on their community experiences through classroom rituals.

Rituals comprise symbolic actions that create social orders (Hallett, 2007) and ritual performances are expressed through everyday interactions (McLaren, 1987). Routines and rituals can be distinguished along three dimensions: communication, commitment, and continuity (Fiese, Tomcho, Douglas, Josephs, Poltrock, & Baker, 2002). For example, during the mealtime, routine communications are typically direct and instrumental but ritual communication is symbolic. That is, the use of nicknames, inside jokes, and terms of endearment reinforce individuals' role in the group and hold meaning for those inside the family.

And the commitment to routine is task oriented setting, clearing, washing dishes but ritual is affective and emotional. The continuity to routine focus on food time limited role repetition but ritual focus on group belonging, cross-generational symbolic referents, future planning.

In the interaction ritual chains theory, participants share interests through rituals and experience mutual subjectivity and emotional connection, finally they feel a strong sense of belonging (Collins, 2004). Collins (2004) argues that interaction rituals produce emotional energy, the gathering of which is a central motivating force for individuals. Affect is the engine of social order. Those interaction rituals that are most effective in generating emotional energy are the ones that bolster institutional stability.

Especially, children form their own rituals separately to adults, which may be evinced in paly and talk. The rituals contain symbolic meaning about the culture of the peer group. It is likely that rituals frequently indicate the inclusion or exclusion of specific individuals by the group (Kyratzis, 2004). Therefore, this study examines community experiences of a Mongolian-Korean child through peer interaction rituals over time in the preschool classroom, South Korea.

2. Methods

2.1. Design

This research was designed as a case study. The case study enables to obtain holistic and meaningful features about real-life events (Yin, 2009). The preschool has 99 children ranged from 2 years to 5 years and 17 teaching staffs, is located in G city, South Korea. The research classroom is a 5 years of age class which has 8 boys and 12 girls. The class has one Mongolian-Korean boy and the others are Korean children. Most of the children belonged to middle-income families, and the Mongolian-Korean boy's family has a Mongolian mother and a Korean father.

2.2. Data collection

Participant observation was carried out for 6 months (from April to October, 2018, except vacation), three hours each day, twice a week in the classroom. Observation was focused on Mongolian-Korean boy's narratives, behaviors, and face expression through peer interaction rituals during free play time, circle time, mealtime etc. And the semi-structured interviewed conducted with an assistant principal, a class teacher and a Mongolian mother of a participant boy. Also, class curriculum, school newsletter and a Mongolian-Korean boy's educational portfolio were collected.

2.3. Data analysis

In the data analysis process, observation data, interview data, printed documents and educational portfolio were brought together, and transcripts were constructed. Two step process was used in the analysis of the transcripts. In the first phase, the data set was content-analyzed in terms of peer interaction ritual's types and functions. In the second phase, meaning analysis was conducted in order to figure out the community experiences of a Mongolian-Korean boy.

3. Results

A Mongolian-Korean child's (assumed name: JUNHO) experiences of community were related to transition to group emotions, symbol, and memories over time through peer interaction rituals. Classroom rituals were included in 'monday morning prayer', 'everyday luxury greeting', 'listening attitude chant in the circle time', 'thankful chant before lunch', 'taking a group picture in the peer birthday party', 'peer interaction signs to gather peers and start off play.'

3.1. Transition from negative emotions to positive emotions

In the beginning of the semester, he used to ask for help from his teacher whenever he meets conflicts among friends and have often an angry expression during free paly time. But he has changed to share positive group emotions(smile, laugh, shout) between friends through peer interaction rituals. In the interaction ritual contexts, a good example for making group emotion is 'sharing of laughter' and laughter is likely to 'repeat rhythm'(Collins, 2004). At the end of the semester, Junho laughed frequently and played with his friends joyfully.

3.1.1. The beginning of the semester: looking at his teacher with a tearful face. *5 boys are playing top-spinning game in their classroom*

> JUNHO: (looking at friends' play for a long time) "me!"
> CHID A: "I am playing with top, now" (he doesn't give a top to Junho)
> JUNHO: (look at his teacher with a tearful face)
> TEACHER: "A, can you give one of them to Junho?"
> CHILD A: "No, I am playing with friends"
> JUNHO: "teacher, A said to me 'you can't play with top'"
> Finally, Junho ended free play time without having a top

3.1.2. The end of the semester: playing with his friends joyfully. *5 children play hide-and-seek outside*

> CHILD B: "Come out, come out, wherever you are!"
> Junho and other kids hide behind trees and lay in wait
> … (After a while)
> CHILD B: "I am going to find you"
> … (After a while)
> CHILD B: "I can't find you!, Junho, Come out, please"
> JUNHO: "Wow! I am here! (with a laugh)"
> Finally, Junho becomes a new tagger and repeats the play

3.2. Transition from his private symbol to the group symbol, 'dinosaur'

In the beginning of the semester, he was interested in 'dinosaur', which was his private symbol and he didn't want to let friends know the information about it. But he has changed to explain dinosaur to his friends and 'dinosaur' became the group symbol. As well as actions and interactions, rituals are also associated with symbolic objects. Symbolic objects communicate ideas, values or attitude among children (Maloney, 2000).

3.2.1. The beginning of the semester: private interest in different types of dinosaur. *At the snack time*

> JUNHO: (to A, sitting the next seat) "Do you know what the strongest dinosaur is?"
> CHILD C: "Tyrannosaurus!"
> JUNHO: "No!"
> CHILD A: "Then, what is it?"
> CHILD B: "What is it?"(to Junho)
> JUNHO: "Um… I don't know, I won't tell you"

3.2.2. The end of the semester: giving his dinosaur's information to his friends. *CHILD A: (to me) "Teacher, do you know 'Nanotyrannus'?"*

> RESEARCHER: "No, I just know Tyrannosaurus."
> CHILD A: Really? We all know the dinosaur names."
> RESEARCHER: "Junho is a Dr. Dinosaur in this class, right?"
> JUNHO: "my friends do know about the dinosaur well."
> CHILD A, B: "Junho told us that"

3.3. Transition from his mom's hometown to group memory and story, 'Mongol'

In the beginning of the semester, he didn't say to friends about 'Mongol' voluntarily, which was just his mom's hometown and his private memories. But he has changed to introduce to friends about Mongol and 'Mongol' has become group memories as a common story after 'bank' project activity. In the ritual theory, group stories could make common emotions and memory finally, they could experience sense of community (Wulf, 2013).

3.3.1. The beginning of the semester: Mongol is his mom's hometown. *JUNHO: "my mom's hometown is Mongol, did you know that?"*

> RESEARCHER: "Yes, do your friends know about that?"
> JUNHO: "I don't know!"
> TEACHER: (to Junho) "Your mom made a Mongol cake and you brought it, one day"
> JUNHO: "Yes! My friends said that the cake is good"
> RESEARCHER: "Have you ever told your friends about Mongol?"
> JUNHO: "No!"

3.3.2. The end of the semester: talking about his experiences in Mongol to his friends.

TEACHER: When we had a 'bank' project activity, Junho was in Mongol with his parents.
So, I asked his mother for taking picture of Mongol's bank and money.
She posted Mongol bank and money pictures in class online café.
I and children could talk about Mongol's bank in the project time.
After Junho came back to Korea,
We had a circle time and he said his experiences in Mongol to his friends.
After that, children became interested in the Mongol.
They often ask to Junho Mongol's house, foods, play, his relatives living in there etc.
Some kids said to me 'I want to go Mongol later"

4. Conclusions

These results showed that a Mongolian-Korean child's adjustment and experiences of community through peer interaction rituals which are evinced in paly and talk over time. It described peer interaction rituals that contribute to make a sense of community in preschool settings. And it showed that the experiences of community were related to share to group emotions, symbol, and memories. The findings suggest that further studies on peer interaction ritual's roles for creating multicultural classroom community.

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CRITICAL THINKING IN DESIGN

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Abstract

Trend thinking is about becoming aware of changes in the user within the context of a specific culture that can affect the future success of products in the marketplace and even the marketplace itself. Learning about abductive reasoning is important to understand for this type of critical thinking. This paper provides an overview of some concepts and processes used to promote critical thinking in an undergraduate upper level course taught in the College of Design at the University of Minnesota on communicating trends. Students who take the course come from the College of Design as well as various other colleges at the University of Minnesota.

Keywords: Design, trends, future, critical thinking, learning.

1. Introduction

This paper provides an overview of some concepts and processes used to promote critical thinking in an undergraduate upper level course taught in the College of Design at the University of Minnesota on communicating trends. Students who take the course are from the College of Design as well as various other colleges at the University of Minnesota and the course does not require design prerequisites. This means that students come from diverse disciplines, and concepts taught in the class cannot assume any former design experience.

Throughout the term, the class is organized into a team of 4-6 class members with each team composed of a spectrum of their self-defined expertise. Individuals within the team engage in a series of projects involving a user identified as other than oneself in the collective marketplace. Data must be collected and coordinated into a series of inferences by the team members to apply to a market segment—usually identified by age, gender and other characteristics, such as event, location including climate, season, as well as such characteristics as the preferences of the user. The schedule allows time for individuals and teams to present their work to the class for discussion and critique. Ample time is provided to allow the full class to digest how projects are organized: how to recognize individual and collective behaviors; how to optimize clues, symptoms, analogies, scenarios and hunches; and how to integrate concepts.

The concept of trends in the broadest sense, involves keeping abreast of those changes that occur within a culture and can be described as an anomaly or deviation from the norm (Raymond 2010). Trends can occur long term or short term. A trend can be century long and involve major life style changes. An example of a long-term trend is the 20th century trend toward democratization of dress that involves casual dressing with fewer categories of clothing worn for a wide variety of occasions and that do not differentiate status. This has been possible with the increasing mass and global production that has resulted in affordable, albeit cheap products, often of low quality. Now everyone can afford this casual look! And with this long-term trend toward casual dressing has come short term trends accompanied by descriptive language. Terms such as athleisure, a combination denoting leisure and athletic wear, are coined to describe and market such democratizing trends related to specific products.

Trend thinking is critical thinking to learn how to observe the behavioral changes that are in process within a culture and how this might influence the user. Trend thinking activities thus demonstrate a process by which students can become acquainted with anticipating the future. Trends are a prediction of something that may likely occur in a certain way—"specifically something that will be accepted by the average person" (Vejlgaard 2008, p.7). In this information rich era, what is "trending" is critical to understand for anyone involved in the design of consumer products or services. When design is approached from a human-centered, behavioral, change-making perspective, designer, maker, and user all become informants of the process and the associated trend analysis (Goncu-Berk 2018).

2. The process of trend thinking

Trend thinking is reasoning that involves a combination of the familiar inductive, deductive reasoning and the less familiar abductive reasoning process (Fisher 2018). Abductive reasoning is sideways thinking in which the researcher engages in collecting data but then must consider how it all associates. It requires integrative skills, the result of which may not be considered entirely logical. It often takes a creative leap to come forward with something new and useful. Abductive thinking proceeds in an orderly and methodical way toward the development of useful inferences. Inferences result from hunches, clues, symptoms, analogies, and scenarios. To accomplish this kind of critical thinking requires intensive data collecting and the application of abductive reasoning.

When compared with the process of design thinking, the process of trend thinking has some similarities. Aspelund (2015) outlines steps or stages of the design process. He explains that at every stage, the student must pause, evaluate, and reflect upon the research being done. In like manner the process of trend thinking involves a step-by-step process based upon following a procedure, and evaluating and reflecting upon the outcome. Design thinking according to Kelly and Littman (2001) is research involving the user in defining the problem.

The process of trend thinking means learning through a series of experiences that provide building blocks that inform outcome. Research begins with techniques for learning how to examine the pertinent data through both desk and field research. Desk research delves into literature on theories about the direction of trends, who is involved and at what pace. For example, the user is characterized in terms of who is first and last to follow a trend direction, length of time a trend exists according to certain characteristics. Field research involves how to observe and take note of what is happening around you, being curious, flexible, and open to change. It means being willing to characterize first you as the user in terms of likes and dislikes, life-style preferences, attitudes and behavior and then to discern this experience of individual characterization in others. As the researcher collects data, the relationship of the forecast to the user, the product and marketplace become input for the trend. The following exercise, "From me to we" helps a student to understand himself as the user of products and how that translates to self as part of a collective.

2.1. From me-to-we

Because apparel design, production and marketing usually involve the concept of the collective, this product category is useful for trend thinking as an educational tool that allows the student researcher to learn the difference in perspective of oneself as an individual compared to another, and then how the perspective of oneself informs collective behavior (Blumer 1969). Change in the expression of self involves both individual and collective behavior. An example of individual expression would be if a person strives to be uniquely individual in dressing, eating, or in choices of entertainment and stands out in this individual expression from peers; such a leader in the trend is often characterized as an early adopter. An example of collective expression would be if a person notices that those in the cohort group of the trend leader are thinking or acting in a similar way. There is a tension created when a person wants to conform as both part of a collective expression and at the same time, wants to express himself individually.

From "me-to-we" is a useful concept in trend thinking, First the researcher must examine and understand his or her own behavior –i.e. needs, desires, likes and dislikes. Through self-directed questions, this exercise probes favored product attributes. The student researcher can become aware of his own preferences and by comparing them to others on his team, can sort out similarities to others within his cohort group. An objective in this process is to eventually move outside one's own cohort group and learn how to discover the behaviors of another external group different from one's familiar cohort in such aspects as age, preferences and lifestyle. Learning the perspective of another group is useful when designing or marketing products.

2.2. From visual to verbal

Documenting is an important means of collecting data that can provide both visual and verbal insights. Because students in this class are not always used to the power of the visual and relating the visual to verbal explanations, they are encouraged to collect such data in a notebook. Most students have access to a smart phone and both the camera and audio recording features included can be used to document both desk and field research. Students learn the importance of the visual as well as how to use the visual optimally to provide verbal detail and richness to their findings. Specific meanings can come from analysis of data derived from photo documentation. Students are encouraged to engage in exploring the visual as means to develop or interpret the verbal. Such notebooks vary in their use, but as students become familiar with the opportunities of this assignment, they often explore visual relationships through

collage, for example placing photos along a timeline or on a continuum according to positive or negative reactions of the user.

Once the student researcher learns about these two concepts, e.g. me-to-we and navigating visual and verbal connectional information, then one can move on to the user being studied as an individual and as a collective. Now the student proceeds to desk and field research.

3. Desk research

3.1. Key quotes

An example of desk research involves integration through significant concepts addressed in the literature. Students are asked to integrate concepts when examining data that already exist, such as census data or readings that address existing trend theories, and ideas of forecasters that can be applied to their projects. To do this, students are asked to select a "key quote" from a current reading assignment and then to find support or an expansion of that idea from previous readings. Writing a summary coordinating ideas from the readings is the final task. This integration of readings requires reflection and abductive reasoning. Desk research of a student who integrated readings from several sources follows:

"This quote relates heavily to trend thinking because forecasting is at the center of trend identification and analysis. This article lays out the types of forecasting and necessary sources of information needed to make accurate forecasts about fashion trends. Trend thinking requires one to think as a forecaster by analyzing the greater global markets across multiple industries to identify mega and mini trends that can affect certain consumer segments. Forecasting does just that through specialized professions with specialized education and experiences. Mega trends are those that reflect a cultural shift that becomes influential in changing the way people view themselves. An example of a mega-trend is the greater acceptance of gender neutral and non-binary clothing. Mini-trends are those that are fleeting and evolve from season to season. This could be a color, fabric or silhouette that is gone by next season (DeLong, 2018)."
(Report of student in class 3217.)

This assignment repeated throughout the semester forces the student to reflect upon and integrate readings. Scenarios can further critical thinking.

3.2. Scenarios

Futurists who often create more expansive scenarios provide a useful basis for predicting adjacent trends, such as the increase in the use of Internet retail and e-commerce, or social networking (Singh 2012). Most industry professionals spend time thinking about how forecasts will affect the success of their products within the available markets, and scenarios help to focus and enhance the exercise of integrating readings for students. A scenario narrative explores the future use of a product from a user's lifestyle point of view. Such scenarios can make design ideas more explicit. As Martin and Hanington (2012) suggest, scenarios should focus more on what technology might enable than on the details of technology. For example, the above student quote from the readings could be explored further with the following scenario:

Future Scenario: In year 2035 the number of retail stores has diminished, and retail has gradually given way to online shopping for a majority of users in the US. In addition, the government has urged all populations to adopt sustainable products because of the sheer glut of non-biodegradable products—both new and used-- that are stockpiled around the country.

Questions: How would the design of products change under these circumstances? How could individual expression be achieved? What could become a mega-trend?

Solutions considered by students include products designed for second use; products that are biodegradable; multiples designed in basic shapes and colors to serve both the gendered and gender-neutral markets; body modifications such as tattoos to achieve individual expression.

The teams address outcomes of such a scenario: the differences that could occur in changes in shopping behavior; design for those seeking gender neutral clothing; how designers would change the product.

Such scenarios call for further integration of ideas that are best informed when backed by research. The teams who engage in such a strategic planning tool help create a shared product vision for the future. But such a shared vision involves field research.

4. Field research

4.1. Participant observation

In sociology and anthropology participant observation is a process by which one learns to maintain a sense of objectivity while participating in a familiar or unfamiliar activity –The process involves first being a careful observer, a good listener and being open to the unexpected (Kawulich 2005). Second, this process means once you have walked away from the activity being observed, to quickly record what is remembered and then to distance yourself from the immediate activity to analyze what is happening. At first the activity can be a familiar one. Students have selected; riding on the bus between campuses, eating out at a restaurant, attending a theatrical production, or handing out treats at Halloween in their neighborhood. For example, here is a student observing and reflecting upon how current experience compares with her past experience of dressing in costume for Halloween:

"For this event, I observed the trick or treating event at 50th and France storefronts on Saturday, October 27. Growing up, the majority of costumes I would see were store bought and consisted of a lot of superhero's, princesses, and popular TV or movie characters. During the trick or treating event I barely saw any boys dressed as a super hero or a girl decked out in a princess dress from the Disney store. The majority of the costumes were either DIY ideas found on Pinterest or food, which was very surprising. Children were dressed as Tacos, donuts and watermelon which made me laugh because that is something I never would have thought to dress up as a child. The most creative DIY costume I saw was a cup of hot coco. The girl had made her costume as a mug and put little white balloons around her neck area to act as marshmallows. She had even added a design to the fabric mug and monogrammed her initials on it. I really appreciated the out-of-the-box thinking by both parents and their kids when it came to selection of a Halloween costume to wear this year. It shows that as consumers become more creative, they are less willing to pay for the over-priced, low quality, generic costumes that can be purchased ready-made." (Report of Student in class 3217)

This means being flexible with what is observed and being able to relate observation to past experience. With practice in participant observation, one can move from the familiar to observe the unfamiliar. It takes effort to go beyond the familiarity of one's own experience and group to consider another group without becoming resistant and judgmental in the outcome. It means learning about being an astute observer and learning to create a certain distance not only from your familiar group but also to the other group.

4.2. Make the familiar-strange

Learning how to make the familiar strange is a possible outcome of participant observation. It means bringing to awareness the habits that influence us. Only when we do not take for granted those familiar experiences can we accept some measure of objectivity in our thinking. Then the "what if" and the "where for" can begin to take shape. Here is a student quote that begins to address the "what if":

"Sustainability has been a crucial factor in many parts of society that has hit a high in recent years, especially in fashion. Many fashion brands have recognized the importance of the environment and sustainability and have made significant changes to how they operate and manufacture clothing. However, many of these companies still operate in the realm of fast fashion. Due to this, consumption increases and will remain high even with their green initiatives to combat environmental issues, because consumers will continue to buy goods and not stop." Report of Student in class 3217

This significant quote could be expanded with a scenario or at least a discussion of fast fashion and the current concept of slowing the pace of fashion and what sustainable practices could be involved (Clark 2008).

5. Conclusion

These concepts and processes are examples of trend thinking that require much reflection that is not only individual but also involves group thinking. The important trend thinking occurs when the user is considered within the context of the current time but also becomes part of the prediction for the future. As students become informants in the trend thinking process, they can regard change to be related to our physical and cognitive needs, and to our social and emotional needs. If they consider change in this way, they could trend toward having a more sustainable world because the design and marketing of products would be based upon abductive reasoning that takes serious data collection using both desk and field research and provides an opportunity to engage in this type of reasoning process that relies on hunches, inferences and "what ifs".

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HIGHER ARTS AND DESIGN STUDENTS' ATTITUDES TOWARDS LEARNING COMPUTER PROGRAMMING

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Abstract

A review of undergraduate arts and design programmes offered in Portuguese public higher education revealed some form of computer programming is included in about half of the curricula. This paper aims to address a gap in scholarship about arts and design students' acceptance of programming. A study was conducted which applied a survey instrument based on the Unified Theory of Acceptance and Use of Technology to a sample of students enrolled in those arts and design programmes that include computer programming units. Out of 270 valid responses, 44.8% of students reported to be already familiar with computer programming and 28.5% reported to be currently learning. Their level of familiarity was found to correlate with students' views of the utility, effort, peer approval, self-efficacy and anxiety associated with programming. Among students familiar with programming or currently learning, it was also found those perceiving the activity as voluntary were more likely to harbour a positive perception of its utility and effortlessness, while reporting less anxiety. Positive perceptions of utility, effortlessness and peer approval were also found to correlate with students' intention to program or to learn computer programming, while higher anxiety had a strong negative impact on that intention. Female students, comprising 57% of participants, were more likely to see with greater anxiety the perspective of programming computers. Students' anxiety is therefore a challenge for educators, and efforts to demystify the topic and to mitigate differences between genders in programming acceptance should be encouraged. Given the present prevalence of computer programming in arts and design curricula, scholars are also encouraged to conduct further research, including case-studies and wider technology acceptance surveys.

Keywords: Higher education, arts education, technology acceptance, computer programming, student survey.

1. Introduction

There were approximately 15500 students enrolled in 105 undergraduate arts and design programmes in Portugal's public higher education institutions during the academic year 2016-2017, according to data published by the Portuguese Ministry of Science, Technology and Higher Education (DGEEC, 2017). Those programmes include a wide range of specialities, such as visual arts, music and other performing arts, multimedia, communication design, product design, or architecture. Examination of each programme's curricula allowed the researchers to identify 43 programmes that include one or more mandatory units on the topic of computer programming, as well as 7 programmes including elective units on the subject. Overall, it was determined that approximately 7650 arts and design students enrolled in public higher education will have the opportunity to learn computer programming while taking their undergraduate degrees, and that 6400 of those students will indeed be required to complete at least one mandatory unit on the subject. Still, there is little research on these students' opinions and attitudes regarding computer programming. This paper thus presents the main findings from a study on computer programming acceptance by arts and design undergraduate students, which follows up on a preliminary survey by the researchers (Morais, Morais, & Paiva, 2018a).

In the Unified Theory of Acceptance and Use of Technology (UTAUT) technology use is understood as the dependent variable, which in turn is predicted by Behavioural Intention, a view shared by multiple technology acceptance models (Venkatesh, Morris, Davis, & Davis, 2003). In formulating UTAUT, its authors reviewed multiple such models and hypothesized three constructs – Performance Expectancy, Effort Expectancy, and Social Influence – as determinants of Behavioural Intention to use a technology, while hypothesizing an additional construct – Facilitating Conditions – as a direct determinant of actual use. In UTAUT, Performance Expectancy is defined as the degree to which users

perceive a technology as useful for achieving their goals; Effort Expectancy as users' perception of ease of use and learning; Social Influence as users' view of other people's expectations towards their use of that technology; and Facilitating Conditions as users' belief their technological and organizational environment supports using that technology. Venkatesh et al. also tested three other constructs – users' own Attitude Towards Use, users' Anxiety about the technology, and users' perception of Self-Efficacy in using the technology – and didn't find them determinant of either Behavioural Intention or actual technology use. In addition, UTAUT also proposes that the relationships between constructs and dependent variables are moderated by users' age, gender, experience, and the degree to which they feel their use of a technology is voluntary.

According to the original paper, UTAUT explains approximately 70% of the variance in Behavioural Intention and 50% of the variance in technology use when the moderating variables are included in the analysis (Venkatesh et al., 2003). Recent literature reviews corroborate the adequacy and the widespread use of the model in educational technology research (Khechine, Ndjambou, & Lakhal, 2016; Williams, Rana, & Dwivedi, 2015), while also demonstrating the application of UTAUT to a wide spectrum of technologies. UTAUT was therefore considered an appropriate model for studying arts and design students' acceptance and use of computer programming.

2. Methodology

The present study applied an online survey instrument based on the Unified Theory of Technology Acceptance and Use to an opportunity sample of students enrolled in Portuguese public arts and design undergraduate programmes where computer programming is included in their curricula. The researchers devised a survey including items measuring Performance Expectancy, Effort Expectancy, Attitude Towards Use, Social Influence, Facilitating Conditions, Self-Efficacy, Anxiety, and Behavioural Intention (Venkatesh et al., 2003) as seven-point Likert scales in disagree-agree format. Recent research has revised some of the hypotheses in Venkatesh's original UTAUT paper and validated Attitude Towards Use as a direct determinant of Behavioural Intention (Dwivedi, Rana, Jeyaraj, Clement, & Williams, 2017). In addition, given the topic of computer programming, a measure of students' Self-Efficacy and Anxiety towards that activity was considered very valuable on its own.

Moderating variables in the UTAUT model, such as gender and age, were collected through demographic characterization questions. Experience was presented as a ternary option between no knowledge of programming, currently learning, previous familiarity. Perceived voluntariness of use followed the original authors' use of a single seven-point scale from fully mandatory to fully voluntary (Venkatesh et al., 2003). Participants with some experience of computer programming were also asked to self-report their usage frequency and intensity, following the scales proposed by Davis (Davis, 1986). The questionnaire was written in Portuguese and validated by a focus group of students and by retroversion by an independent professional translator and subsequent comparison to the original items.

2.1. Data collection

The researchers contacted the academic coordinators for the 50 arts and design programmes previously identified and asked them to forward the survey, which had been prepared as a Google Form. Responses were collected during two periods, March to April and September to October 2018, as not all recipients responded and forwarded the survey to students at the same time. On aggregate, 344 responses were obtained from students in 18 different institutions. After excluding responses from students attending programmes outside the scope of this study, a sample of 270 valid questionnaires was obtained.

2.2. Data analysis

The SPSS 24 software was used for analysis of the valid questionnaires. Item groups corresponding to the UTAUT constructs were analyzed for internal reliability. Responses were grouped by participants' knowledge of computer programming, as students that reported no knowledge of the topic had received some of the questions in slightly different form. In any case, Performance Expectancy, Effort Expectancy, Attitude Towards Use, Facilitating Conditions, Self-Efficacy, Anxiety, and Behavioral Intention were all found to have an adequate or better level of reliability (Cronbach's α > .7), as defined by Nunnally (1978). Factor analysis also corroborated these constructs' consistency. However, Social Influence was revealed to factor into two components among students without knowledge of programming and among those learning for the first time. Two Social Influence items related to institutional support of programming, which presumably made little sense to those students, were removed. The remaining two items were found to have excellent reliability (α > .8) and are equivalent to the items composing the Subjective Norm construct from the Theory of Planned Behaviour, which is defined as the influence of peers and people the individual regards as important (Ajzen, 1991) and was included in the UTAUT model.

3. Results

Out of 270 participants, 121 students (44.8%) reported familiarity with some form of computer programming, 77 (28.5%) reported to be learning for the first time, and the remaining 72 (26.7%) reported no knowledge of the topic. 217 students (80.4%) have or will learn computer programming while taking their degree, while the remaining, presumably enrolled in a programme where programming is elective, reported choosing not to. Table 1 presents participants' gender, age, and the programme year they were attending, broken by students' reported experience. For clarity, age and seniority are presented as groups, even though their values were collected and analysed as continuous integers. Please note that most undergraduate arts and design programmes in Portugal are three years long.

Table 1. Demographic characteristics of the students and their level of programming experience.

		No knowledge (n = 72)		Learning (n = 77)		Prior knowledge (n = 121)		Total (n = 270)
		n	%	n	%	n	%	n
Gender	Female	46	29.9%	51	33.1%	57	37.0%	154
	Male	26	22.4%	26	22.4%	64	55.2%	116
Age	18 – 20	35	25.5%	51	37.2%	51	37.2%	137
	21 – 24	29	28.7%	19	18.8%	53	52.5%	101
	25 – 34	6	25.0%	5	20.8%	13	54.2%	24
	35 +	2	25.0%	2	25.0%	4	50.0%	8
Year (Seniority)	1st year	20	27.0%	34	45.9%	20	27.0%	74
	2nd year	21	29.6%	19	26.9%	31	43.7%	71
	3rd year	22	23.7%	21	22.6%	50	53.8%	93
	4th year +	9	28.1%	3	9.4%	20	62.5%	32

Students were also asked to report their daily computer use, and strong Spearman 2-tailed correlations were found between greater daily computer use and knowledge of programming ($p < .001$). Neither gender, age, or seniority were found to correlate with students' level of programming knowledge.

3.1. Acceptance and use factors

Computed means and standard deviations for each UTAUT construct are presented in Table 2, broken by students' programming experience. Since the original scales ran from -3 (full disagreement) to 3 (full agreement), a positive Performance Expectancy reflects an agreement with programming being useful, while a positive Anxiety reflects an agreement with programming being intimidating.

Table 2. UTAUT constructs' mean responses and students' programming experience.

	No knowledge (n = 72)		Learning (n = 77)		Prior knowledge (n = 121)	
	Mean	St. dev.	Mean	St. dev.	Mean	St. dev.
Performance Expectancy	0.15	1.43	0.68	1.43	1.07	1.43
Effort Expectancy	-0.95	1.24	-0.69	1.21	0.10	1.48
Attitude Towards Use	-0.35	1.64	0.25	1.59	0.91	1.74
Social Influence	-	-	-	-	0.22	1.51
(Subjective Norm)	-1.49	1.52	-0.55	1.57	0.06	1.73
Facilitating Conditions	-0.62	1.29	0.16	1.56	0.72	1.50
Self-Efficacy	-0.80	1.17	0.26	1.31	0.75	1.27
Anxiety	-0.22	1.47	0.13	1.28	-0.58	1.52
Behavioral Intention	-1.99	1.21	-0.08	2.04	0.25	2.11

Analysis found compelling Spearman 2-tailed positive correlations between students' knowledge of programming and their Performance Expectancy, Effort Expectancy, Attitude Towards its Use, their influence by Subjective Norm, their regard of the Facilitating Conditions, and sense of Self-Efficacy (all p values $< .001$). A suggestive correlation between more programming knowledge and less Anxiety was also found ($p = .027$), however it was students that were learning to program that reported the highest Anxiety. Behavioural Intention to use or learn programming also correlated very strongly with students' knowledge ($p < .001$). Students without that knowledge were very likely to report having no intention to learn or use it in the future. Note that 53 participants in the survey, presumably taking degrees where the subject is elective, had reported no plans of learning to program while taking their degree.

Application of the appropriate analyses while grouping responses by participants' programming knowledge yielded correlations worth noting, which are detailed in the following three sections.

3.1.1. Students without any knowledge of programming

Among students without any knowledge of programming, analysis found a persuasive Pearson 2-tailed correlation in which older students were more likely to report less Anxiety towards programming ($p = .008$). However, strong negative correlations were found between students' seniority and both their influence by Subjective Norm ($p < .001$) and their Behavioural Intention ($p = .002$). Regardless of age, students closer to finishing their degree, presumably with their interests consolidated, were thus more likely to feel less peer pressure regarding learning programming and to have a lesser inclination to do it.

Spearman 2-tailed analysis yielded a positive correlation between students' time spent daily using a computer and their Performance Expectancy of computer programming ($p = .001$). Persuasive correlations between students' gender and some UTAUT constructs were also found. Female students were more likely to regard learning and using programming with greater Anxiety ($p = .006$), while male students reported more positive views of the Facilitating Conditions ($p = .006$).

3.1.2. Students currently learning programming for the first time

Among students learning to program for the first time, Spearman 2-tailed analysis found significant correlations between their gender and their acceptance of computer programming. Male learners were much more likely to harbour better Effort Expectancy ($p = .005$) and Attitude Towards Use of programming ($p = .001$), as well as a better view of the Facilitating Conditions ($p = .009$). Male students were also somewhat more likely to report a better Performance Expectancy ($p = .020$) and Self-Efficacy ($p = 0.20$). A conclusive correlation showed female students were again more likely to regard programming with greater Anxiety ($p = .002$) and in addition were also somewhat less likely to manifest a Behavioural Intention to program in the future ($p = .029$).

Students learning programming were asked to report on their perceived voluntariness of programming use and compelling correlations were found between greater voluntariness and better Performance Expectancy, Effort Expectancy, Attitude Towards Use, as well as less Anxiety (all $p \leq .001$). Greater perceived voluntariness also showed a very strong correlation with a greater Behavioural Intention to program ($p = .001$).

3.1.3. Students already familiar with programming

Among students that reported prior knowledge of computer programming, Spearman 2-tailed analyses also yielded significant correlations between their gender and their computer programming acceptance. Male students were more likely to report better Performance Expectancy ($p = .012$), Effort Expectancy ($p = .002$) and Attitude Towards Use of programming ($p = .004$), a better view of the Facilitating Conditions ($p = .003$) and of their Self-Efficacy ($p = .005$). Yet again, a strong correlation was found showing that female learners were more likely to view programming with greater Anxiety ($p < .001$) and were much less likely to manifest a Behavioural Intention to program in the future ($p = .002$).

These students also reported on their perceived voluntariness, and strong correlations were found between reporting a greater voluntariness and reporting better Performance Expectancy ($p = .016$), Effort Expectancy ($p < .001$), and Attitude Towards Use ($p < .001$), less Anxiety ($p = .005$), and greater Self-Efficacy ($p = .019$). Greater perceived voluntariness also showed a very strong correlation with a greater Behavioural Intention to program ($p = .002$).

3.1.4. Students' Behavioural Intention to use or learn computer programming

As expected from UTAUT, Spearman 2-tailed correlations were found between participants' responses to the other constructs and their Behavioural Intention. Positive views regarding Performance Expectancy, Effort Expectancy, Attitude Towards Use of programming, and Subjective Norm all showed compelling correlations to students' Behavioural Intention to use or learn programming ($p < .001$). Overall Social Influence also showed a compelling positive correlation to Behavioural Intention among those students already knowledgeable of programming ($p < .001$). While not explicitly predicted by the model, very strong correlations between a positive view of Facilitating Conditions and Behavioural Intention to use computer programming were also found among students learning and among students with knowledge of computer programming ($p \leq .002$). Self-Efficacy also correlated compellingly with Behavioural Intention among students in those two groups ($p \leq .001$); the same correlation was also found among students without any familiarity with programming, but not as strongly ($p = .018$). It is also worth emphasizing that Anxiety showed a compelling negative correlation with Behavioural Intention to use computer programming among learners ($p < .001$), as well as a persuasive negative correlation with the Behavioural Intention to learn among students unfamiliar with the topic ($p = .006$).

As described, students that were learning or already familiar with computer programming were also asked to report on their frequency and intensity of use. Behavioural Intention to use computer programming correlated compellingly with frequency and intensity of use among these students (p < .001 in all cases), thus corroborating one of the core assumptions of the UTAUT model.

4. Discussion and conclusions

Both the preliminary study (Morais et al., 2018a) as well as the present one show that even in the congenial context of arts and design undergraduate education, gender remains, alongside prior familiarity, the greatest factor in students' attitudes and opinions about computer programming. This is all more important as 'learning to code' is so often considered an element of digital literacy (KnowledgeWorks, 2015), which in turn is one of the arguments for the dissemination of computer programming in arts and design education (Knochel & Patton, 2015). Given the consistent differences that were found in expectations of effort, attitude, and feelings of anxiety regarding computer programming between male and female students involved with the subject, addressing these should be a concern of educators adapting programming syllabi to arts and design education. These conclusions run convergent with those of a survey of art and design educators' views of computer programming (Morais, Morais, & Paiva, 2018b).

Continued interrogation of the UTAUT model would also be a worthwhile endeavour, and a context-specific model may be required given the width and the depth of computer programming as a base technology. Further analysis and validation of the model will be forthcoming. These findings can also further research on attitudes towards computer programming in arts and design education, both through larger technology acceptance studies and through practice characterization case-studies.

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LOW-COST CODE TO CHECK SOME OF THE 20 RULES FOR EFFICIENT WEB WRITING: A PROBLEM-BASED LEARNING SITUATION

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Abstract

People do not read information on the Web in the same way as they read printed material. Studies have shown that reading on screen is around 25% slower than reading from paper. Instead of carefully reading information, users typically scan it (Morkes & Nielsen, 1997). Users will have time to read 28% of the words if they devote all of their time to reading. More realistically, users will read about 20% of the text on the average page (Nielsen, 2008).

Therefore writing for the web is different from traditional print writing; it has its own rules. Nowadays everyone may be a web writer so everyone should learn the basic rules about how to write effective web content. Users should not only know how to write for the web but also how to present information to facilitate scanning and enhance comprehension.

In short, the text for the web must be easy to understand, concise, scannable and leave no uncertainty in the mind of the reader at first and faster reading.

In order to reach these goals, a previous contribution (García-Cabrera, 2018) offers a brief methodology based on two basic principles (Make text short and Make text scannable) and 20 good practices structured in a series of microcontents (Loranger & Nielsen, 2017). Following this brief guide you can teach/learn how to apply the principles of ease of use or usability of the Web to write digital text. The results show that this minimalist methodology, structured in microcontents, can be taught and learned in just a few minutes.

With the aim of supporting this brief method automatically, this paper shows how to code some of these 20 good practices in an easy and low-cost way. This challenge will be a flipped classroom in whatever subject where student learn programming. In particular, the students of operating systems can learn about bash programming but at the same time about web information system. In addition, the experience of solving this open-ended problem teaches general computer science engineering competencies such as "Solve problems through initiative, determination, independence and creativity" and traversal skills such as "Manage time and available resources. Work in an organised manner."

The final objective of this paper is to share this problem-situation case to encourage the design and implementation of problem-based learning that allows students to apply content from more than one Computer Science Engineering subject and generate useful, open, low-cost software products.

Keywords: Flipped classroom, problem-based learning, microlearning, web writing.

1. Introduction

This contribution is based on a reality that generates a need, which involves a complex problem that requires a solution.

The reality is that content is the key to the success of a good website. But the digital medium has some limitations that detract from the ability of readers to understand the Web:

- Reading speed decreases by 25% (Morkes & Nielsen, 1997) and content is poorly understood.
- Users are unable to focus their attention on long pieces of text. If the text is too long, it is simply not read, it is preferred to print it if we are really interested in that information.
- The sight jumps from one side to the other without focusing on the details. Studies have shown that nearly 80 percentage of users scan Web pages for visual clues so they can find content quickly. They look for things that stand out: bold text, bullets, links and descriptive titles.
- Attention is dispersed. Users read only 28% of the information if they are reading. But in practice they only read about 20% of the text on each page (Nielsen, 2008).

Therefore, it is imperative to adapt our way of writing to the digital medium, to the Web. It is necessary to write texts and present this writing on Web pages in an effective way. In other words, texts that help users to read less yet remember and understand more information with less effort. So, the complex problem to be solved is to coach current and future Web writers (who will be all of us) on how to write efficiently on the Web. In order to solve this, a previous contribution (García-Cabrera, 2018) offers a minimalist methodology based on two basic principles (Make text short and Make text scannable) and 20 good practices structured in a series of microcontents (Loranger & Nielsen, 2017). It therefore applies a microlearning pedagogical approach (Job & Ogalo, 2012). Following this brief guide you can teach/learn how to apply the principles of ease of use or usability of the Web to write digital text.

But this is not enough; it would be better to have some automatic assistance to help web writers. As a result, the challenge is to solve an open-ended problem: to provide a useful, low-cost and open software product that supports as far as possible the edition of web texts.

The purpose of this work is to convert this realistic problem that requires a solution in the problem-situation design based on the problem-based learning (PBL) approach (Barrows, 1996) as part of flipped class activities. The main objectives are to make bash programming more attractive to students as well as helping them to develop professional skills, that is, general computer science engineering competencies, for instance, first as "Solve problems through initiative, determination, independence and creativity" and traversal skills as "Manage time and available resources. Work in an organised manner."

2. Previous work

The first step in solving a problem is to describe it as clearly, specifically, simply and systematically as possible. This effort was made in a previous contribution by means of a brief methodology, based on two basic principles and only 20 good practices structured in a series of microcontents. The Methodology for Writing Effective Texts for the Web applies two important pieces of advises: a) **Make text short** and, b) **Make text scannable**. I shall try to explain what I mean.

First of all, your text should be brief to the point it should take minimal effort to understand. Text must be concise, clear and direct. It must be as long as necessary but as short as possible. (a1) Connect with the audience and keep their attention. (a2) Inverted pyramid. Story is structured from most to least important. (a3) Answering the basic 5 W's and H Questions: WHAT, WHO, WHEN, WHERE, WHY and HOW. (a4) Facts and not empty words. Avoid subjective descriptions and remove instructions text. In contrast, use factual information. (a5) Use simple sentence structures (15-20pp). (a6) Use the most common words and those with the fewest letters. (a7) Avoid jargon, acronyms or obscure words. (a8) Use plain, active and clear language (English, Spanish and so on) (Boldyreff, 2001). (a9) Remove instruction text or reduce to a minimum. (a10) Use time expressions with day and time, avoid relative time expressions referring to the past or future because the information remains on the web.

Second, the text should be formatted to help users find content. Users go online with a specific aim or interest. They are going to browse the page to pick up the information they actually need. There are many ways to format your text to aid scannability: (b1) Break your text in short paragraphs with just a few lines, no more than 3 or 5 lines (40-70 words). (b2) Start each paragraph with the most relevant and usable information. (b3) Write each paragraph (or phrase) around one idea. (b4) Use headlines in order to break up the content and make it very easy to scan (no more than 3 levels). (b5) Highlight the most important sentences in order to draw attention to ideas that are crucial. You can make them bold but never italic or underlined. Italic it is difficult to read. Underlining can be confused with a link and it is less illegible. (b6) Use a numbered list for things in order, bulleted list for things in no particular order. (b7) No more than 7 items in a list, much better if there are 5 things. Lists create chunks of content that facilitate scanning, separating ideas and allow for counting. (b8) Use numerals rather written numbers (no more than 4 figures). (b9) With large numbers with several zeros, use first the number and after the word 'thousands', 'millions', 'thousands of millions' or 'billions'. (b10) Do NOT use Roman numerals, only for kings, popes and centuries.

Following this brief guide you can teach/learn how to apply the principles of usability of the Web to write digital text (Krug, 2013). The aim is to apply simple but efficient recommendations aimed at producing concise texts presented in such a way that they are easier to understand in a first and quick reading by the user. It seeks to develop in one of the basic skills, essential in the Knowledge Society, to be a Web writer who contributes to the development of collective intelligence (Woolley, 2010).

3. Considering the feasibility of the PBL

Before thinking about the design & implementation all aspects related this problem situation (Edström & Kolmos, 2014) it is necessary to check if it conforms to the characteristics of a PBL and at the same time if this learning process can achieve some learning outcomes relevant to the subjects involved and general competences related to computer science degree.

The first step is to analyse the problem in detail in order to have a clear definition and conception of the problem taking into account the restrictions: the solution must adopt an open-source model, encourages open sharing and collaboration, simple and by means of bash language. Therefore, the question is which of these 20 good practices (see section 2) can be automated in these low-cost conditions.

To face this challenge, the student must considerer the strengths of bash programming language. Bash is an unix shell (a command interpreter) and a shell program (sometimes called a shell script) is a text file that contains standard UNIX and shell commands. It is far easier to write and debug a shell script than a C/C++ program. A shell script, by virtue of being a text file, can easily be viewed to check out what actions it is performing. A shell script can be transferred to other Unix and Unix-like operating systems and executed (if the shell itself is present). In bash you can use and combine easily all unix/linux commands and unix/linux provides a great many powerful commands to process texts and strings in different ways. These text processing commands are often implemented as filters as: *grep*, *sort*, *uniq*, *cat*, *more*, *cut*, *paste*, *head*, *tail*, *wc*, *tr*, and so on. In addition, bash programming supports list data structure called *array*. An *array* stores a list or collection of elements not bound to specific data type (strings, numbers and so on). So, in bash language it is very easy to make iterate loops over a list of words.

Taking into account these previous facts, the easiest rules to face are (**a5**, **b1**) because they imply a code that extracts phrases or paragraphs and count the number of words.

It must be assumed that raw text will be processed and therefore all these good practices (b4, b5, b6, b7) related to style and editing, in principle, require an off bash solution and a brainstorming session. Perhaps, for rule (**b7**) a rough solution is possible. For instance, by assuming that if paragraphs with very few words in a row appear in the text, they may be elements of a list. The solution would be to extend the previous code (b1) and check that the number of very short paragraphs in a row should be less than 7.

Initially you may think that the rest of the rules would be out because they require semantic interpretation and need a complex natural language processing. But a deeper analysis of these rules allows us to identify a set of rules (**a7**, **a10**, **b8**, **b9**, **b10**) for which a rough solution could be found because some pattern could be found.

For instance, for the good practices (a7, a10, b8) it is possible to have 3 glossaries files. One text file that stores all jargon, acronyms or obscure words (the most common), another that contains the most frequent relative temporal expressions and another with all written numbers from zero to nine hundred and ninety-nine. The code for the three is to check that these words do not appear in the text.

It is possible to code rule (b9) finding big numbers, that is, sequences of 5 or more figures. Finally, the (a10) rule involves checking for Roman numerals, that is, finding words formed only by the letters I, V, X, L, C, D, M, in upper or lower case. The program can warn the writer to make sure he is using it with kings, popes, and centuries. You can also try to check if the word "pope", "king/queen" or "century" appears nearby.

From the previous discussion, it follows that the problem is truly ill-structured in which there is no obvious right answer. In order to develop a robust solution, the students need: a) define the problem, b) generate possible solutions, c) evaluate the alternative solutions by constructing arguments and articulating personal beliefs, d) implement the most viable solution, and e) monitor the implementation (Jonassen & Hung, 2018) (Sinnott, 1989). Technical knowledge and reasoning must be applied as basic programming skills and the use of the engineering lifecycle process Conceive Design Implement Operate, CDIO (Crawley, 2007).

4. Considering the knowledge and skills learned

The second step is to check if this PBL produces deep knowledge and skills that encourage independent and lifelong learners and assist in development of skills relating to bash programming. From the previous sections, it is evident that students learn some technical knowledge/methods about web usability and writing web. Also the students develop personal and professional skills such as critical thinking, that is, general computer science engineering competencies as "Solve problems through initiative, determination, independence and creativity" and traversal skills such as "Manage time and available resources. Work in an organised manner."

The only way to check if the solutions generated develop the most relevant features of bash programming is to codify them. In addition, the implementation of this programming allows us to identify the information and resources that students need to understand and solve the problem. As can be seen in the examples (Figure 1), it is necessary to learn skills relating bash programming such as: arguments, variables, special variables, quotes, command substitution, input, redirection, pipes, while and for loops, conditionals, boolean operations, files and so on. Therefore, this problem situation gives students a solid foundation in how to write Bash scripts, that is, students will be well armed with the right knowledge and skills.

Figure 1. Bash code of rules a5, a10 and b9.

```bash
#!/bin/bash
# Author: Lina García-Cabrera
# Description: Receive a paragraph, separate into lines
# and show those that are have more than x words.
if [ $# -ge 2 ] # Check number of arguments
then
  if [ -f ${2} ]
  then
    paragraph="$(cat $2)"
  else
    echo "Sintaxis: ${0} numwords [file]"
  fi
# a line finish with "."
old="$IFS"
IFS='.'
read -ra lineas <<< "$paragraph" #Convert string to array
#Print lines that have more than x words with *
for i in "${lineas[@]}"
do
  palabras=$(echo $i | wc -w)
  if [ ${palabras} -ge ${1} ]
  then
      echo "${i}:${palabras}:*"
  else
      echo "${i}:${palabras}:"
  fi
done
IFS="$old"
```

```bash
#!/bin/bash
# Author: Lina García-Cabrera
# Description: Receive paragraph & traced numbers greater X figures
if [ $# -ge 2 ]
then
   if [ -f ${1} ] && [[ ${2} != *[^0-9]* ]] # Check arguments
      then
      paragraph=($( cat ${1} ))
      for num in ${paragraph[*]}
      do
      # Delete possible punctuation symbols such as " () [] . ,
        nn=$(echo ${num} | tr -d '[:punct:]')
        if [[ ${nn} != *[^0-9]* ]]
        then
          if [ ${#nn} -gt ${2} ]
          then
            echo "${nn} It's a number of ${#nn} figures."
          fi
        fi
      done
   else
      echo "SYNOPSIS: ${0} file figures"
   fi
else
   echo "SYNOPSIS: ${0} file figures"
fi
```

```bash
#!/bin/bash
# Author: Lina García-Cabrera
# Description: Receive a text and search for relative temporal expressions
# You must pass the file stores the relative temporary expressions
# and the text file that will be analyzed or also read text from keyboard

if [ $# -eq 2 ] # Check number of arguments passed to a Bash script
then
    if [ -f ${1} ] && [ -f ${2} ]
    then
        text="$(cat $2)"  # File text
    else
        echo "SYNOPSIS: ${0} temporalfile [filetext]"
    fi
else
    if [ $# -eq 1 ] && [ -f ${1} ]
    then # read the text from keyboard
        read text
    else
        echo "SYNOPSIS: ${0} temporalfile [filetext]"
    fi
fi

if [[ $text != "" ]]
then
    # clear text: extra whites, punctuation, uppercase to lowercase
    text=$(echo ${text} | tr -s [:blank:] | tr -d '[:punct:]' | tr [:upper:] [:lower:])

    while read -r temporal # find temporal expressions
    do
        traced=$(echo $text | grep "$temporal")
        if [[ "${traced}" != "" ]]
        then
            echo "Detected this temporal expression $temporal in file $2"
        fi

    done < <(cat $1)
fi
```

5. Discussions and conclusions

Web content is crucial to the success of a good website. People go to the Web to quickly find very specific information in which they are really interested. But the reader's attention tends to be dispersed and the efficiency of reading and understanding is very poor. This work presents a minimalist methodology based on two basic principles (Make text short & Make text scannable) and 20 good practices structured in microcontents. Bearing in mind that the average speed of comprehensive reading is between 200 and 300 words per minute, the reading of this minimalist methodology with a length of about 400 words involves around 2 minutes. Following this brief guide you can teach/learn how to write efficiently on the Web in just a few minutes. Hence, it adopts a microlearning as a strategic process for creating, harvesting, acquiring, retaining and applying knowledge learning (Job & Ogalo, 2012). Also, the paper shows how to convert this realistic world problem into a PBL that provide a useful, low-cost and open software product that supports as far as possible the edition of web texts. The analysis of the feasibility of the problem-situation shows that 8/20 rules can be implemented, 40%. This figure could be higher if the text was in HTML5 format. In this case the rules related to style and editing can be coded and 55% of the rules would be observed. This challenge will be a flipped classroom in whatever subject where students learn programming.

The ultimate goal of this paper is to share this problem-situation case to encourage the design and implementation of problem-based learning that allows students to:

- Apply content from more than one Computer Science Engineering subject,
- Stimulate interest in learning programming,
- Develop general Computer Science Engineering competencies to face professional challenges,
- Generate useful, open, low-cost software products.

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CONTENT BASED INSTRUCTION IN THE FOREIGN LANGUAGE CLASSROOM: CHALLENGES AND BARRIERS IN THE CONTEXT OF AN AMERICAN PUBLIC SCHOOL OF THE STATE OF MASSACHUSETTS

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Abstract

This article examines content-based instruction (CBI) as a didactic methodology for the teaching of foreign languages in a North American public school in the state of Massachusetts. It gives an account of the difficulties experienced by a group of teachers in the implementation of this methodology.

Currently, there is a significant amount of literature which supports CBI as a teaching method. However, few studies are focusing on the actual working conditions of teachers and what happens in the classrooms where this method is followed. Whereas research in language teaching didactics has allowed for critical analysis of this method, it has not accounted for the difficulties and doubts teachers face. Therefore, this study focused on teachers' evaluations and suggestions. For this purpose, the authors conducted interviews, analysed lesson plans and didactic materials and also administered a critical evaluation of the students' proficiency in the target language.

This study identified the handicaps and risks of this methodology. It also highlighted that the way used to implement this product in this school required an effort on the part of teachers, which did not, in any way, translate into benefits for the students.

This study is comprised of four stages:
1) Theoretical foundations of the CBI methodology;
2) Analysis of Teachers' Feedback and perspective;
3) Language ideology in a neoliberal context of data-driven and increased privatization of Education;
4) Final considerations and suggestion of possible future research needs;

This research is of particular interest in Portugal where there is a robust governmental push for empowering councils across the country to take charge of their educational needs. This paper sheds light on areas such as autonomy and school innovation, leadership in education and the definition of the concept of being a teacher. It is also relevant for any entity interested in related issues due to curricular changes, together with the professional well-being and stability of the teaching staff.

Keywords: Content and language-integrated learning (clil), classroom discourse, bilingualism, leadership, critical thinking.

1. Introduction

Currently, there is a significant amount of literature, which supports CBI as a teaching method. However, few studies are focusing on the actual working conditions of teachers and what happens in the classrooms where this method is followed. Whereas research in language teaching didactics has allowed for critical analysis of this method, it has not accounted for the difficulties and doubts educators face when teaching a foreign language course that draws on a vast academic curriculum. The lack of subject knowledge and pedagogical approaches to academic content that traditionally was not in the domain of foreign language lessons is a crucial concern presented. In this sense, it is postulated as the primary objective of this study to understand the difficulties experienced in the classroom during the CBI implementation process and to understand the reasons for refusing what was presented as a methodological novelty.

Therefore, this is a qualitative study that pretends to analyse and interpret teachers' discursive features and practices aiming to provide a close view of the implementation of a methodological transition carried out in a particular school. For that, four teachers were interviewed: one Latin, two

Spanish and finally one Portuguese teacher. Curriculum mapping was analysed, and lesson observation took place.

Finally, is it relevant to reinforce that this study wants to exclude generalizations over other teachers that use a similar methodology. However, the problematic and the discussion presented may be transferable to other educational sceneries and may shed light on the educational field.

2. The issue

What happens inside of a classroom is critical for the process of teaching and learning. It is not relevant to present a theoretically well-founded methodology if teachers do not have the conditions to develop it. Theo Boland and Jos Letschert (1995) argue that "the heart of the curriculum (...) is the classroom where the teacher-student interactions take place." Therefore, although the reference literature indicates potential benefits for learning a foreign language following the theoretical model Content Based Instruction, it is necessary to understand the particular conditions in which this method is developed and applied.

Foreign language teachers (FL) are usually focused on the linguistic, cultural and communicative dimension of the language they teach. The programs are organized in relevant thematic contents that allow to study the culture, to understand the structure of the language and consequently to develop communicative skills. However, the foreign language is also a discipline in the humanities area and, therefore, it also has other responsibilities:
- the ability to critically examine one's cultural ideas and traditions;
- the ability to see oneself, not only as a citizen belonging to a nation but also as human beings connected to others by bonds of recognition and mutual concern;
- a narrative imagination that allows the individual to put himself in the place of the other; (Not for Profit 2010) by Martha Nussbaum.

One can easily verify the multitude of aspects that need to be considered when organizing and creating a curriculum for the languages, as well as the breadth of knowledge and sensitivity of the educators who teach these curricula. Besides, there has never been such a more significant debate and tension between what is taught in the classroom and what society believes students will need once out of school. The world is changing to such an extent that language teachers are asking for what is supposed to be taught. Nevertheless, the choice of the CBI model does not impede, neither ignore, this language teaching problematics. According to Stryker (1997) "*CBI can be refreshing and liberating for both teacher and students (...) more a philosophy than a methodology, there is no singular form for CBI.*"

However, during the operationalization process of creating and delivering the curriculum, difficulties arose, and not all teachers were able to adapt. Some of them have left the school arguing their inability to adapt to the requirements of the method. Therefore, the central research question of this study was: How is content-based instruction carried out discursively by a group of teachers in a world language department and their feelings affected their professional wellbeing and learning environment in their classes.

3. Theoretical fundamentals of CBI

North American research has presented CBI as a model to follow for the teaching of Foreign Language (FL). Stoller (1997) presents this method as being a natural approach to LE learning. Curtain and Pesola (1994) demonstrates the benefits of teaching thematic contents as a vehicle of language learning. Krashen, Swain and Cummins, authors of much of the theory behind the implementation of CBI, after having analysed the immersion programs of Canada and the United States, argue that students learn more effectively if intensely exposed to a foreign language.

In fact, since its introduction in Foreign Language Annals (Leaver and Stryker 1989) CBI has been used in a wide variety of contexts over the last 25 years. According to the authors, this method can be characterized as (...) *a philosophical orientation, a methodical system, a syllabus design for a single course, or a framework for an entire program of instruction. CBI implies the total integration of language learning and content learning. It represents a significant departure from traditional foreign language teaching methods in that language proficiency is achieved by shifting the focus of instruction from the learning of language per se to the learning as language through the study of subject matter.*"

It is for this reason that the CBI authors propose the construction of a curriculum centered on a topic, subject or thematic unit, which should be approached by the use of texts and other authentic materials appropriated to the interests and needs of the students. Thus, in this perspective, we can consider CBI essentially as a student-centered method that allows the teacher to resort to a great variety of working methodologies that can range from the development of research projects to cooperative or experimental teaching.

3.1. Key underpinnings

1. According to CBI, we must learn a foreign language in order to involve specific contents of other subjects. The organization of the curriculum is mainly based on a thematic area to the detriment of the language itself. The student's communicative competence develops during the study process of a topic related to science, art, social studies, culture, history, politics or economics. The language used should allow natural learning as it must be understandable and relevant to the needs of the students.

2. The explicit learning of the structure of the language (grammar) happens as a pretext for communication. For this reason, the artificially created exercises for classroom situation cease to make sense. It is hoped that the teacher will be able to find authentic materials as well as create moments of reading, writing, and conversation oriented to the linguistic and cultural reality of the language being studied. In the words of Leaver and Stryker (1997) *This concept is especially relevant to CBI since, in order to prepare our students to live and work in a new culture, we must create a direct link between the classroom and the culture being studied. This cannot be accomplished effectively in a program that focuses primarily on grammatical competence".*

3. The development of communicative competence is essential for language learning. Fluency and linguistic rigor are seen as parallel principles. However, fluency takes on greater relevance as it is essential for the communicative process, rather than linguistic purity. In this sense, students are expected to be able to use and manipulate the language (to produce and receive) spontaneously, without previous memorization.

4. Students should have the opportunity to use what they learn in language classes to read, understand and intervene in the world. In the same way, teaching and lesson preparation must be flexible to adapt to the student's previous knowledge.

5. CBI in a very natural way must enable cooperative, experimental teaching as well as the development of research projects.

6. In a general way, CBI has excellent potential to motivate and self-implicate. Once contextualized and learner-centered, learning is achieved. Students are ready for the development of activities that must be capable of generating intrinsic motivation. Consequently, the approach of complex contents, so essential for humanistic education, happens spontaneously. Students should have the opportunity to make choices and set preferences based on the specificity of their needs and interests. There are always multiple possibilities of analysis for the same topic, and there must be freedom to explore them in a student-centered style of teaching. Therefore, there is flexibility and adaptability to build the curriculum and its sequences. Subtopics can be included, new questions raised, or objectives can be reformulated.

4. Research findings

Most studies about CBI instruction tended to look at the language development of students and their success in learning the subject matter. They also focus on student's motivation and its impact on language learning enthusiasm. Although there are few pieces of research based on the teacher's perspectives, theorists expected educators to implement their views of how a classroom should be. Therefore, the finding researches here presented are mostly the result of teachers discourses.

Many teachers internalized a distinction between *language learning* and *language use*. Consequently, they believe that first, students should be able to manipulate the language and, only after use it in authentic communication activities. This contradicts the CBI theory; therefore, a mindset change requires training, time, and an understanding of the process. If one of those premises fails, it is doubtful that a school will be able to implement a communicative language teaching approach (CLT), task-based language (TBLT), content-based instruction (CBI) or also called content and language integrated learning (CLIL). In this particular school, some of the teachers did not have an understanding of the theoretical underpinnings of CBI. They were invited to design curricula for teaching the language without a whole vision of what was expected. There was a lack of communication between the head of the department and the team. Generic and contradictory information given led teachers to write and rewrite the curriculum in a time-consuming process. According to teachers, the uncertainty of what the expectations were, and the regular learning walks with very critical and harsh feedback, resulted in an unmotivated team.

In order to carry out this method educators had to produce all teaching resources. As CBI requires authentic material, the biggest challenge was to research for reading, listening and visual resources for the student's age level. The disparity of themes worked in the classroom, forced a continuous investigation without real conditions to succeed. During interviews teachers explained that some of the resources were produced under pressure and, as a consequence, decontextualized and inaccurate information was delivered to students, which created a disbelief of their value as teachers.

During the process of writing the curriculum, two forces were contradictory: the tension between the whiling to understand languages and cultures under the dynamism of globalization and, on the other side, the reinforcement of nationalism as a centripetal force. Thus, the significance of learning Spanish became a field of dispute: in one hand, teachers defending language as a cultural capital of independent and critical thinking. In some cases, discussing the role of the United States in the world and questioning the *establishment*. On the other hand, the teaching of linguistic and content information transformed into goods or emphasising a positive appraisal of the American culture. This group of teachers assumed the learning of Spanish as an "added value" for traveling abroad, or as an eventual future professional valuable skill. On this approach, teaching the language was based on what teachers considered universal shared values, ignoring concepts of diversity intercultural perspective or critical thinking. The analyses of teaching material and lesson observation showed learning moments of prejudice reinforcement towards other societies.

It was also possible to verify a significant concern related to class management and indiscipline control or unproductiveness, which contradicts the idea of intrinsic motivation. Part of this reality has to do with how students are distributed across classes. Although the district offers Portuguese and Spanish courses since elementary school, going up to level 5 in secondary, it cannot be guaranteed that all students will do the same course linearly. New students in town, emigrants arriving, or students changing classes produced a great disparity of ages, experiences, and interests. In this scenario differentiation would have been key to the success of the program, however big classes and lack of support made it impossible.

The implementation of CBI under these conditions resulted in a violent psychological working environment that caused an embarrassing teacher turnover: seven teachers abandoned school in less than four years. Students talked about "the curst of Wold Language Department" and bet for "the next to fall." Teaching conditions in the classroom were each week more challenging to overcome.

5. Future research needs

CBI has considerable potential and may be part of the solution to the problems of articulation of foreign language and other departments. Thus, it would be interesting a comparative study with a European school that has adopted CLIL as a methodology. Since one of the biggest concerns in the school referred in this paper was the difficulty of finding authentic material, how could this group of teacher benefit from teaching a program in which part of the material was already prepared and ready to use in a textbook.

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OVERVIEW OF DESIGN TEACHING ON ENGINEERING COURSES: A COMPARATIVE STUDY BETWEEN BRAZIL AND PORTUGAL

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Abstract

This paper presents an overview of design teaching in the undergraduate engineering courses at the main institutions of higher education in Brazil and Portugal. In order to carry out the comparative study, the curricula of the main engineering courses in Brazil and Portugal were used. The aim of the research is to first analyze how the design, as a disciplinary content, is being introduced in the engineering courses in both countries. In a second moment, a comparative analysis will be made between the information collected in Brazil and in Portugal in order to register how this conjugation is occurring and whether there is some similarity or not in the way of design approach in the engineering courses in each country. As a result, it is discussed how the design can collaborate with the interdisciplinarity between these areas and contribute with the formation of the new competences of the engineer.

Keywords: Education, design, engineering, Brazil, Portugal.

1. Introduction

Education is the object of study, concern, focus, strategy and discussion in all the nations of the globe and reflects the intense changes the world has witnessed in the last decades of the 20th century, beginning with the two great wars, then the expansion of capitalism and the cultural and economic globalization in the 21th century. According to UNESCO (2010), engineering deserves our attention, its contribution to development must be fully acknowledged, being vital the full measurement of engineering's capacity to make a difference in the developing world. If engineering's role is more visible and better understood, more people would be attracted to it as a career. Now and in the years to come, it is fundamental to ensure that motivated young women and men concerned about problems in the developing world continue to enter the field in enough numbers.

The performance of engineering professionals is closely associated with the improvement of products and processes, optimization and innovation of production management models and Research & Development (R&D) efforts of the companies. The conditions of the engineering education occupy, therefore, a central place in the discussions involving the formulation and implementation of strategies for industrial development. They are part of the range of challenges that countries must face to sustain productivity gains and to strengthen their competitive positions in the dynamic knowledge-based economy of the world. The economic growth should be accompanied by a qualitative and quantitative improvement of employment and greater social cohesion. This demands a change in higher education system, promoting interdisciplinarity, stimulating entrepreneurship, emphasizing the cultural and social involvement of universities. This is propelled by strategic government investment in engineering education as an incubator for the technology-based entrepreneurial talent that will drive national economic growth (Brasil, 2019; Confederação Nacional da Indústria [CNI], 2018; Cordeiro et al, 2008, Heitor et al, 2004).

2. Scenario of engineering education in Brazil

Portuguese and Brazilian relations have lasted more than five centuries. Having as a backdrop the Atlantic, the two "brothers" countries are physically and symbolically united, by territory, history, culture, language and regional spaces in which they are inserted. Some points of convergence and singularities are evidenced, as well as the strong distinction regarding the amplitude of difficulties, since in Brazil these are extended by their territorial dimension, socioeconomic inequalities and regional diversities (Almeida, 2008).

Engineering education in Brazil had its beginning in 1699, with Dom Pedro II, King of Portugal at the time, and the creation of the first class of Fortification, for the training of military engineers. The fundamental landmark for higher education was the coming of the Portuguese royal family to Brazil in 1808, a fact that allowed the creation of several institutions, some of them offering higher education courses. The beginning of the formal education of engineering in Brazil was with the Royal Military Academy in 1810, replacing the Royal Academy of Artillery, Fortification and Drawing, installed in 1792, in Rio de Janeiro. In 1874, the army left the formation of engineers for civil institutions, when the first engineering school was borne: The Polytechnic School of Largo de São Francisco. Throughout the 19th century, several educational establishments for higher level vocational training emerged, even though they were isolated and in specific contexts, without having a university system, such as the Polytechnic School of São Paulo in 1893. The first university of the federal government of Brazil, the current Federal University of Rio de Janeiro (UFRJ), was created in 1920. And in 1934, through the political perspective of a liberal-democratic regime, with a different model, the University of São Paulo was created by the São Paulo government. Since 1950 there was a significant growth in the number of courses of engineering, with the great expansion occurred from the second half of the 90's. This is coincident with the edition of the new "Law of Guidelines and Bases of National Education" (1996), when the growth of engineering courses has reached an annual average of 96 new courses per year, mainly in the private sector (Cordeiro et al, 2008).

From 2010 to 2014, due mainly to the performance of the country in terms of infrastructures expansion, a significant growth was registered, both in terms of the offers (expansion of the number of courses), and applications for engineering courses (Brasil, 2019; CNI, 2018). After this period, these numbers started to decrease due to the recent economic, political and social crisis installed in the country. For each 1,000 candidates in engineering selection processes, only 175 were admitted and only 95 concluded their courses, suggesting a kind of "funnel" (CNI, 2018). In 2018, 6,106 engineering courses were registered in the E-MEC system, operating in 1,176 distinct institutions, including private and public. In addition to the numerical expansion, there was also a great growth of qualifications or areas of coverage of the engineering courses. Today there are already 60, considering the first denomination of the courses (civil, electrical, mechanics, etc.) and more than 250 when is considered the second denomination or emphasis (civil construction, electrical power, automobile mechanics, etc.). Between 2001 and 2018, there was, therefore, a total growth of 692% in the number of engineering courses (Brasil, 2019).

Brazil faces some difficulties to compete in the international market. According to the Global Innovation Index (IGI), the country lost 22 positions in the ranking between 2011 and 2017, which stood at 69º place among the 128 countries evaluated. In 2014, while Portugal had about 16 engineers for each 10,000 inhabitants, Brazil recorded only 4.8 engineers for the same inhabitants (Brasil, 2019).

3. Scenario of engineering education in Portugal

The teaching of engineering in Portugal was originated in the Nautical Class, created in 1765. The Royal Academy of Fortification, Artillery and Drawing, created in 1790, is considered the first modern school of Portuguese engineering and one of the first in the world. In the 20th century, with the implantation of the Republic in 1910, the teaching of engineering started for the first time to be held at the university, when the Polytechnic Academy of Porto, created in 1837, and predominantly military (although it also included civil engineering), replaced the School of Nautical. Integrated in the new University of Porto, created in 1911, with its courses of engineering, is in the genesis of the current Faculty of Engineering of that university (Azevedo, 2013). The foundation of Instituto Superior Técnico (1911) and the transformation of the Polytechnic Academy of Porto into Technical Faculty (1915), were considered decisive milestones in the technical context, since they would play a fundamental role in consolidating the social recognition of knowledge (Heitor et al, 2004).

In 1970, the Polytechnic Institutes were integrated into the higher education system, attributing the bachelor's degree (Academia de Engenharia de Portugal [AEP], 2006). Since 1972, new university engineering courses have been created in Coimbra, Porto, Braga, Aveiro, Lisbon and some other localities, strengthened by the European integration. The law of bases of the educational system integrated the higher institutes of engineering in Polytechnic education in 1988 (AEP, 2006, Heitor et al, 2004). Currently, the teaching of engineering is carried out in universities (oriented to the research and creation of scientific and cultural knowledge) and polytechnic institutes (oriented to the applied research and creation of the knowledge of professional nature), both public and private (Azevedo, 2013), which integrate an intrinsically rich and diversified institutional system.

Considering the area of education and training represented by Engineering, Manufacturing and Construction, currently Portugal has 319 courses in 94 institutions and organic units of education, including the graduation and integrated masters, in 12 specialties (Ordem dos Engenheiros, 2015). These specialties are subdivided in 72 different qualifications or areas of coverage of the engineering, in a total of 1010 cycles of study, that offered in 2018, 11,615 places, occupied by 10,805 selected students through the 3 stages of admission. Regarding the number of students, there was an increase of almost 9% in the total number of

graduates in higher education in engineering (from 14,412 in 2010 to 16,105 in 2017), which opposes to the decrease of 12.4% in the total number of students enrolled in this area (from 88,644 in 2010 to 78,830 in 2018) (DGES, 2019).

The Bologna Process has triggered an impressive set of reforms (AEP, 2006; Heitor et al, 2004). Signed in 1999, is an intergovernmental cooperation of 48 European countries in the field of higher education that guides the collective effort on how to improve the internationalization of higher education (European Commission, n.d.). Furthermore, there is still the Erasmus+, the European Union's programme to support education, training, youth and sport in Europe, providing opportunities for Europeans to study, train, and gain experience abroad (European Commission, n.d.).

While Brazil occupies the 40th place, Portugal is classified as the 25th best higher education system in the world in the U21 Rankings of National Higher Education Systems 2019, developed by "Universitas 21", a reference network that aggregates universities research in several countries (Universitas 21, 2019).

4. Comparative study between Brazil and Portugal

Despite the visible growth of admissions in engineering, the productive sector has encountered difficulties to recruit skilled workers to act on the frontier of knowledge of engineering, which, in addition to the technique, requires that its professionals have mastery of skills as leadership, work in group, planning, strategic management and learning autonomously. These competencies, known as "soft skills", combine solid technical training with a more humanistic and entrepreneurial formation (Brasil, 2019). Proposals for modernizing engineering courses should consider international trends and specific aspects of the reality of each country, with more multidisciplinary, systemic and consistent visions. All these aspects should be aligned with the needs of society, especially in relation to sustainability issues, future-bearing areas (e.g. Nanobiotechnology) and new generation of production 4.0 industry (e.g. advanced automation, big data, artificial intelligence, design, etc.). In international experiences, the curricula focused on the development of competencies and the adoption of more practice-oriented teaching methodologies, such as the PBL – Project Based Learning, are good examples of modernization (CNI, 2018). Engineering knowledge has always been system-based knowledge where engineers are working with the phenomena of black boxes in their design. The new challenge is not to work with the black boxes, but to do work within a collaborative intercultural and interdisciplinary team (UNESCO, 2010).

Design projects that have been used as vehicles to motivate and integrate learning and cornerstone project-based courses, are also seen to enhance students' motivation and their attraction to engineering. So, what does the word "design" mean in an engineering context? Why is this complex, fascinating subject so hard to teach? Engineering design is a systematic, intelligent process in which designers generate, evaluate, and specify concepts for devices, systems, or processes whose form and function achieve clients' objectives or users' needs while satisfying a specified set of constraints (Dym, 2005). Design, interdisciplinary by nature, is a strategic problem-solving process that drives innovation, builds the business success and leads to better quality of life through innovative products, systems, services and experiences (World Design Organization [WDO], 2019).

Design can help and, through its tools and methodologies, show new paths inspired not only in new technologies, but also in human needs, adding new values that are perceived by consumers and viable to implement. By its holistic and integrative character, the design has become more valued and coined with the term "Design Thinking" establishing the correspondence between human needs (desirability) and the technical resources available (feasibility) considering the practical constraints of the business (viability) (Brown, 2009).

The design insertion format in engineering courses can be done in a variety of ways: as a programmatic content addressed within a discipline, as a regular compulsory subject, as an elective or optional subject, as an extension course, as a specialization or minor and, even, as a content linked to an integrated project. And there are two important aspects to introducing product design to engineering students at undergraduate level: "when" and "how" the subject of design is taught (Sathikh, 2018). When means that it could be introduced at the freshman year, making design a core subject at the very early stages of study, where the subject maybe introduced too early to be effective or as an elective, at the senior year, as a follow up to what students learn in the freshman year, maybe too late to bring some real effect. How is about the method and means that it can be taught not only with a principal focus based on the aesthetic but also upon usability, sustainability and design for manufacture (built on the framework of studio-based learning) (Mills; Treagust, 2003-04).

The aim of the research was to analyze how the design, as a subject content, is being introduced in the engineering courses in both countries. The curricula and teaching plans of Mechanical Engineering courses in important educational institutions in Brazil and Portugal were considered and selected among the best evaluated in 2018/2019, according to Quacquarelli Symonds [QS] World University Rankings by Subject 2019: Engineering – Mechanical, Aeronautical & Manufacturing and the University Ranking of Folha de São Paulo (RUF 2018) – Mechanical Engineering.

Table 1. Design subjects inserted in engineering courses in Brazil and Portugal (adapted by the authors, 2019).

BRAZIL	**POLI-USP: Polytechnic School, University of São Paulo, public (São Paulo/SP, Brazil) #51-100 (QS); #1 (RUF)**	
	Applied Design Project I (Interdepartmental Disciplines of the Polytechnic School)	optional, 150h, semiannual, 6 credits
	Applied design Project II (Interdepartmental Disciplines of the Polytechnic School)	optional, 150h, semiannual, 6 credits
	UNICAMP: Faculty of Mechanical Engineering, Campinas State University, public (Campinas/SP, Brazil) #101-150 (QS); #2 (RUF)	
	IPhone Application Development and Design (Integrated courses program)	online, external course
	PUC-RIO: Pontifical Catholic University of Rio de Janeiro , private (Rio de Janeiro/RJ, Brazil) #601-650 (QS); #14 (RUF)	
	----nothing was found----	
	EEM-IMT: Engineering School, Mauá Institute of Technology, private (São Caetano do Sul/SP, Brazil) #18 (RUF)	
	Design Thinking (Minor of Design and Innovation)	elective, 80h, semiannual
	Strategic Design and Innovation (Minor of Design and Innovation)	elective, 40h, semiannual
	Interior Design (PAE - Projects and Special Activities)	elective, 40h, semiannual
	Development of Accessory and Application of Surface Design (PAE - Projects and Special Activities)	elective, 40h, semiannual
	INSPER: Institute of Education and Research, private (São Paulo/SP, Brazil) #140 (RUF)	
	Software Design	1st period, 80h, semiannual
	Nature of Design	1st period, 80h, semiannual
	Application Co-Design	2nd period, 80h, semiannual
	Design for Manufacturing	3rd period, 80h, semiannual
	Product-Service System Design	elective, 80h, semiannual
	Design Thinking	elective, 80h, semiannual
PORTUGAL	**FEUP: Faculty of Engineering, University of Porto, public (Porto, Portugal) #101-150 (QS WUR By Subject Ranking)**	
	Integrated Product Design	5th period, 6 credits
	ULisboa: Higher Technical Institute, University of Lisbon, public (Lisbon, Portugal) #101-150 (QS WUR By Subject Ranking)	
	Product Development and Entrepreneurship	optional, 5th period, 6 credits, semiannual
	UC: Mechanical Engineering Department, University of Coimbra, public (Coimbra, Portugal) #151-200 (QS WUR By Subject Ranking)	
	----nothing was found----	
	UA: Mechanical Engineering Department, University of Aveiro, public (Aveiro, Portugal) #251-300 (QS WUR By Subject Ranking)	
	Eco-design and Eco-efficiency (Sciences and Engineering of the Environment)	5th period, 6 credits
	ISEP: Higher Institute of Engineering of Porto, Polytechnic of Porto, public (Porto, Portugal)	
	----nothing was found----	

According to the collected data (Table 1), it can be observed that, in general, design as a subject is being inserted in mechanical engineering courses more prominently in Brazil, with the occurrence of 13 disciplines, comparing to Portugal, with the discreet occurrence of only 3 cases. In the majority (77%) they are being offered as elective or optional, taken usually at the end of the course, in the last (5th) period. Other important observation is about the addressed content, where most of them are about project and product/service development.

Although this study was limited to a small sample, restricted to some institutions in Brazil and Portugal, have emerged during the research other schools in Europe that also offer design subjects in the mechanical engineering curriculum, such as: University of Cambridge, England (Structural Design, Product Design, Engineering Design, Integrated Design Project); Delft University of Technology, Netherlands (Machine Design Project); Politecnico di Milano, Italy (Machine Design); among others.

5. Final considerations

Design education represents both serious challenges and glorious opportunities (Dym, 2005). Design is still a complement to the engineer's training, and not a basic requirement; it is a start, but it still has a long way to go. In this scenario, design can act and show new paths, through its tools and methodologies, inspired in human needs, not only in new technologies, but also in adding new values that are perceived by consumers and are viable to implement. Design can then be considered as an interdisciplinary content factor that, when applied in design practice, can contribute to the development of innovative products, enrich the training of the engineer and be a relevant agent in the innovation of higher education.

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LITERACY APPLICATION IN DISCIPLINARY PEDAGOGICAL PRACTICES AT LEGAL ENVIRONMENT

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Abstract

This oral presentation has been focused on the results of a research on literacy practices in undergraduate law programs at Universidad San Buenaventura (Medellin Campus), a private institution and at Institución Universitaria de Envigado, a public institution, between terms 2017-II and 2018-II, both institutions located in the State of Antioquia (Colombia). For this purpose, a research work was conducted in three phases. During the first phase, the way some theoretical and conceptual perspectives have been employed to talk about comprehension and textual production in the legal environment at higher education institutions in Latin America was reviewed until reaching the term Literacy. The second phase included the development of a field work involving the application of a questionnaire to students attending the legal program from the two schools about three common selected courses. Furthermore, interviews were administered to professors lecturing such courses and the work was executed on a focal group with students who graduated from both schools. During the third phase, the analysis of results was performed based on the initial categories for the analysis: discursive genres, (legal) field, (legal) argumentation, and inter-textuality, as well as some other categories established later, which are deemed as emerging categories: didactics, textual practices, and orality. This allowed concluding that different strategies involving literacy which favor disciplinary learning and the development of professional competences are developed in the professors' pedagogical practices. In most circumstances, however, which is accounted by students, alumni, and professors is employed in a non-intentional manner. As a non-intentional literacy, it is not found at a specific place which allows it to actually operate as a pedagogical mediation intended to favor the teaching-learning processes.

Keywords: Law, legal environment, literacy, pedagogical practices, higher education.

1. Introduction

The levels of reading and writing in Latin America have been analyzed massively during the last 30 years (Brown, 1999; Carlino, 2005; Parodi, 2008; Zavala, 2009; Londoño, 2015; Navarro et al., 2016). This interest has been consolidated thanks to the relationship between comprehension and textual production in different educational cycles. Such is the case that a relevant number of research works has been focused on understanding the way students entering the University read and write (Carlino, 2005), on describing the relationship between learning and the levels of reading comprehension (Rosenshine, 2005), on explaining the influence of writing processes on learning (Londoño & Ramírez, 2017), and on revealing the social and political roles of reading and writing for the construction of more critical, autonomous, and democratic citizens (Giroux & McLaren, 2018), among others..

Recently, however, the research interest has been focused on the analysis of the way reading and writing are frequently being employed at the pedagogical practices of university educational programs (Skerrett & Bomer, 2011), understanding their role as a pedagogical mediation which is intended to have access to the information from reflection (Alexander, 2017), analysis (Roberge, Losey & Wald, 2015), and discursive argumentation (Özdem, Cakiroglu, & Ertepinar, 2017). Having said that, it seems that such comprehension and textual production practices do not always accompany the educational process in a positive manner, either due to the didactic elements present or due to the lack of concepts of students who have recently been involved in these fields of knowledge.

Therefore, some research works have been intended to describe whether the levels of reading and writing developed during the educational process do correspond to the ones required by the employment (Parodi, 2008) and professional (López, 2002) contexts. In other words, if pedagogical practices based on comprehension and textual production are not functional in some cases for the academic educational

process but they comply with the educational role of the professional persons and allow them to perform in an appropriate manner.

For the abovementioned, literacy (Cassany, 2005) emerges as a theoretical and methodological option suitable for analyzing comprehension and textual production with respect to specific contexts, understanding the text as a social, cultural, and disciplinary construction.

For this reason, the research entitled *Literacy in the Legal Environment: Literacy Practices at the Law Schools of Universidad de San Buenaventura and Institución Universitaria de Envigado*, executed thanks to a specific agreement between both institutions from academic term 2017-II to academic term 2018-II, was conducted with the purpose of describing literacy practices at both schools as a way of addressing the characteristics practices show around the literacy employed in the field of Law at the institutions named above. Finally, we acknowledge Milton Castellanos and Kennier Garay, professors at University of San Buenaventura (Medellin), who participated in this research.

2. Design

This was a qualitative (Patton, 1990) and applied (Bonilla y Rodríguez, 1997) research. This implies that individuals interact with other members within their social context in order to share the knowledge they have about themselves and their reality (Heigham & Croker, 2009). Based on such definition, this research should be seen as a qualitative work since it is intended to describe the literacy practices at the Law Schools from two universities. Besides, the research is focused on the intervention within a specific context instead of on the development of theories; this being said, the research, in general, "comprises all fields associated to the environment of social technologies which are intended to produce induced or planned changes with the purpose of resolving problems or operating on any aspect of reality" (Ander-Egg, 2003, pp. 41-42). Thus, understanding literacy practices in the field of Law allows the construction of proposals to improve such practices and strengthen the levels of literacy of students and future professionals.

3. Objective

The objective of this research was to describe the literacy practices at the Law School of Universidad de San Buenaventura (Medellin Campus) and Institución Universitaria de Envigado. For this purpose, conceptions about literacy assumed by professors and students from both schools were established. Likewise, an inquiry was conducted about those pedagogical practices directly or indirectly associated to elements inherent to literacy. Finally, in conjunction with the participants, potential literacy practices which take place for the daily performance of legal professionals were also identified.

4. Methods

The comprehensive hermeneutics was the methodological perspective assumed for this research (Patton, 1990). Therefore, characterization of literacy practices in the field of Law was based on three key concepts: experience, expression, and comprehension. Research was developed in three phases:

4.1. Phase 1

This phase included the construction of the state of the art; central categories of research and its basis were defined. To this effect, the documentary revision technique was employed. A selection of articles published between 2007 and 2018 was made on Latin American journals indexed on Latindex. Articles should address the reading and writing processes in the legal environment in both professionals and students. 9 articles were found during the search and they were analyzed by using a constructed rubric. Such rubric allowed identifying and classifying the bibliographic, bibliometric, and discursive information of analyzed texts.

4.2. Phase 2

The field work was developed during this phase. The field work consisted of the approach to students, professors, and alumni from the legal schools of the universities named above. The purpose was to collect their opinions, positions, and ideas. They were asked about their experiences and literacy and argumentation practices in education in the legal field and the importance of reading and writing practices in the legal teaching processes and in the professional performance within this discipline. 3 common courses were selected: History of Political Ideas (first academic term), General Procedural Theory (fourth academic term), and Conflict Solution Methods (seventh academic term). A group of alumni from the two schools were further selected for forming a focal group.

Techniques and instruments employed were as follows: questionnaire (Ander-Egg, 2003) applied to 110 students attending the selected courses (74 students from Institución Universitaria de Envigado and 36 students from Universidad de San Buenaventura). The interviews were administered to 6 professors lecturing such courses. The semi-structured interview guide was employed as the instrument (Bonilla y Rodríguez, 1998). The focal group technique was used with alumni (Vaughn, Schumm & Sinagub, 1996). The instrument for the entire group was a guide of questions. The inclusion criteria to participate in the focal group were the following: exceeding two years as alumni; having been involved in litigation processes; or having developed functions as a professional in the legal field; not having been a professor; and having given his/her acceptance to participate in the group. The focal group consisted of 4 alumni from the schools.

4.3. Phase 3

This phase included the development of the information analysis. The analysis was based on the information collected with the instruments. The data from the questionnaire administered to 110 students was used to perform a statistical analysis, as follows: for the data reduction process, a multivariate factorial analysis was conducted through the Principal Component Analysis method. This analysis included the Kaiser-Meyer-Olkin (KMO) sampling adequacy method and then the Varimax Rotation Technique was applied. On the other side, a qualitative analysis of the interviews applied to six professors of the selected courses was conducted. Relevant transcription and systematization were made on an analytical matrix (Londoño, 2015) in such a way that answers of interviewees were associated to the analysis categories pre-established from the documentary revision. Furthermore, the matrix was employed to review prevalence and reiteration, which suggested the emergence of new categories. The information collected with the focal group was also transcribed. Relevant analysis required a matrix which related the answers to analysis categories employed during the interviews with professors.

5. Discussion

Initially, it was possible to establish that the number of research works on literacy in the legal environment was incipent. This is due to the fact that research works have been mainly focused on the inquiry about aspects of form; this corresponds to traditional linguistic studies and the argumentative and discursive construction according to disciplinary norms. Some other studies were found focused on rhetorical aspects and their operation within the professional environment, especially in oral trials. Despite the statement above is directly related to literacy, the importance of social and cultural context on the comprehension and textual production, including the disciplinary field, is not deeply outlined.

From the bibliographic revision, however, the following initial categories were identified: discursive genres, (legal) field, (legal) argumentation, and inter-textuality. Work with these categories allowed developing the field work in order to apply the questionnaire to students, the interview to professors, and the focal group to alumni.

The questionnaire to students included an inquiry about their perceptions about: writing practices, professors' guidance, and reading practices. By comparing through the instrument to the theoretically established concerning the literacy practices, it was verified that there was no a significant statistical difference. This means that students recognize and value a number of exercises and practices at the classroom relating to reading and writing and they associated them to the legal field. Likewise, it was found that they view these practices as a merely instrumental action.

All professors who were administered an interview coincidentally affirmed that comprehension and textual production are significantly relevant for the educational processes and the professional practice in the legal field. However, a deficiency associated to concepts of applied linguistics which could enrich the pedagogical work and develop better levels of student's literacy was observed. During the analysis of interviews, some new categories emerged: didactics, textual practices, and orality. This coincides with the research tendencies described above, since interviewed professors, when talking about textual practice, make a specific reference to spelling and grammar. The argumentative exercise, however, is associated to works on logics and the way premises are constructed.

Finally, results obtained through the focal group of alumni allowed establishing that despite the ignorance on the literacy concept in the legal field, alumni acknowledge practices relating to their education and professional performance. However, they express a disagreement between the use given to comprehension and textual production during their education and the one they require during their professional practice. In terms of literacy, this may refer to the lack of knowledge on contexts and discursive genres in the pedagogical practices offered during the education process and to the disconnection of pedagogical practices with the professional performance contexts.

6. Conclusions

The study allowed noticing that literacy in the legal field offers a significant number of discursive genres with different super-structures and different pragmatic uses. This necessarily impacts any reference made to teaching. If pedagogical practices consider literacy, the context for comprehension and textual production plays a fundamental role. Thus, professors require the specific knowledge of the discipline, the recognition of present linguistic elements, and the performance of an intentional use of practices with students.

Professors participating in the study apparently show no recognition of the potential employment of literacy for the meta-cognitive process relating to the education and professional performance. This further implies that they think that students should have the level of literacy expected when starting the professional program and they do not envision that the pedagogical exercise of comprehension and textual production within the framework of the specific knowledge may enhance the discursive competences of a future attorney or his/her cognitive processes.

Statements of alumni within the focal group are a reinforcement of the above, since they affirm that their performance implies the development of activities which involve literacy practices through some disciplinary discursive genres that were not expressly considered during their education process. This allows thinking about the problem with the education of professionals at a higher-education level based on the literacy as a potential enhancer of the disciplinary knowledge. Therefore, teaching how to read and write at the university is mandatory from a specific knowledge (context).

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MODEL-BASED LEARNING:
AN INQUIRY APPROACH TO TEACH SCIENCE

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Abstract

Mountain building was one of the first geological phenomena simulated through modeling in the early nineteenth century. Several scientific models were created by geologists in an attempt to understand deformation structures such as faults and folds. However, the learning of this scientific content requires a high level of abstraction and the recall of previous knowledge. The difficulties finding in teaching and learning this process makes evident the not surprising huge alternative concepts diagnose in students. The modeling of mountain building can facilitate the learning process, the irradiation of alternative conceptions and the mobilization of the new learning to solve problems of daily life. With the intention to teach mountain building processes in 7th grade (students age ranging 12-13 years) the authors came across with the need to verify if an inquiry model-based approach could promote meaningful learning in science students. The purpose of this study was not only finding results to this research problem through model-based learning, but also developing education resources to evaluate if the learning was meaningful. Researchers adopt a mixed-methods research (QUAN-qual model) with the data analyzed based on statistics procedure. The data triangulation was made with focus group interviews. A two hours' intervention program was implemented in a science class composed by thirty students (n=30) of a school in the north of Portugal. Before the intervention students were asked to answer a diagnostic test. After intervention students filled a Gowin's Vee. Six focus group (five students per group) were established and interviews were conducted by a member of the research team. Results showed that girls had better achievement in the diagnostic test in questions related to the identification of faults and folds ($\chi^2_4=10.874$; p=0.028), in the correspondence between the types of forces that originate these structures ($\chi^2_8=16.148$; p=0.040) and their respective deformation regimes ($\chi^2_1=9.357$; p=0.002). Likewise, female students had a better performance in completing Gowin's Vee ($\rho=0.515$; p=0.004). Nevertheless, both boys and girls explained in the focus interviews how they achieved a meaningful learning supported in the inquiry models' activities.

Keywords: Inquiry, models, meaningful learning, mixed method research, natural sciences.

1. Introduction

The most recent reforms in Science Education have placed emphasis on Inquiry-Based Teaching (IBT) (Gilbert & Justi, 2016; Kawalkar & Vijapurkar, 2015). However, these guidelines haven't been fully implemented in Portuguese schools, perhaps on account of the challenge that adopting these practices represents, and because there is a significant distrust in their contribution for the improvement of teaching. However, studies have demonstrated the potential of these practices (Kawalkar & Vijapurkar, 2015). The IBT belongs to a Socio-constructivist dimension of learning and aims to contribute to the personal and social development of students, encouraging them to critically participate in today's society. In IBT, the teacher is a learning facilitator that not only conveys conceptual knowledge but also assists students in finding solutions, through observation, questioning and argumentation (Kawalkar & Vijapurkar, 2015; Fonseca, Barreiras & Vasconcelos, 2005). There are several strategies to develop a teaching process that will match these guidelines. One of them is laboratory work.

Accordingly, several authors argue in favor of laboratory practices in the Natural Sciences classroom (Kim & Tan, 2011; Leite, 2000; Torres & Vasconcelos, 2015; Vasconcelos & Torres, 2017). Lab work is considered to be an enhancer of competencies, attitudes and values that favor students'

motivation, the learning of scientific methodology and the development of scientific attitudes (Leite, 2000). When it comes to teaching Natural Sciences, working with models seem to be beneficial. The models in Natural Sciences classes helps the learning process and promotes a better understanding of scientific concepts, increasing the students' engagement, and improving their knowledge, which, together, may reduce the lack of interest in the curricula (Spronken-Smith, 2012). According to IBT and since models are central to scientific activity, students should seek to mirror the scientific activity, which would allow them to experience the process of knowledge building (Bolacha, Martins, Barros, Deus, & Fonseca, 2009).

The mountain building was one of the first geological phenomena simulated by modeling. However, learning this scientific content requires a high level of abstraction and the use of significant prior-knowledge, which may explain the existence of alternative conceptions. Modeling mountain building may facilitate this learning process and help to build knowledge that is fundamental to the understanding of Earth and Science (Bolacha et al., 2009; Moutinho, Moura & Vasconcelos, 2016).

2. Methodology

This research was based on a mixed-based methodology (QUAN-qual model). Its development sought to evaluate the impact of the use of modeling in Natural Sciences class of the 7th grade. The model aimed to favor the learning process of orogenic phenomena and the understanding of the presence of marine fossils in the Himalayas. The model activity was performed as an inquiry approach leading students to observe, register data, analyze and conclude. To register their inquiry activities students were asked to fill a Gowin's Vee.

2.1. Sample, instruments and procedure

The study was carried out in a school in the city of Oporto (Portugal); it was applied to a 7th grade Natural Sciences classroom (figure 1), with 30 students, aged 12 to 13 years; the majority of participants were female (n=19; 63.3%).

Figure 1. Photographic record of the intervention program.

The instruments chosen for data collection were the cognitive test, Gowin's Vee, and an interview guide (figure 2). A cognitive test was used, allowing the identification of the conceptions of the participants. Gowin's Vee comprised two central questions – "*How were the Himalayas formed? Why are there marine fossils at the top of this mountain?*" – students were asked to answer these questions through modeling activity. A structured interview was also used, based on an interview script.

Data collection took place at three different times. Firstly, a cognitive test was applied. Afterwards, data was collected during the modeling activity by filling Gowin's Vee. From a learning perspective, the

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Gowin's Vee helps students, especially the younger ones, to recognize the complexity of the process of knowledge construction. This instrument allows the contact between the new conceptual content (to be learned) and the concepts that the student already had, enabling the restructuring and construction of knowledge. Additionally, this tool facilitates the identification of the various scientific concepts related to a certain theme and its relations, systematizing them in a condensed and clear way (Gowin & Alvarez, 2005). In addition to its value in the learning process, the analysis of this type of register allows us to investigate how students organize and integrate scientific knowledge and procedures, as well as an important data collection instrument able to be used in educational research (Gowin & Alvarez, 2005).

Finally, several interviews took place within six focus groups (five students each). In this variety of interviews, the researcher seeks to understand the mutual understanding of the individuals, as well as their personal visions. Focus groups are especially helpful when the interaction between respondents leads to a shared understanding of the questions posed by the researcher (Gay, Mills & Airasian, 2012). The groups were defined by the researchers in order to guarantee intergroup homogeneity and intragroup heterogeneity.

Figure 2. Different stages of the intervention program.

1st Stage:
• Cognitive test
• Himalayas' context description

3rd Stage:
• *Focus* group interviews

2nd Stage:
• Modeling activity
• Gowin's Vee
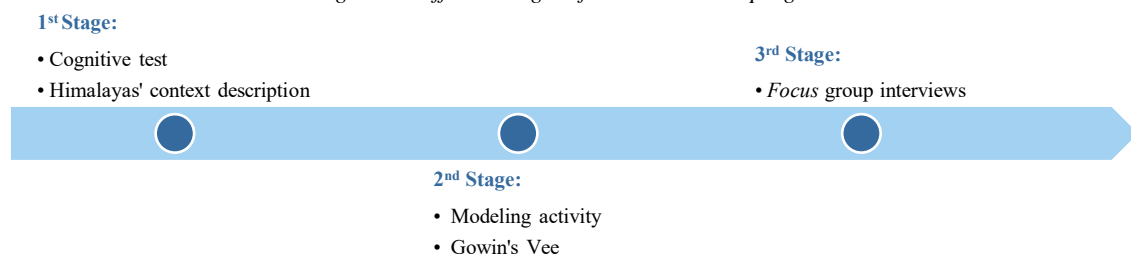
Data was analyzed by resorting to statistical methods and content analysis, which provided the framework for the organization and description of results.

3. Results

3.1. Cognitive test

Results were satisfactory, with an average of 60.5%. However, 8 students (26.6%) scored less than 50%. The majority of students associate brittle and ductile deformation to the formation of failures (70.0%) and folds (73.3%). Nonetheless, they showed difficulties in identifying these structures when looking at a schematic drawing; only 14 students (46.7%) managed to identify the structures, and only 1 student (3.3%) associated the structures to the type of force involved. Ten students (33.3%) correctly ordered the statements about the sequence of events that give rise to a failure.

When asked why there are marine fossils at the top of the Himalayas, no student was able to answer (0.0%). Nine students (30.0%) related this fact to the action of convergent forces/movements but failed to fully explain the phenomenon. Three students (10.0%) pointed out changes of sea level as an explanation and two other students (6.7%) said that the mountain "*was born from the seabed*".

Statistical analysis was performed using chi-square independence test. Significant differences were found in relation to the frequency of correct answers and gender, in the questions related to the identification of faults and folds (χ^2_4=10.874; p=0.028) and in corresponding the nature of forces to the origin of these structures (χ^2_8=16.148; p=0.040). The recognition of the brittle (χ^2_1=9.357; p=0.002) and ductile (χ^2_1=9.357; p=0.009) regimens showed significant differences.

The majority of correct answers were found in the girls. The better results found in girls may be explained by an earlier psychological development, which may relate to higher motivation, engagement and attention during classes (Voyer & Voyer, 2014).

3.2. Gowin's Vee

Students made Gowin's Vee as a way to report the modelling inquiry work. Figure 3 shows one of students Gowin's Vee.

After analyzing the Gowin's Vee, results were considered good. The average obtained was 75.2%, which represented an increase of 14.7% in relation to the cognitive test. Spearman's coefficient was used to test the correlation between the scores of each instrument and a significant correlation was obtained (ρ=0.515; p=0.004). This suggests a positive correlation between conceptual knowledge and its systematization, by filling Gowin's Vee; those participants with best test results were the ones that better completed Gowin's Vee.

Figure 3. Gowin's Vee as a way to report the modelling inquiry work.

Similarly, to the cognitive test, answers to Gowin's Vee were analyzed using the chi-square independence test. Significant differences were found in relation to the frequency of correct answers and gender, in terms of record-keeping (χ^2_4=10.318; p=0.035) and value judgments linked to the representation of a fixed plate (χ^2_1=7.177; p=0.007). Again, the best results were obtained by females, which may be similarly explained.

3.3. Focus group interviews

Performance in focal interviews was very good. Five of the six groups were able to correctly define a fault and every student was able to clarify what a fold was. In both cases, these geological formations were related to the typology of the forces at hand and their corresponding deformation regimens. Students were able to explain the mountain building, by stating: "*the rocks, due to the compressive forces of the lithospheric plates, deform and rise, since they become thicker*"(II-1). One student pointed out that the deformation of the lithosphere and the formation of mountains results from the fact that the interior of the Earth is "*...always in motion due to the convection currents*"(V-1).

Additionally, all groups recognized the lithospheric plates that were involved in the formation of the Himalayas and their nature. In relation of the existence of marine fossils at the top of the Himalayas, five groups reported that they made it possible to determine the environment in which the rocks were formed, thus stating that "*the rocks at the top of the Himalayas were formed at the bottom of the ocean*" (I-2). Note that one of the groups reported that these fossils were also important for geochronology.

Results related to the teaching methodology showed that all groups considered that it contributed to the improvement of their learning, by helping them to formulate explanations. Students described this methodology as "*more interactive*"(I-3) than traditional practices, arguing that "*it is easier [to understand] when you see things happening rather than when the teacher is only talking...*"(I-1). According to one student, "*in the test (...) it reminds us of what we did in the class and helps us to build answers*"(II-1), favoring the application of knowledge to new situations.

In relation to learning, one student emphasized that: "*with models we can ask more questions because the topic is not so abstract. We can ask questions such as 'Why did this happen?'*"(III-2), which shows an important potential of this methodology in terms of questioning and formulating hypotheses. In addition, students suggest that the model is a way of "*seeing how nature works*"(III-3), bringing real world phenomena to the curricular contents.

4. Conclusions

Inquiry activity using modeling proved to have a positive impact in learning contents related to the scientific theme at hand. The teaching methodology that was employed favored the emergence of significant learning, which were reflected in improved results, in between the cognitive test and Gowin's Vee, which were later confirmed through interviews. After this activity, students were able to explain the

formation of folds and faults, distinguishing between the fragile and ductile behavior. In relation to the formation of mountains, findings showed an improvement in students' mental models, evidenced by the quality of answers and putting aside alternative conceptions. This cognitive development was also notorious in terms of learning about the importance of the presence of marine fossils at the top of the Himalayas in the reconstruction of the Earth's history.

Students applied and developed several competences such as observation, record-keeping, formulating hypothesis, data analysis and processing, and drawing conclusions, which are essential in the completion of the Gowin's Vee and in scientific practice. Students showed an understanding of scientific knowledge, mobilizing it to problem resolution and formulating solutions based on their own observations and inferences, which resulted from the manipulation of the model. Accordingly, authors argue that modeling activities are fundamental to the improvement of scientific education, in its different domains.

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ASSESSING OUTCOMES IN ELECTRICITY AND MAGNETISM COURSES IN ENGINEERING DEGREES. STUDENTS' PERFORMANCE ANALYSED BY BEMA

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Abstract

The field of high education is a dynamic environment constantly seeking for new methodologies and tools to promote learning and increase students' performance. Learner-centered teaching methodologies such as blended learning, problem-based learning, learning-oriented assessment, flip teaching, teamwork and effective oral and written communication are new pedagogical tools used in our instruction strategy. These innovative teaching methods can be applied jointly with classical methodologies, acting in a complementary and synergistic manner. The capacity to oversee and assess the progress of student's performance is a critical issue for the academic community. One broadly used tool for measure the student's performance in introductory physics is the Brief Electricity and Magnetism Assessment (BEMA), designed specifically as a standardized instrument to evaluate students' qualitative understanding of electricity and magnetism (E&M) key concepts.

In order to analyze the performance of E&M students, the research-based assessment tool BEMA was used. The E&M course analyzed is included in the Bachelor's Degree in Industrial Electronics and Automation Engineering (DIEA) at the Universitat Politècnica de València (UPV), Spain. It is a second semester traditional curriculum in which the use of traditional textbooks and screencast have been combined. BEMA pre- and post-instruction tests were carried out at the beginning and end of the course respectively. Besides, an additional test, four months after the end of the course, was also conducted in order to analyze the persistence of the learning process.

To deepen understanding of student learning in the E&M course, correlations of pre- and post-instruction scores have been investigated, identifying systematic trends. Learning-persistence has been introduced as an additional parameter in this analysis for the DIEA curriculum. The relevant information obtained through the BEMA test will allow teachers to adapt the educational program and teaching methodologies to improve students' performance.

Keywords: Assessment, learner-centered teaching, BEMA test, innovation effectiveness.

1. Introduction

In the last decades, higher education is in a process of continuous evolution. Advances in Information and Communications Technology provide with new tools to support the academic needs in different teaching and learning models (Valtonen et al., 2015). Flip teaching, blended learning, teamwork, effective oral and written communication, problem solving strategies and peer evaluation are, among others, methodologies that are used in daily instruction model (Adachi, Tai, & Dawson, 2018; Liu et al., 2016; Shih & Tsai, 2016; Stadler, Becker, Greiff, & Spinath, 2016). These innovative teaching methods can be applied jointly with classical methodologies, acting in a complementary and in a synergistic manner. The capacity to oversee and assess the progress of student's performance is a critical issue to the academic community.

In order to quantify student-learning gains after the introduction of a methodological change, several standardized assessments in introductory physics (i.e., concept inventories) have been proposed. Currently, two of the most commonly used instruments to evaluate students' qualitative understanding of key concepts in electricity and magnetism (E&M) are the brief electricity and magnetism assessment (BEMA) and the conceptual survey of electricity and magnetism (CSEM) (Ding, Chabay, Sherwood, & Beichner, 2006; Maloney, O'Kuma, Hieggelke, & Van Heuvelen, 2001). Both test are essentially identical in their overall performance (Eaton, Johnson, Frank, & Willoughby, 2019). In this paper, performance of students of E&M courses have been analyzed through the BEMA test. This test is specifically designed to assess students' knowledge of electrical and magnetic concepts before (pre-test) and after (post-test) completing electrical and magnetic courses (Kohlmyer et al., 2009).

An important novelty compared with other works is that, in addition to the pre- and post-test, an additional test was performed four months after the end of the course to analyze the persistence of the learning process. As a result, the main finding was that two thirds of the students maintain the knowledge acquired during the E&M course after four months without receiving any additional instruction related to the subject, but a third of the students lower their grade to the levels they had before pursuing the E&M course. The information obtained through this tool will allow adaptation of the educational program and teaching methodologies to improve students' performance.

2. Methods

The E&M course analyzed is included in the Bachelor's Degree in Industrial Electronics and Automation Engineering (DIEA) at the School of Engineering Design-Universitat Politècnica de València (UPV-Spain). Lessons of the introductory E&M course at UPV are structured through the term in two 90 minutes lesson per week, and 2 hours laboratory session every other week. The methodology used is a combination of flip-teaching (FT) and traditional methodologies, where the university's e-learning platform was intensively used.

The data collected in this study contained the results of the students' responses to the BEMA test which was delivered three times to the same group of students. The BEMA test was administrated following the usual instructions (time limit of 45 min, the same grade for all students who completed the test, regardless of the score achieved). The BEMA pre-test (BEMA 1) was delivered to students during the first week of the course while the post-test (BEMA 2) was delivered at the end. A third test (BEMA 3) was delivered after the summer holiday at the beginning of the second year, four months after the end of the E&M course, in order to analyze learning persistence. The number of students who have taken the tests (BEMA 1 and BEMA 2) are 115 out of 151. The number of students that carried out the third test (BEMA 3) was 83. The comparison between the second and the first test (post-test and pre-test) provides information about the effect of the course on the E&M knowledge of the students, while the comparison with the third one, is related to the retention of E&M concepts (persistence after a certain period of time).

To perform an in-depth analysis, the results have been divided into terciles, grouping the students from highest to lowest grades in the final mark of the E&M course (upper, middle and lower tercile). The results have been depicted in a range from 0 to 10.

3. Results

The mean value of the test results, reported in Table 1, has been calculated globally for each test (BEMA 1, BEMA 2 and BEMA 3) and for each tercile. The global mean value from the first test administrated (BEMA 1), without the students having acquired any knowledge, increases from 2.49 to 4 after finishing the course (BEMA 2). This rating increase is linked with the course learning. Four months after the end of the course (BEMA 3), the global mean value decreases to 3.56, which indicates a loss of the knowledge acquired. The same trend can be observed in the results grouped by terciles, where the mean value increases from the first test to the second one and decreases for the last test. The best results are obtained at the end of the course (BEMA 2), both in the global mean and in the terciles; however, it is worth noting that the results from BEMA 3 are higher to those obtained from BEMA 1, which is related to the persistence of learning after completing the course.

Table 1. Average of the three BEMA tests, and average of the segmentation in the terciles.

	BEMA 1	BEMA 2	BEMA 3
Mean	2,49	4,00	3,56
Upper tercile	3,57	5,52	5,43
Middle tercile	2,20	3,36	3,17
Lower tercile	1,63	3,00	1,94

Figure 1 shows the comparison of the results from all the students classified in terciles who performed the tests. The results BEMA 1 vs. BEMA 2 (Fig. 1a) indicate how most of the students obtain a higher score after the end of the course (BEMA 2), which is indicated by their ratings located above the unit line (red line). It can also be observed that the increase in the rating is higher in the students from the upper tercile, indicating that these students obtain a higher academic performance.

Figure 1. Rating for all the students classificed in terciles (the triangle indicates the mean value of each tercile ± SD). a) BEMA1 vs. BEMA2. b) BEMA2 vs. BEMA3.
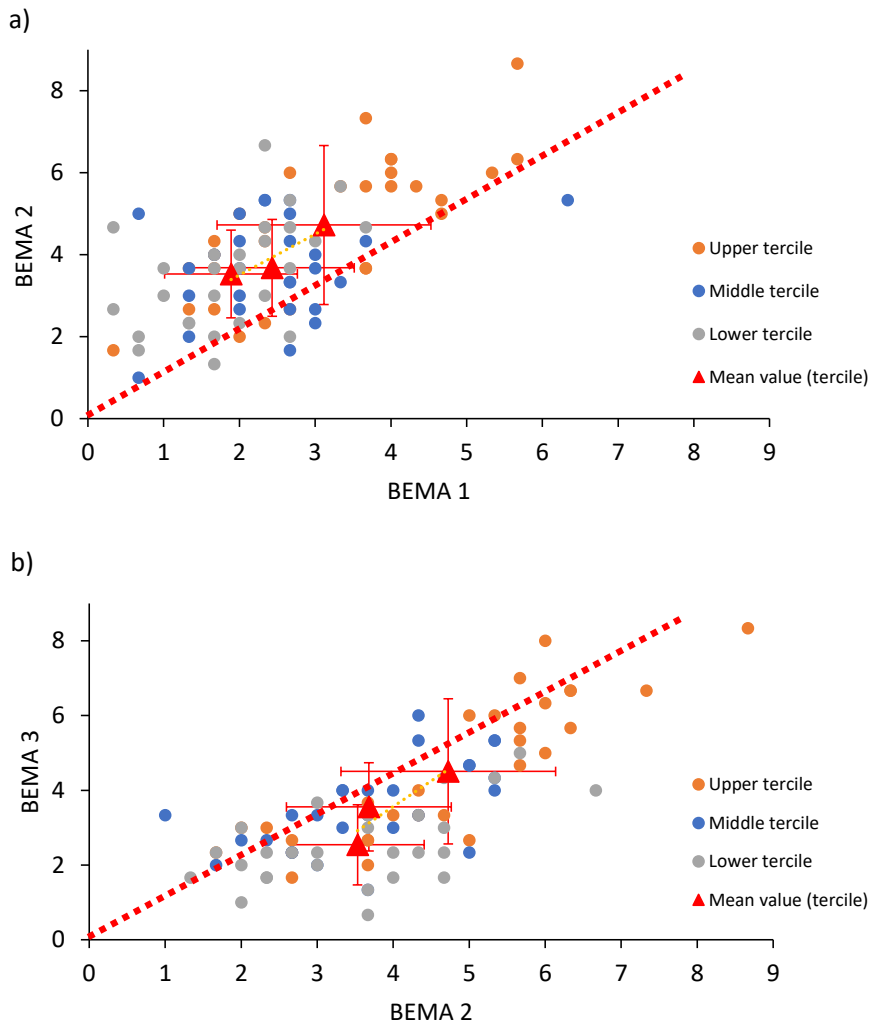
Comparing the results BEMA 2 versus BEMA 3 (Fig. 2b), it can be observed that in the upper and middle tercile, the majority of the scores are maintained close to the unit line. In particular, the mean values for both terciles are only slightly below, indicating a high persistence in the knowledge acquired. By contrast, in the lower third, a significant decrease in the mean value is observed (far away from the unit line), which indicates that the persistence drops significantly in this group of students. It can also be noted that the higher the BEMA 1 rating is, the higher rating those students obtain in the BEMA 2; likewise, the higher the BEMA 2 rating, the higher score those students obtain in the BEMA 3. These

results suggest that the initial scores, which are related to knowledge base, lead the trend of the rest of the scores.

To analyze the learning persistence in greater detail, a Bland-Altman plot (Bland & Altman, 1999) (Fig. 2) is used, where the semi-sum of the rating from BEMA 2 and BEMA has been represented versus the difference between them. The horizontal bars correspond to the value of the average difference (red line) and twice the standard deviation (blue lines). It can be observed how the difference increases when the semi-sum increases, indicating that students with high scores (and also medium scores) are able to keep the scores obtained four months earlier. On the other hand, students from the lower tercile are located, most of them, below the red line, pointing out the inability to maintain the previous ratings over time.

Figure 2. Bland-Altman plot from BEMA 2-BEMA 3 results.
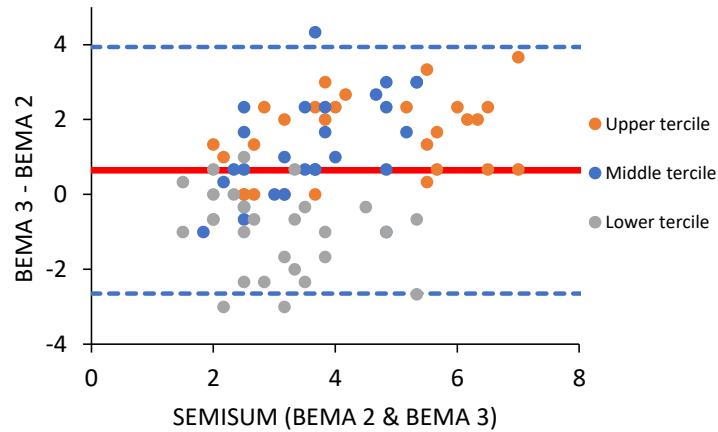
One feature worth stressing is that the rating of BEMA 3 test from the students in the lower tercile drops to values close to BEMA 1 (Table 1), indicating almost null persistence of the acquired knowledge. Conversely, students from the upper and middle tercile are able to retain the acquired knowledge. Middle tercile students presents a slight decrease in the rating (ca. 0.2 points), while for students located in the upper tercile, the difference is less than 0.1 points, which indicates that virtually all the acquired knowledge is maintained.

Figure 3. Mean rating evolution.
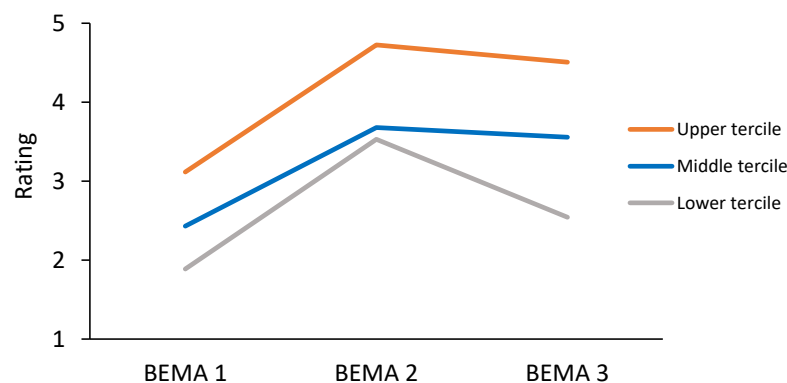
From Figure 3, where the mean rating from the different terciles has been plotted, students evolution can be clearly observed. All students increase their scores from BEMA 1 to BEMA 2, nevertheless, students whose rating grades are high or medium, maintain their grades over time while those with low ratings (lower tercile students) are not able to do so.

4. Conclusions

In this paper, performance of students of E&M courses have been analysed through the Brief electricity and magnetism assessment (BEMA), studying the correlations of pre-and post-instruction scores and identifying systematic trends both from mean results and from terciles based on their final grades in the course. The persistence of the knowledge acquired four months after the end of the course has also been included.

The results indicate a tendency in the acquisition and maintenance from what has been learned. Students who start the course with a solid knowledge base demonstrate more capacity and ability to learn throughout the course, showing higher persistence in the knowledge acquired. On the contrary, students who start the course with low knowledge base, despite increasing their knowledge, obtain lower grades because it is a superficial, not deep, learning. In addition, those students show an inability to maintain it over time.

There is a clear relationship between the types of students, the evolution of learning and the loss of it. Students with better results (higher grades) maintain their knowledge over time. On the other side, students with worse grades, with shallow learning, so volatile, lost their learning after a few months.

Effectiveness of methodological changes oriented to improve students learning have to be measured not only immediately after the course is finished, but also after some months. Persistence will also increase student's ability to incorporate new knowledge and skills.

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USING CLASSROOM ASSESSMENT TO IMPROVE PEDAGOGY
- THE JAPANESE EXPERIENCE -

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Abstract

Educational practice itself is in a state of great transition as many nations seek to adapt teaching and Learning activities in an effort to revitalize students' motivation and performance. One such measure, termed 'formative assessment', is a classroom assessment practice that is becoming the heart of the educational framework. This practice promotes continuous learning and assessment dialogue among students and their teachers, creating and sustaining their collective learning identity as respectful and successful group members. Research 'knows' that social engagement has profound psychological effects. It is, therefore, of particular interest to discuss how the interactive instructional methods that characterize 'formative assessment' interplay with the high level of collective action required of Japanese people. This is given a rich socio-cultural context by chaotic aftermath of the catastrophic 9.1 earthquake, named for its magnitude as the Great East Japan Earthquake of 2011. It is in the selfless responses to this event that the words "quiet dignity" refer. These attributes of identity have formed across centuries in unique cultural circumstances, and by their theoretical similarity parallel the core elements required for formative assessment, otherwise known as Assessment for Learning (AfL). The cultural development of the Japanese nation sanctions harmonious and reciprocal group action as the sine qua non of a functional society. This fact supports the proposition that Japan is a naturally hospitable research and development context for AfL. Consequently, many aspects of AfL have presented themselves in Japanese Lesson Study (*jugyo kenkyu*) plans since the 1910s. The authors provide unique insights into the culturally embedded pedagogy and assessment. The article is rationalized around indigenous words (e.g. *kaizen*) steeped in deep cultural meaning thousands of years of in the making. When these key terms are explored, they introduce the Western practitioner to novel yet familiar ideologies that assist active practitioners everywhere with their efforts to explore alternative assessment practices and revitalize traditional methods. These terms are key to an understanding about the exportable nature of indigenous assessment methods when they are designed to promote deep learning (internalization), and sustain collective motivation (social cohesion). This article emphasizes those particular aspects of Japanese cultural tradition that drive effective assessment, create well-rounded (*zenjinteki*) students, and prepare young adults for success in life. The authors take various approaches, exploring how classroom assessments are embedded into instructional process around the world, and how these may be creatively integrated with Japanese perspectives on classroom learning and assessment.

Keywords: Classroom assessment, Japanese lesson study, culture of evaluation, Japanese teachers daily Jargon, kyoukan toshiteno omoiyari (group cooperation and empathy).

1. Introduction

The Great East Japan Earthquake that occurred on March 11, 2011 created an opportunity to reveal the culture of Japan and Eastern countries to the world. The relationship between spiritual tradition and education are reconsidered on the basis of the mutual interaction between society, culture, and religion. The Straits Times, which is the most- read newspaper in Singapore, published an article titled Awed by a nation's quiet dignity-World watches amazed at survivors' civility and patience amid the ruins- five days after the devastating earthquake happened. It represented some aspects of Japanese spiritual tradition such as selflessness, patience and stoicism. The following is the full text[1].

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[1] See: http://www.chinapost.com.tw/commentary/the-china-post/special-to-the-china-post/2011/03/17/294991/In- awe.Htm
See: https://www.japantimes.co.jp/life/2013/08/24/general/long-gone-writer-tells-it-how-it-is/#.XLl2cZP7RsM

The strengths and challenges of education in Japan is holistic learning as follows. Although schooling is an important social system in any country, the way in which schools in Japan and foreign countries differ greatly. In foreign countries, while the work of teachers is mainly specialized in classes, in Japan, teachers give integrated instruction on subjects, student guidance, club activities, etc., and the zest for living (certain academic ability, a well-balanced mind with heart, character-wise and a healthy body). For example, in foreign countries, staff other than teachers take care of and take charge of school lunches and cleaning of classrooms, etc., in Japan, it is conducted with the students under the supervision of the teachers. In addition, various school events such as excursions and committee activities are conducted under the leadership of the teacher, and the school is responsible for fostering the children. In addition, after school, sports activities are often carried out by groups other than schools such as local sports clubs in foreign countries, but in Japan it is common to carry out club activities in schools. In addition, in Japan, teachers often take part in securing the safety of attending school routes. Such "Japanese-style school education" is highly regarded internationally.

Teacher's Learning is as well. Japan's schooling is largely supported by the high quality of teachers. One of the supporting factors is in-school training. In Japan, a lesson study has been actively carried out for the purpose of improving the situation by having teachers see each other's classes with each other and exchange ideas and discussions. Therefore, there is a culture in which the teachers are focused on teaching plans, class configurations, and teaching skills.

Shields early analyzed the relationship between society, education and religion by using the framework of sacred architecture sites. He pointed out the significance of historical and cultural approach which has its religious foundations mixed with Confucianism, Buddhism and Shinto, for grasping Japan's educational reform from the inside (Shields 1999). It also means if the essence of 21st educational system is a learning environment based on social constructivism, a unilateral educational reform only from the outside might destroy the learning environment embedded in the culture of school (Walker 2016). Based on this, theoretical research on pedagogies necessary for the implementation of formative assessment and on cultural aspects of classroom in Japan has been conducted (Arimoto et al 2015).

2. Objectives

The authors provide unique insights into the culturally embedded pedagogy and assessment. The article is rationalized around indigenous words (e.g. *kaizen*) steeped in deep cultural meaning thousands of years of the making.

This takes the reader behind-the-scenes of the making of, providing insights from the one scene

Brian Simon's question "Why no pedagogy in England?" (Simon, 1981) is still (unfortunately) equally apt for many schools across globe today. Rejecting the notion that pedagogy is a 'neutral-free vehicle for transmitting curriculum content (Alexander 2000, p.30), Alexander moves beyond the contemporary dominance of the socio-cultural theory which emphasizes the relativism of education and knowledge construction.

The 2008 Tokyo seminar on formative assessment was the first one by OECD held in Asia Pacific Region. Strange to say, 99% teachers across Japan don't know the terminology of assessment. But We see in the OECD (2016) statistical report that Japan scores significantly above the average levels related to performance and outcome equity.

They observed the social reproduction of "altruism even in adversity", noting that Japanese inter-relationships (*kankei*) are, "rooted in thousands of years of Japanese tradition and has withstood outside influences". For schools located in regions that suffered damage from the Great East Japan Earthquake and schools that have since accepted children and students affected by the disaster, challenging issues include providing learning assistance to children and students affected by the disaster, and providing special guidance for their mental and emotional wellbeing.

If schools are a preparation for life, should they pay to knowledge creation. This is very important implication. Because the gap between school and society widens increasingly all the time. The question for itself "knowledge-creating school" had been shed in 2002 by D. H. Hargreaves, influenced by Nonaka SECI model of knowledge creation from knowledge creating company.

3. Methods

The author has tried to collect indigenous words and pull out from exemplary school and region vs pilot from students by AfL teachers effort to change teaching for deep understanding against a backdrop of test culture (Arimoto 2018, Howe & Arimoto 2014, Arimoto & Nishizuka et al 2017). The author provides unique insights into the psychology of assessment, being rationalized around indigenous

words steeped in deep cultural meaning thousands of years of the making. These are: *kankei, kata cultural script, kaizen, kizuna, kizuki,* and *kyodo tsunagari.*

- *kankei* (Japanese value concepts in replace of those of the Western such as truth, good, beauty. *Japanese society values kankei* (interrelationships) and access to networks of trusted people. Hargreaves (2012) in his "A self-improving school system in international context" for school leadership says as follows, 'In Japan it is *kankei,* which concerns access to networks of trusted people); no line between uchi (inside, us, in-group, inside home) and soto (outsider, other groups, outsider the home)

- *kata cultural scripts* (collective-consciousness-based form (how to do it, e.g.-copy masters' kata or their ways of performing/doing; -breaking with masters' kata; -the creation of their own kata). It functions as a hidden curriculum in social cohesion embedded in organization learned by cultural constructivism such as inheritance of type. According to teaching gap, *people within a culture share a mental picture of what teaching is like. We call this mental picture a script. The script is, in fact, a mental version of the teaching patterns we identified ... Scripts are mental models of these patterns. We all share this cultural script.* Kata had led to remove the defect and limit of prior behaviorism learning theory into together at school & together in life. It related to informal and nonformal learning........)*;*

- *kaizen* (refers to the continuous improvement down to the smallest and most detailed level of self-introspection, is another important cultural concept.)*;*

- *kizuna* (another aspect of outcomes, growth rather than performance; bond, ties, wet human relationship like *omoiyari* (compassionate consideration for others) based on "innate nature is goodness", dignity........ Japanese teachers maintain a social bond with their students, based on the (Buddhist) theory that the stronger the bond, the more successfully young learners will become *zenjinteki* (well-rounded) in character and reproduce similar communities around them.)*;*

- *kizuki* (new mindful awareness/ notice, realize, recognize, Japanese culture demands a strong focus on collective competences (e.g., peer collaboration), on persistence (gambaru) towards outcomes and on mindfulness (kizuki) as an L2L competence / exists as a more multidimensional and multi-level. concept than the Western terms "alignment" or "congruence" imply, it strengthens vertical loop aspects as multi-layered. Life is real. Culture of evaluation)*; Kizuki:* constructing a new understanding of the targeted issue with*; Sasshi* as metaphor: the attentive meta-cognition of surroundings and feelings*; Mitate* as visual image: the image of some other object corresponding to the real one and so on. As well. The OECD (2012, p. 193) notes that Japan 'seeks to build its education system around [L2L], this is the heart of the Japanese education system' This is what double-loop learning is all about. The ringi serves the dual functions of allowing people to challenge core operating principles and, in both the process and the outcome, affirm and reaffirm the values that are to guide actions. Paradoxically, it is a process that mobilizes disagreement to create consensus. It is also a process that allows innovation to be driven from all directions and for "intelligence" to evolve to increasingly higher levels. … 'Learning to learn' is the final principle of holographic design brings us back to our earlier discussion of organizational learning (Arimoto et al 2016, Morgan 1986).

- *kyodo tsunagari* (Under the prerequisite that native place, birth-place, one's old home is an epitome of the present-day world, a kind of metaphors such as indra-net of "each gem is dispensable for reflecting each other" as a kind of worldviews. The homeland rich with mountains and rivers, adjacent to the sea, and blessed with abundant blossoms comprised of local food from the ocean or the mountains; homeland in tohoku, including a cuisine rich in regional flavour and geographic region for breadbasket for Tokyo, therefor rich-biodiversity and disaster-prone region. It related to tangible cultural heriage e.g. festival, food, events etc.) .

4. Discussion

Figure 1 is the hypothetical sketch of cultural constructivism to explain quiet dignity. Despite the (European) Enlightenment's legacy of pervasive rationalism, we encounter specific fragments of Buddhist tract as Europe's political institutions, such as UNESCO's International Commission ("Delors Report", 1996) prepared for the 21st-century. The official language of the Delors Report urged schools to lift the "minds and spirits" of their children to the "plane of the universal and in some measure to transcend themselves (1996, p. 18).

This culture has brought certain things to the level of collective consciousness, and systematic use, which cannot be grasped by an individual subject's consciousness. These are tacit understandings that individualistic cultures have identified in European and North American nations, leaving them in the realm of unconsciousness (and which are therefore unmanageable).

Figure 1. hypothetical sketch of cultural constructivism to explain quiet dignity
"Three steps forwards two steps back" see Shimojima & Arimoto(2017).
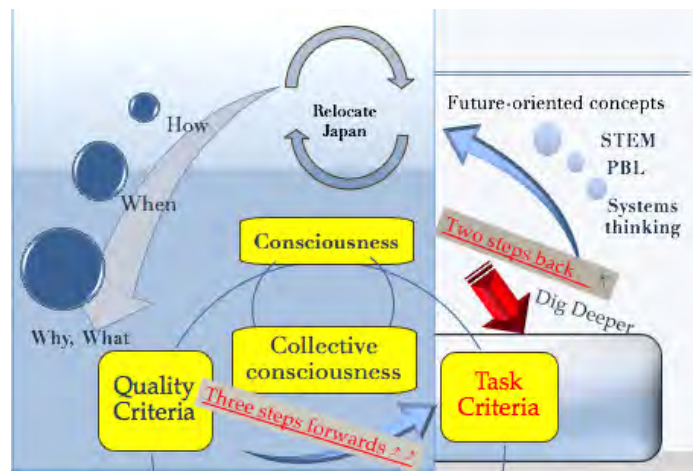
The amalgam six k's *(kankei, kata cultural script, kaizen, kizuna, kizuki, and kyodo tsunagari)* leads to quality criteria. *Omoiyari* exists underlying six k's *as* Japanese-style sympathy: Japan has traditionally been noted for the extraordinary exclusivity of its culture—a factor that is now recognized as one of the country's most serious handicaps in its dealings with the outside world. The exclusivity of the Japanese mindset goes beyond the intangible features of culture, such as philosophy, morals, ethics, values, and so on; it also includes race, food, and other aspects of life. The importance of human ties and interconnectedness often were specifically expressed in prosocial utterances stressing the need for others through elements of *amae and omoiyari* – values encouraged in *shudan seikatsu* as essential features of a "human-like" person.… Children also demonstrated their capacity for self-regulation in the context of cleanup behavior, in which they showed no reluctance to remind each other of mutual responsibilities (Arimoto et al 2013, Kelly 2001)

5. Conclusions

It is widely understood that Japanese cultural philosophy places high implicit value on the socio-emotional aspects of social life and learning. The 'mind-heart nexus' is, perhaps without their intent, implied in Black and Wiliam's (2009) reference to learners' "inner mental life". As a single concept, "inner mental life" suggests the interior complexity of the 'heart or mind nexus'. It would seem safe to presume that Buddhist canon was not in Wiliam's deliberations in that paper of 2009, entitled 'Developing the Theory of Formative Assessment'.. Coincidentally then, these differing theoretical constructs, one from 20th-century social cognition, the other from traditions 1000s of years old, underpin similarities in interactive learning environments of the 21st-century (Arimoto & Clark 2019).

Japanese teachers maintain a social bond with their students, based on the (Buddhist) theory that the stronger the bond, the more successfully young learners will become zenjinteki (well-rounded) in character and reproduce similar communities around them. (Arimoto & Clark 2018).

Further, calls for a focus on "self-improvement" (Voss, 2009) suggest opportunities for an integrated approach (Mikulas, 2007) to learning-theory, and the creative-integration of lesson-study cultures into European school level systems.

Buddhist principles stress the importance of evaluation, since they refer to the possibilities and choices which guide actions. Recognizing arrangement of possbilities and choices to improve the psycho-bio-socio-cultural condition means to realize the importance for man in forwarding to more complex levels of understanding and evaluating life's experiences (Voss, 2009, p.18)

We in Tohoku are living in the Eastern edge of Silk Road and has kept traditional Golden Hall of *Chuson-ji* Temple (850, 1224-) *Shumidan* (Buddhist alters). There we can notice traditional Gorgeous decorations of gold, silver and *raden* (mother-of- pearl inlay work), *shitan* (rosewood or red sandal wood) from South-East Asia, Ivory from Africa. Behind the scene, Four heavenly kings (guardian kings) are believed to guard the four directions. In modern, dynamic Buddha is located in central position as human potentials, which shows a kind of world views. Robert Thurman in Inner revolution, powerfully outlines the process required to attain understanding of inner world of cultural traditions and how it relates to social and educational change. We need to explore the dreams of a better world our cultural ancestors had and the strategies they devised for fulfilling their dreams. James Shields call this "sacred architecture".

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PORTO PLANETARIUM – CIÊNCIA VIVA CENTER: FROM A DISSEMINATION PROGRAM TO AN EDUCATIONAL PROGRAM

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Abstract

The Porto Planetarium - Ciência Viva Center (PP-CCV) is owned by the University of Porto, but is under the scientific and operational management of the Center for Astronomy / Astrophysics Research of the University of Porto (CIAAUP), which fosters the Institute of Astrophysics and Space Sciences (IA), the largest astronomy research unit in Portugal.

Given the mission enshrined in its bylaws CIAAUP, and therefore PP-CCV, promotes science dissemination, science communication and astronomy teaching. As such, since its creation the PP-CCV has promoted astronomy and science outreach, through a diverse program that has evolved significantly over the years. Dissemination has been a common practice in the form of specific activities for children in school ages, and with distinct activities for non-specialized public.

However, in 2016, an analysis revealed that, even though the science dissemination component was well developed, the educational one, even from a non-formal point of view, was lacking.

The main goal of this contribution is to present the undergoing research which conceived, developed, implemented and evaluated an educational program for the PP-CCV between 2016 and 2018, and continues as an educational program, available in the current school year.

The educational program was conceived based on problem solving through interdisciplinarity, involving the curriculum from Earth and Life Sciences, Physics, Chemistry and Mathematics. It was created to fit the essential learnings, goals / programmatic / curricular guidelines of the subjects in the Portuguese mandatory schooling. At the same time, a new process of direct and continuous interaction with the visitors was added, since the moment they choose a didactic sequence, until it is implemented in their formal education contexts. From start to finish, the whole process is subject of evaluation by the teacher(s) which accompany the school group.

Preliminary research data shows that this strategy, of creating and implementing a dedicated educational program, has prompted the PP-CCV as a mean of formal education. The first year of implementation of this new educational strategy saw an increase of over 3000 visitors from the previous year. After the evaluation of the visit, the results show that 98.57% consider that it was useful for their students and 98.59% that it was pedagogically relevant.

This first data analysis already seems to indicate that non-formal interdisciplinary learning strategies are not only feasible, but also facilitate the processes of formal education in "real schools" with "real actors".

Keywords: Non-formal education, astronomy, planetarium, educational program.

1. Porto Planetarium – Ciência Viva Center (PP-CCV)

In the network of Ciência Viva Centers (CV, 2018), a close collaboration with research units is fairly common. However, the PP-CCV is the only center of this network integrated into a research unit of its the scientific area of intervention - the Institute of Astrophysics and Space Sciences (IA).

The IA (2019): is the largest research unit in the field of Astrophysics in Portugal, encompassing more than two thirds of all active researchers in Space Sciences in the country. It is also responsible for most of the national productivity in international ISI journals in the area of Space Sciences. This is the

scientific area with the highest relative impact factor and the field with the highest average number of citations per article in Portugal.

The IA is a research unit which resulted from the merger, in 2015, of the Center of Astronomy and Astrophysics of the University of Lisbon (CAAUL) and the Center for Astronomy / Astrophysics Research of the University of Porto (CIAAUP). The latter was a Foundation for Science and Technology - public agency (FCT) research unit hosted by the Center for Astronomy / Astrophysics Research of the University of Porto (CIAAUP): a private, non-profit association, recognized as of public utility. Thus, in 2015 this association started hosting IAas a research unit. The PP-CCV is owned by the University of Porto and CIAAUP is responsible for its scientific and operational management. Given its statutory mission of scientific dissemination, communication and teaching of astronomy, the CIAAUP, and inherently the PP-CCV, have an annual average turnout about 30,000 visitors.

In addition to 62 researchers and an Administration and Services Unit (shared with IA), the PP-CCV currently has: an Executive Director; a Coordinator (who also works as an explainer); two designer / editors; an element responsible for the digital technologies of information and communication (who also works as an explainer); one responsible for social networks / press release (who also works as an explainer); an activities facilitator (in exclusivity) and a highschool teacher.

2. Science communication, science dissemination and science education

As already mentioned, the CIAAUP, and by inherence, the PP-CCV has, among other things, statutory missions to promote science communication, astronomy dissemination and support for astronomy teaching in elementary and secondary schools. Thus, as this article intends to address only the educational component of the work carried out in the PP-CCV, it is necessary to clearly define the concepts of science communication, dissemination and teaching support used, in order to better understand the educational program that will be presented.

Quite often, in many academic circles and even institutions that promote scientific communication, the concept of scientific dissemination is intentionally used in a way that distances the latter practice from the work of scientific communication. In this sense, authors such as Kunth (1992), Bueno (2010) and Crato (2016) reserve for scientific dissemination the whole exercise of dialogue between experts (or their mediators) and lay public, which has assumed a mission of social education from its inception. Thus, dissemination plays a central role in captivating the public for science and hence for the promotion of scientific literacy. It informs the public about important topics of present-day science, reveals sources and entices the pursuit of knowledge - it shows science as "another" human creation which is a part of life, of our daily routine and our culture (Crato, 2016). For these authors, the concept of scientific communication emerges as a component of dissemination or diffusion of "content" between expert peers (disciplinary or interdisciplinary).

Yet, for some authors, this apparently clear distinction between the concepts of scientific communication and dissemination is artificial. For example, Lewenstein (2003), Burns, O'Connor, and Stocklmayer (2003) consider that scientific dissemination is included in the generic concept of science communication.

However, the distinction between the concepts of dissemination and teaching of science is less arguable. Nevertheless, the use of the concept of education in different contexts, to the detriment of the concept of teaching, is due to the assumption that one of the missions of the school, besides teaching, is to educate: rather than outline didactic sequences for the understanding of knowledge, the school dwells on the mobilization of knowledge and skills developed by students, and on the reflection of the value system.

Crato (2016) states that, even if they are different concepts, formal education and teaching are organized processes, with programs (and / or curricular goals) with mandatory evaluation moments which contribute decisively to obtain certification.

If dissemination can choose which subjects to use, in order to spark the public interest, even if they are one-off and dispersed, this is not an option with teaching. For dissemination, sparking a taste for science around a specific theme is enough, but for teaching, the goal is the positive assessment of a whole program (with the diversity of themes included), and, more importantly, the mobilization of these skills and knowledge (Costa, Monteiro, & Costa, 2010). Summing-up: scientific dissemination tends to be fortuitous, while teaching tends to be systematic.

3. The design, development, implementation and assessment of the educational program of the PP-CCV

As seen given the mission enshrined in its bylaws, CIAAUP, and therefore PP-CCV, promote science dissemination, science communication and astronomy teaching. Since its creation, the PP-CCV, has been promoting astronomy and science outreach, through a diverse program that evolved significantly over the years. Dissemination has been a common practice in the form of specific activities for children in school ages, and with distinct activities for non-specialized public. In 2016, an analysis revealed that, although the science dissemination component was well developed, the educational one, even from a non-formal point of view, was lacking.

To solve this problem, CIAAUP asked the Ministry of Education to assign one of its teachers, from primary and secondary education, to the planetarium. The intended profile had the underlying objective to find someone with an interdisciplinary professional training: someone with a degree in Biology-Geology teaching, but with a Master's Degree in Astronomy Teaching.

Thus, one of the components that resulted from the work of this teacher was the design, development, implementation and evaluation of a real educational program for PP-CCV.

3.1. The educational program of PP-CCV

The process to outline an educational program, which would make non-formal education in Astronomy at the PP-CCV more efficient, began by analyzing all the existing resources in the PP-CCV itself. In 2016, these resources were crossed-checked with the curricular programs, guidelines and targets of compulsory schooling (from pre-school to secondary school). In 2017, this work was extended to the new framework implemented by the ME: the Profile of Students at the end of mandatory schooling and the Essential Learning, within a framework of Autonomy and Curricular Flexibility. Based on this work, didactic sequences were outlined; for the hands-on labs we produced and/or revised guides for the visitors and of visitation itineraries for the facilitators (in order to standardize the didactic sequences). This was structural work, which could only be carried out with the involvement and in a spirit of effective collaborative work among all the elements of the outreach unit of the PP-CCV.

The result, in 2018, was the layout of an educational program, with twenty-one different didactic sequences, covering all years of mandatory schooling; ten different disciplinary curricular areas and a logic that can, at the option of the teacher, be disciplinary, multidisciplinary or interdisciplinary, according to Pombo (2005) and Levy, Guimarães, and Pombo (1994). In the short term, we intend to deepen this visitation model by providing pre- and post-trip resources, in a rational way as proposed by Orion (1993) and that enhances the work to be developed in the formal contexts of teaching.

This educational program is currently fully implemented. In order to make this possible, it became necessary to introduce a new template for booking visits in the PP-CCV. Thus, all booking requests are analyzed before the visit takes place, in order to verify their adequacy to the students grade and the teachers goals for the visit. To fulfil this goal it became necessary to analyze hundreds of requests and to establish a similar number of direct contacts (telephone, e-mail or face-to-face) with teachers. This work produces detailed weekly work schedule maps for the science communicators, featuring planetarium shows, hands-on labs and other one-off activities, like lectures or telescope observation. In order to avoid large waiting groups of students in the PP-CCV, a new space to develop laboratories was created, thus extending the PP-CCV maximum capacity to 120 visitors per hour, an almost 30% increase from the previous capacity of 95 visitors.

To have some follow-up from the visiting teachers, a system which produces an attendance certificate from a database was created from scratch and implemented, which also allows teachers to evaluate of the work of the PP-CCV. At the same time, training meetings for teachers were also organized.

For the dissemination of this new educational program, the site of the PP-CCV (http://www.planetario.up.pt/) was restructured and a partnership with Porto Editora SA was established. Thus, this company forwards, to all teachers in their databases and by recruitment group, emails with specific content about the PP-CCV offer for their specific recruitment group.

3.2. The assessment of the educational program of the PP-CCV

In the period between September and December (which corresponds to the first academic period), the number of visitors of the PP-CCV, from 2016 to 2017, decreased (minus 450 visitors). However, taking into account only the first three months of implementation of the new educational program (September to December 2017):

- the number of students who attended laboratory activities increased (over 360 students). Thus, 61% of students performed laboratories in 2017 (against 46.94% in 2016). The number of students who did the most adapted didactic sequence to the 7th grade increased (over 1475 students). Thus, 50.59% of students completed this sequence in 2017 (against 12.87% in 2016);
- the number of students who completed the didactic sequence more suited to Natural Sciences, Biology and Geology increased (202 more students). Thus, 26.50% of students completed this sequence in 2017 (against 19.38% in 2016).

This data set could be a direct consequence of the booking analysis subsequent direct contact with the teachers, but we cannot exclude other factors.

On the other hand, in the first three months:

- Some teachers attending our accredited continued training brought their students to the PP-CCV;
- the PP-CCV began to be recognized, in training meetings, by the teachers;
- some teachers present in training meetings brought their students to the PP-CCV.

The above data demonstrates a counter-cyclic flow of visitors. In fact, in absolute numbers, there was a decrease in visitors, in line with what happened in previous years. However, the number of visitors in didactic sequences towards the contents of formal education increased significantly.

This trend intensified in the following year with a new tendency - a significant increase in the number of visitors of the PP-CCV. Comparing the 2016/2017 school year, with the 2017/2018, there was an increase of more than 3000 visitors. On the other hand, the monthly average number of visitors who attended a show and a laboratory (a didactic sequence that corresponds to a greater deepening of the contents of formal education), has more than doubled. In the specific case of the laboratories, in 2017/2018 an additional 800 were performed, compared to 2016/2017.

However, the point of the evaluation to the work done is much deeper than a simple numerical analysis of the number of visitors. From our point of view, what would be most helpful for this discussion is how the intervention affected students science knowledge. This was another aspect requested from the work developed by the teacher assigned by the ME.

With this in mind, in 2017, the teacher started the doctoral program in Teaching and Dissemination of Sciences, at the Faculty of Sciences of the University of Porto. Given the small time elapsed, it is understandable that this is a work still in its early stages.

Even so, as early as 2017, a small evaluation questionnaire was drawn up, which is filled, voluntarily, by the teachers, after the visit to the PP-CCV.

The preliminary analyses of 71 questionnaires revealed that:

- 98.57% considered that the didactic sequence associated to the immersive film was useful for their students;
- 98.59% considered that the didactic sequence associated to the immersive session was pedagogically relevant;
- 94.37% directly related the didactic sequence to the formal education curriculum;
- 90.14% considered that the live part of the session, inside the planetarium, was useful for their students;
- 92,96% directly related the live part of the session, inside the planetarium, to the formal education curriculum.

Regarding the didactic sequence carried out in a laboratory context, the analysis of the 33 validated questionnaires revealed that:

- 90.91% considered that the didactic sequence, was useful for their students
- 84,85% considered that it was an increment to what could be done in their school laboratory;
- 93.93% directly related the didactic to the formal education curriculum.

The educational program was evaluated as Good by 39.44% of respondents, and Very good by 57.75%. Furthermore, 100% considered it very likely that they will return to visit the PP-CCV with their students and 95,65% would return for a personal visit.

4. Conclusions

As we tried to clarify the long road already traveled is actually just beginning. There is a whole range of pre- and post-visit resources to be built, which will enhance non-formal teaching of the PP-CCV in the formal teaching contexts of visitors. On the other hand, the model of non-formal education itself can also be enhanced. Such work will begin after the evaluation of the model which, as it was made clear, is still in a very preliminary stage.

However, the first data analyses already seems to indicate that non-formal interdisciplinary learning strategies are not only feasible, but also facilitate the processes of formal education in "real schools" with "real actors".

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INVOLVEMENT IN HOMEWORK THROUGHOUT THE GRADE LEVELS IN SECONDARY EDUCATION

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Abstract

Homework is one of those topics that have been constantly updated within the educational field. Not only is it an issue that has been debated permanently in different educational sectors, but opinions and attitudes were always very changing and polarized. It is somewhat paradoxical that while the relevance of homework increases as students' progress through the educational system, their involvement in homework tends to decrease. Thus, the present investigation tries to provide reliable information about changes in students' involvement in homework, as throughout the grades of Secondary Education. In addition, it is intended to know to what extent such changes relate to motivational and affective variables related to homework (intrinsic motivation, interest, perceived usefulness and anxiety) of the students themselves. A total of 899 students from 14 schools from three provinces in northern Spain participated in the study, whose ages range from 12 to 16. The data were analysed in two stages. The first stage was a multivariate analysis (MANCOVA) examining the relationship between the grade level (independent variable) and the three variables associated with involvement in homework (dependent variables). Prior performance and gender were introduced as covariables (for the purposes of statistical control). In the second stage, new covariables were added to the previous design, namely intrinsic motivation, interest, perceived usefulness and anxiety regarding homework. The results of this research indicate that, as the grade progresses, the involvement of students in homework gets worse: they do less homework, dedicate less time and use worse this time spent on homework because they do not understand what their purpose is. In addition, the girls spend more time doing homework despite the fact that, according to the results obtained in the present study, homework time management in girls is worse than boys.

Keywords: Homework, involvement, motivation, secondary education.

1. Introduction

Homework is one of the most controversial issues in education for many years. The issue is really important, but its high degree of complexity does not allow us a clear answer about its prescription.

Trautwein, Lüdtke, Schnyder and Niggli (2006) have proposed a theoretical model of homework in which elements of the expectancy-value theory (Eccles & Wigfield, 2002), the self-determination theory (Deci & Ryan, 2002), and research on learning and instruction (Brophy & Good, 1986) are combined (Valle et al., 2015).

In this way, the variables directly related to the involvement of students in homework are determined by other variables of different nature like the motivational variables. The type of reasons or reasons that students have to do their homework, along with the degree of interest and the perceived usefulness they have of them, affect their degree of involvement (amount of homework done, time dedicated to them and use of that time) and, consequently, in their academic performance (Pan et. al., 2013). If the more students are involved, the better grades they obtain, then doing homework is better than not doing homework, and assigning homework in class will therefore contribute to improving students' academic performance (Suárez et al., 2019). But, how is this involvement throughout the grades? Thus, the present investigation tries to provide reliable information about changes in students' involvement in homework, as throughout the grades of Secondary Education. In addition, it is intended to know to what extent such changes relate to motivational and affective variables related to homework (intrinsic motivation, interest, perceived usefulness and anxiety) of the students themselves.

2. Method

2.1. Participants

899 students from 14 schools from three provinces in northern Spain participated in the study, whose ages range from 12 to 16. Of them, 24.1% were in their first year of compulsory secondary school (n = 217), 22.6% were in their second year (n = 203), 22.5% were in their third year (n = 202) and 30.8% were in their fourth year (n = 277).

2.2. Measures

The data in this study were recognized by EDE (Homework Survey) and the following variables were evaluated: a) *amount of homework done*, b) *time spent on homework*, and c) *homework time management*. Each of these dimensions is composed of several items with a Likert scale with five alternatives (ranging from 1 = none to 5 = all).

In order to have information about motivational and affective variables linked to homework, information was collected on the following variables: a) *intrinsic motivation towards homework*; b) *interest in homework*; c) *perception of usefulness of homework* and d*) anxiety.* Each of these dimensions is composed of several items with a Likert scale with five alternatives (ranging from 1 = none to 5 = all).

Prior academic performance was obtained by the final qualifications obtained in Language, Foreign Language, and Mathematics.

2.3. Procedure

The data on the students' survey were collected in one class period during regular school hours by external staff, after obtaining the consent of the school directors and the students' teachers.

2.4. Data analysis

For the data analysis, MANCOVAs were first carried out, taking as an independent variable the grade and as dependent variables the three variables linked to the involvement in homework. Previous academic performance was introduced as a covariate. In the second stage, the motivational variables were incorporated as covariables, in addition to the previous performance. As an effect size measure, we used the partial eta-squared coefficient (η_p^2). To interpret the effect sizes, we used the criterion established in the classic study by Cohen (1988), based on which the effect is small when $\eta_p^2 = .01$ ($d = .20$), the effect is medium when $\eta_p^2 = .059$ ($d = .50$) and the effect is large if $\eta_p^2 = .138$ ($d = .80$).

3. Results

− Differences in involvement in homework by grade level

At a multivariate level, controlling for the effect of academic performance, the results show statistically significant differences in the variables associated with involvement in homework by grade level ($\lambda_{Wilks} = .895$, $F (9,2161) = 11.19$; $p < .001$, $\eta_p^2 = .036$) as well as by gender ($\lambda_{Wilks} = .958$, $F (3,888) = 12.83$; $p < .001$, $\eta_p^2 = .042$). The gender and grade level interaction is not statistically significant. The effect sizes are small. As expected, prior academic performance is significantly related to the set of variables associated with involvement in homework ($\lambda_{Wilks} = .813$, $F (3,888) = 68.14$; $p < .001$, $\eta_p^2 = .187$), with a large effect size, which explains much of the variance in the dependent variables: *amount of homework donde* ($F (1,890) = 193.57$, $p < .001$, $\eta_p^2 = .179$), *time spent* ($F (1,890) = 18.60$, $p < .001$, $\eta_p^2 = .020$) and *homework time management* ($F (1,890) = 41.83$, $p < .001$, $\eta_p^2 = .045$).

Statistically controlling for the effect of prior academic performance, the results of the analysis indicated that there is still a significant amount of variance associated with grade level. Specifically, we observed the existence of statistically significant differences by grade level with regard to *amount of homework done* ($F (3,890) = 31.60$, $p < .001$, $\eta_p^2 = .096$), *homework time management* ($F (3,890) = 6.07$, $p < .001$, $\eta_p^2 = .020$) and *time spent on homework* ($F (3,890) = 3.43$, $p < .05$, $\eta_p^2 = .011$). The effect size is medium in the amount of homework completed and small in the other two variables. Likewise, we could also see statistically significant differences by gender with regard to *homework time management* ($F (1,890) = 3.87$, $p < .05$, $\eta_p^2 = .004$) and *time spent on homework* ($F (1,890) = 30.54$, $p < .001$, $\eta_p^2 = .033$), but not in *amount of homework done*. In this sense, despite the less amount of time spent on homework, boys make a better use of this time. The effect size is small.

− Relationship between involvement in homework, motivation and anxiety

Controlling for the effect of academic performance and the motivational and affective variables included in the model, the results of the MANCOVA showed statistically significant differences by grade level in the three variables associated with involvement in homework taken as a whole (λ_{Wilks} = .924, F (9,2151) = 7.92, p < .001, η_p^2 = .026) and by gender with regard to the three variables associated with involvement in homework taken as a whole (λ_{Wilks} = .965, F (3,884) = 10.74, p < .001, η_p^2 = .026).

However, the effect size is small in both cases.

Just as in the previous model, prior academic performance is significantly related to all three variables associated with involvement in homework (λ_{Wilks} = .846, F (3,884) = 53.78, p < .001, η_p^2 = .154), with a large effect size. Likewise, this relationship is also significant with each of the three variables taken individually: *time spent on homework* (F(1,886) = 15.26, p < .001, η_p^2 = .017), *homework time management* (F(1,886) = 20.80, p < .001, η_p^2 = .023) and *amount of homework done* (F(1,886) = 155.00, p < .001, η_p^2 = .149).

With regard to the motivational and affective variables, the results indicate that they all predict a statistically significant amount of variance in the students' involvement in homework: *intrinsic motivation* (λ_{Wilks} = .967, F(3,884) = 9.93, p < .001, η_p^2 = .033), *interest* (λ_{Wilks} = .982, F(3,884) = 5.35, p < .001, η_p^2 = .018), *perceived usefulness* (λ_{Wilks} = .988, F(3,884) = 3.48, p < .05, η_p^2 = .012) and *anxiety regarding homework* (λWilks = .984, F(3,884) = 4.88, p < .05, ηp2 = .016). In all cases, the effect size is small.

From a univariate standpoint, the four motivational and affective variables explain a statistically significant amount of variance in at least two of the three dependent variables related to the students' involvement in homework. Thus, we found that *intrinsic motivation towards homework* significantly explains the variability in the amount of homework completed (F(1,886) = 17.04, p < .001, η_p^2 = .019) and in homework time management (F(1,886) = 17.71, p < .001, η_p^2 = .020); *interest in homework* is associated with all three dependent variables*: amount of homework done* (F(1,886) = 3.98, p < .05, η_p^2 = .004), *time spent on homework* (F(1,886) = 7.83, p < .01, η_p^2 = .009) and *use of the time spent on homework* (F(1,886) = 8.76, p < .01, η_p^2 = .010); the *perceived usefulness of homework* significantly explains the *amount of homework done* (F(1,886) = 7.40, p < .01, η_p^2 = .008) and the *time spent on homework* (F(1,886) = 6.66, p < .01, η_p^2 = .007); and *anxiety towards homework* significantly explains both the *time spent on homework* (F(1,886) = 5.76, p < .05, η_p^2 = .006) and the *homework time management* (F(1,886) = 6.37, p < .05, η_p^2 = .007).

After having statistically controlled for the effect of prior performance and the motivational and affective variables, we must still explain a significant amount of variance associated with the grade level with regard to the *amount of homework done* (F(3,886) = 22.02, p <.001, η_p^2 = .069), as well as the variance associated with gender in terms of *time spent on homework* (F(1,886) = 26.19, p <.001, η_p^2 = .069) and of the *use of this time* (F(1,886) = 3.95, p <.05, η_p^2 = .004), all of which have a medium effect size except the last one, which is small.

4. Discussion

The results of this research indicate that, as the grade progresses, the involvement of students in homework gets worse: they do less homework, dedicate less time and use worse this time spent on homework because they do not understand what their purpose is. In addition, the girls spend more time doing homework despite the fact that, according to the results obtained in the present study, homework time management in girls is worse than boys.

In line with other studies (e.g., Núñez et al., 2015), the data indicates that there is a downward tendency in the amount of homework completed, the use of the time and the amount of time spent on homework, even though this tendency is the clearest in terms of the amount of homework done (of the amount assigned by the teacher).

As expected based on previous research, girls seem to spend more time doing homework (Trautwein, 2007) even though, according to the results of this study, homework time management in girls is worse than boys.

About educational implications, in view of the results obtained in this study, it is necessary that students understand why it is necessary to do homework. Teachers must prescribe homework by clearly explaining the usefulness of homework. This way we will avoid that as the grade progresses, the motivational variables decrease and, therefore, so do the implication variables.

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ENHANCING MICRO TEACHING TECHNIQUE THROUGH THE INCORPORATION OF LESSON STUDY: PERCEPTIONS OF INITIAL TEACHER EDUCATION MATHEMATICS STUDENTS AT CENTRAL UNIVERSITY OF TECHNOLOGY

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Abstract

Microteaching is a compulsory course in the initial teacher education programme at Central University of Technology. It is aimed at preparing students for teaching practice. Its key strength is to provide a supportive environment in which student teachers could practice their teaching skills in manageable portions, receive feedback on their performance, reflect on the feedback received and subsequently use the information received to improve on their teaching. Using lesson study, teachers have a means for planning, observing, and conferring with others. Lesson study is an initiative that aims to enhance teaching and learning through the methodology of professional sharing of practice. This study explored the perceptions of Initial Teacher Education (ITE) students on the effectiveness of Lesson study in improving micro teaching at the Central University of Technology. A total of 80 initial teacher education mathematics students in their third year of study participated in this study. A five-point Likert scale questionnaire with variables ranging from strongly disagree to strongly agree was used to explore the perceptions of ITE students on the effectiveness of lesson study in enhancing the acquisition of teaching skills. Results indicate that the lesson study approach is a viable ingredient in the process of micro teaching in that collaboration in lesson study reduced feelings of professional isolation; student teachers further reported a sharper focus on pupil learning and enhanced confidence in dealing with questions from pupils.

Keywords: Micro-teaching, lesson study, collaboration, observation of learning.

1. Introduction

Microteaching has been defined differently by different educationists. For example, D.W. Allen (1966) defined microteaching as a scaled down teaching encounter in class size and class time whereas R.N. Buch (1968) defined it as a teacher-education technique which allows teachers to apply clearly defined teaching skills to carefully prepared lessons in a planned series of five to ten minutes encounters with a small group of real students, often with an opportunity to observe the results on video tape. From these definitions microteaching is regarded as a skill-based analytical technique that is used in teacher education to bridge the gap between theory and practice in teaching (Taole, 2015). Microteaching is an organised, concentrated and scaled-down simulated teaching practice where a student teacher teaches a small portion of a lesson to a small group of his or her classmates (Taole, 2015). The usual complexities of the normal teaching encounter such as time, number of learners, content coverage and teaching skills are reduced, which makes it possible to concentrate on specific teaching behaviour and to practice teaching under controlled conditions. Microteaching is applicable for use by both pre-service and in-service teachers. Figure 1 below outlines the micro-teaching cycle.

Figure 1. The Micro-teaching Cycle.

Lesson study on the other hand is defined by Lewis (2002) as a teacher-led instructional improvement cycle in which teachers work collaboratively to: formulate goals for student learning, plan a lesson, teach and/or observe the lesson, reflect on the gathered evidence, revise the lesson for improvement, and reteach the revised lesson.

According to Hart, Alston and Murata (2011) Lesson study has the following key characteristics:

1. Lesson study is centered around teachers' interests: Teachers' interests are central to their professional development. Lesson study goals should be something teachers feel is important to investigate and relevant to their own classroom practice.

2. Lesson study is student focused: Lesson study is about student learning. At any part of the lesson study cycle (Figure 2), the activities should focus teachers' attention to student learning and its connections to lessons/teaching.

3. Lesson study has a research lesson: Teachers have shared physical observation experiences (in some special cases, video may be used in place of the live lessons, but this is not recommended), that provide opportunities for teachers to be researchers.

4. Lesson study is a reflective process: Lesson study provides plenty of time and opportunities for teachers to reflect on their teaching practice and student learning, and the knowledge gained from and for the reflective practice should be shared in some format with the larger teaching and educational communities.

5. Lesson study is collaborative: Teachers work interdependently and collaboratively in lesson study.

Lesson study incorporates many characteristics of effective professional development programs identified in prior research: it is site-based, practice-oriented, focused on student learning, collaboration-based, and research-oriented (Hart, Alston & Murata, 2011). It places teachers at the centre of the professional activity with their interests and a desire to better understand student learning based on their own teaching experiences. Hart, Alston and Murata (2011) further corroborate the structure and sequence of events outlined by Lewis (2002) by arguing that in lesson study: teachers organically come together with a shared question regarding their students' learning, plan a lesson to make student learning visible, and examine and discuss what they observe. Lesson study typically follows the steps outlined in Figure 2 below, with a research lesson (live lesson observation) as the centrepiece of the study process.

Mathematics student teachers were introduced to the lesson study approach. Small teams of student teachers worked together to design, teach, study, and refine a single class lesson. This work was expected to result in at least two tangible products: (a) a detailed, usable lesson plan, and (b) an in-depth study of the lesson that investigates teaching and learning interactions, explaining how students responded to instruction, and how instruction might be further modified based on the evidence collected. Cerbin and Koop (2006) adapted the original Japanese model and came up with a model of lesson study for the college classroom with the following key steps in implementing a lesson study: Formulating learning goals; designing the research lesson; designing the study; teaching and observing the research Lesson; analysing the evidence; repeating the process; and documenting the lesson study. Matanluk, Johari and Matanluk (2013) corroborate Cerbin and Koop's idea of the steps by suggesting the following steps as highlighted in figure 2:

Step 1: Plan a collaborative lesson plan

Teachers together plan and discuss in detail the content. Teachers share their experiences, observations and ideas, create lesson plans that are appropriate to the level of students to be taught. Teachers use various sources to produce a quality lesson plan using textbook, reference books and teaching guide.

Step 2: Implement a lesson in class

A teacher involved in the construction of lesson plans to teach groups of students who have been determined based on lesson plans that have been built. These lessons involve teachers in the Lesson Study group, other teachers act as observers, and a resource. Lesson plan used as a reference in the teaching.

Step3: Engage in discussion and reflect on teaching.

The teacher groups jointly make a reflection of the lesson plan after seeing the reality of teaching in the classroom. Discussions and sharing of ideas and clarifying what has been observed while submitting comments take place and suggestions for improvements are made. Consultants also offer comments and brainstorming.

Step 4: Modify the plan to teach

Teachers to modify and teach the lesson plan in order to learn something from this process. Modification in this step will result in better teaching program and details regarding all the weaknesses noted in the previous lesson. All modifications made to a joint decision and shall be agreed upon by all teachers.

Step 5: Teach the lesson plan that has been modified

Decisions are taken with the consent of the Lesson Study group members. If it is implemented, some members of the group become instructors and other teachers become observers.

Step 6: Shared reflections on a modified lesson plan

The Lesson Study group will share suggestions, comments and ideas based on observations that were made a sin step three. The findings are then noted and recorded in order to make a resource that should guide teachers in the future.

Figure 2. The Lesson Study Cycle.
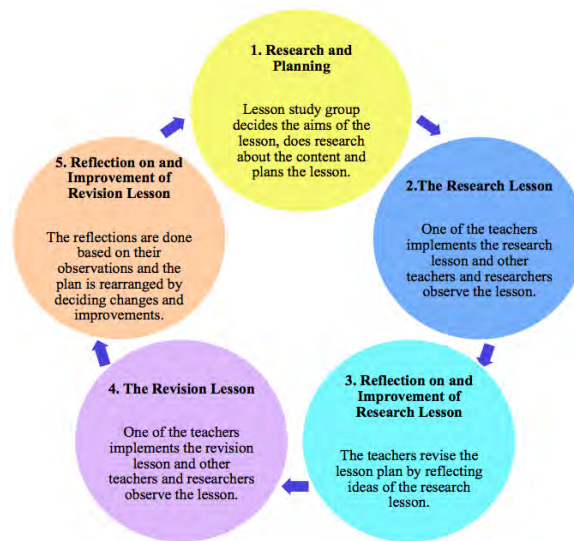
Lewis (2005) suggests that lesson study creates multiple "pathways for learning" that lead to instructional improvement. According to her model, teachers' thinking and practice may improve in multiple ways. This idea is corroborated by Lewis, Perry and Hurd (2009) who identify how the following aspects of the Lesson Study approach may produce instructional improvement: Investigation helps the team to consider students' current characteristics; consider long term goals for student learning and development; study the content area: key concepts, existing curricula, standards, learning trajectory, and research. Planning helps the team to select or develop research lesson; try task in order to anticipate student solutions; write up instructional plan, including goals for student learning and development, anticipated student thinking, data collection points, rationale for lesson design, connection to long-term goals. During the research stage, the team conducts the research lesson, and other members observe and collect data during live research lesson. Reflection helps the team to share and discuss data from research lesson in post- lesson colloquium; team members (and often other observers) draw out implications for lesson redesign, for teaching- learning more broadly, and for understanding of students and subject matter; summarize in writing what was learned from cycle, to consolidate the learning; and if need be revise and reteach the lesson.

According to Lewis (2004) teachers in Japan, where Lesson Study originated, identified seven pathways of improvement resulting from lesson study: knowledge of subject matter; knowledge of instruction; ability to observe students; collegial networks; connection of daily practice to long- term goals; motivation and sense of efficacy, and quality of teaching and learning. Lesson study in the view of Cerbin and Kopp (2006) encompasses the full complexity of teaching and learning in the context of a single class lesson. Essentially, teachers have opportunities to question, explore and reflect on every phase of the teaching and learning process.

2. Methodology

This study aims to examine perceptions of student teachers on the influence of the lesson study approach in the micro-teaching for mathematics student teachers at Central University of Technology, specifically on the influence that this approach has on student teachers' knowledge of subject matter, knowledge of instruction, ability to observe learners and their motivation and sense of efficacy as prospective teachers. Two micro-teaching groups consisting of 40 students each were selected for this study, but 76 students took part. The two groups were introduced to the Lesson Study approach and guided on how to implement it. These groups were further divided into teams of 6-8 students each. After their first presentation of their lessons in a micro-teaching session, qualitative methods were used to document student teachers' perceptions on the influence of the Lesson Study approach in micro-teaching.

To assess this influence participants were asked to each indicate the extent to which the incorporation of Lesson Study into micro-teaching has influenced the following aspects:

- knowledge of subject matter,
- knowledge of instruction,
- ability to observe students,
- motivation and sense of efficacy

A questionnaire consisting of a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) was used to report their responses

3. Findings

This study examines the perceptions of mathematics student teachers at Central University of Technology on the influence of the lesson study approach in the presentation of their micro-lessons. Seventy-six (76) questionnaires were received from the student teachers. The study findings are based on information from questionnaires distributed to third year mathematics student teachers. The researcher's priority was on the influence of the lesson study approach on the student teachers' knowledge of subject matter; knowledge of instruction; ability of student teachers to observe learners; and their motivation and sense of efficacy as prospective mathematics teachers.

Table 1. Knowledge of Content: a teacher's understanding and application of the current theories, principles, concepts and skills of a discipline.

Characteristics developed	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
Lesson Study has helped me to:					
(i) demonstrate an understanding and in-depth knowledge of content and maintains an ability to convey this content to students.	3	14	15	35	9
(ii) maintain on-going knowledge and awareness of current content developments.	6	12	13	39	6
(iii) design standards-based lessons/units	4	16	10	43	3
(iv) demonstrate high quality teaching and learning content through the use of ICT	7	11	8	45	5
(v) use and promote the understanding of appropriate content vocabulary.	3	10	13	41	9
(vi) access a rich repertoire of instructional practices/strategies and apply them appropriately	2	9	12	46	7

Table 1 shows that about 58% of the student teachers agreed that lesson study helped them to demonstrate an understanding and in-depth knowledge of content and maintains an ability to convey this content to students, and about 59% of them agree that it helped them to maintain on-going knowledge and awareness of current content developments. Lesson study also helped them to design standards-based lessons or units (about 61%); demonstrate high quality teaching and learning content through the use of ICT (66%); use and promote the understanding of appropriate content vocabulary (66%); and access a rich repertoire of instructional practices/strategies and apply them appropriately (70%).

Table 2. knowledge of instruction: a teacher supports and encourages a student's commitment to initiate and complete complex, inquiry-based learning requiring creative and critical thinking with attention to problem solving.

Characteristics developed	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
Lesson Study has helped me to:					
(i) instruct the complex processes, concepts and principles contained in state and national standards using differentiated strategies that make instruction accessible to all students.	5	6	8	45	12
(ii) scaffold instruction to help students to reason and develop problem-solving strategies.	8	7	7	44	10
(iii) orchestrate effective classroom discussions, questioning, and learning tasks that promote higher order thinking skills.	6	4	10	42	14
(iv) provide meaningful learning opportunities for students.	2	5	8	52	9
(v) provide meaningful learning opportunities for students	4	4	13	42	13
(vi) integrate a variety of learning resources with classroom instruction to increase learning options.	5	3	19	37	12
(vii) structure and facilitate ongoing formal and informal discussions based on a shared understanding of rules and discourse	3	4	7	43	19
(viii) integrate the application of inquiry skills into learning experiences.	2	5	18	40	11
(ix) clarify and share with students learning intentions/targets and criteria for success.	1	4	12	51	8

Table 2 shows that 75% of the student teachers believed that the lesson study approach helped them to instruct the complex processes, concepts and principles contained in state and national standards using differentiated strategies that make instruction accessible to all students. Seventy-one percent (71%) of them agreed that it helped them to scaffold instruction to help students to reason and develop problem-solving strategies. Sixty-five percent (65%) of the student teachers in this study believed that lesson-study approach helped them to orchestrate effective classroom discussions, questioning, and learning tasks that promote higher-order thinking skills. Student teachers also believed that lesson study approach helped them to provide meaningful learning opportunities for students (83%); provide meaningful learning opportunities for students (72%); integrate a variety of learning resources with classroom instruction to increase learning options (65%); structure and facilitate ongoing formal and

informal discussions based on a shared understanding of rules and discourse (82%); integrate the application of inquiry skills into learning experiences (67%); and clarify and share with students learning intentions/targets and criteria for success (78%).

Table 3. Ability to observe students.

Characteristics developed	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
Lesson Study has helped me to: (i) focus on how students respond to the lesson,	5	8	12	44	7
(ii) gather rich evidence related to the learning goal during the lesson	1	6	17	47	5
(iii) record detailed field notes, or use checklists or rubrics to categorize or monitor student engagement, performance, thinking, and/or behaviour	3	7	10	47	9
(iv) focus on specific types of student activity	6	9	13	36	12
(v) use checklists or rubrics to categorize or monitor student engagement, performance, thinking, and/or behaviour	3	10	9	42	12

Table 3 on the other hand shows that 67% of the student teachers agreed that lesson study approach helped them to focus on how students respond to the lesson. Student teachers further believed that lesson study approach helped them to gather rich evidence related to the learning goal during the lesson (68%); record detailed field notes, or use checklists or rubrics to categorize or monitor student engagement, performance, thinking, and/or behaviour (74%); record detailed field notes, or use checklists or rubrics to categorize or monitor student engagement, performance, thinking, and/or behaviour (73%); focus on specific types of student activity (63%); and use checklists or rubrics to categorize or monitor student engagement, performance, thinking, and/or behaviour (74).

Table 4. Motivation and sense of efficacy.

Characteristics developed	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
Lesson Study has helped me to: (i) Believe in my ability to teach effectively	3	8	11	36	18
(ii) believe in the ability of my students to learn	5	6	9	41	15
(iii) create environments conducive to learning	2	4	7	47	16

Table 4 shows that 71% of the student teachers agreed that lesson study approach helped them to believe in their ability to teach effectively. They also agreed that lesson study approach helped them to believe in the ability of my students to learn (74%); and create environments conducive to learning (83%).

3.1. Conclusion

The findings of this study indicate that the perceptions of student teachers on the influence of lesson study on micro-teaching are positive. Through the incorporation of lesson study aspects in micro-teaching enhance the student teachers' understanding and application of the current theories, principles, concepts and skills of a discipline; their ability to support and encourage their learners' commitment to initiate and complete complex, inquiry-based learning requiring creative and critical thinking with attention to problem solving. It further enhances their ability to observe learners and their motivation and sense of efficacy as prospective teachers.

The findings further suggest that lesson study has a place in the repertoire of teacher learning approaches and that there is evidence that its use can improve teaching, learning and pupil learning outcomes in a range of school contexts.

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'WE LOVE READING, BUT…': NIGERIAN CHILDREN ON FACTORS THAT AFFECT THEIR READING HABITS

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Abstract

In recent decades, Nigeria has repeatedly had low pass rates in examinations taken at the end of secondary school. There are claims that the low student achievements are largely because Nigerian children do not read for pleasure, even though these claims lack the backing of empirical research. This qualitative study therefore explores reading for pleasure done by a group of 9–12 year olds in a book club in Nigeria. It aims to shed light on the extent to which the children read, how, what, when and why they read, and the factors that affect their engagement with reading for pleasure. A study of children's reading habits is important as some research suggests that reading for pleasure may offer many benefits including reading proficiency, increased general knowledge, and improved vocabulary. Through an interpretivist theoretical perspective, the study gathered data using the methods of collage making, observation, questionnaire, and interviews. Findings indicate that the participants read for pleasure, though their level of engagement with reading for pleasure differs. All the participants read printed books, and a few participants also read digitally. Popular reading materials include fiction, comics, factual books, crime and detective books, and adventure books. The children have different motivations for reading, but many state that reading is fun and interesting. Some research done in the United States and the United Kingdom indicates that factors such as availability of books, choice of texts, pedagogies of reading and an enabling adult affect children's engagement with reading for pleasure. This study examined the relevance of these factors to the participants' reading habits and found that the reading engagement of all the participants may have been, in varying degrees, influenced by them. Other factors that possibly affected the participants' reading habits were the reading environment, reading aloud, and the availability of social networks and affordances that support leisure reading. The findings could provide guidance on practices that strengthen children's engagement in reading for pleasure and thereby help in the improvement of student achievement in Nigeria.

Keywords: Reading for pleasure, children readers, factors affecting reading habits, reading engagement, Sub-Saharan Africa.

1. Introduction and objectives

Although Nigeria is Africa's most populous country, its student achievement has been repeatedly low, and the improvement of its primary education system has been identified as one of Nigeria's main challenges (Hardman et al, 2008). Educationists have linked the low student achievement to the absence of a reading culture and made repeated calls for the promotion of recreational reading in Nigerian children and youths (Adesulu, 2016). The claim that the low student achievement is because Nigerian children do not read for pleasure is not altogether surprising as recurring evidence suggests that reading for pleasure offers many benefits including reading proficiency (Anderson et al, 1988), increased general knowledge (Stanovich & Cunningham, 1993), and a raise in the educational standards (Clark & Rumbold, 2006). Studies also suggest that the reading habits of children are influenced by factors such as pedagogy, the reading environment, access to engaging books, and the presence of an enabling adult (Layne, 2009; Cremin et al, 2014). A review of literature on reading in Nigeria revealed a gap: there is no evidence of a study of the reading habits of children in primary school. Therefore, the study discussed in this paper explored reading for pleasure done by a group of fifteen 9–12-year-olds in a book club, Krown Book Club (KBC), in Nigeria with the aim of shedding light on the children's reading habits and the factors that affected their reading engagement, and possibly, suggesting the strategies that could help them to become more engaged readers. The study was guided by the following research questions:

1. To what extent do the 9–12-year-olds at KBC engage in reading for pleasure?
2. How, what, when and why do the 9–12-year-olds in KBC read for pleasure?
3. What factors affect their reading engagement and what social networks and affordances exist to nurture and support their leisure reading?

In this paper, I shall briefly discuss the extent to which the participants engaged in reading for pleasure; the focus of the paper shall majorly be the factors that affected their reading engagement.

2. Methodology and methods

Based on the exploratory nature of the research, I adopted an interpretivist theoretical perspective which enabled me to construe the meaning of the participants' reading engagement from the findings of my study rather than from generally-held perceptions. The methodology used was case study. Data were gathered through the qualitative methods of creating visual images (collage-making), observation, questionnaire and interview. By pasting cut-out papers of different colours on a cardboard, the participants created a collage of their leisure time in the past year. The more time was spent on an activity, the more the activity's assigned coloured paper featured on a collage. I used observation to identify the reading environment KBC provided and what network of resources that support reading it offered. Through questionnaires administered to the participants, their parents and staff members of the book club, I generated data that specifically addressed the research questions, including questions about the participants' out-of-school activities, reading behaviours, attitudes to reading, estimates of their reading frequencies, books read, and home resources that supported reading. The interviews explored the reading habits of the participants, their perspectives on reading and their motivations for reading.

3. Discussions

Findings indicate that all the participants read for pleasure, though their level of engagement differed. Findings also reveal that the reading engagement of all the participants may have been, in varying degrees, influenced by factors such as the pedagogy of reading, choice of text, availability of text, the reading environment, and the availability of social networks and affordances that support leisure reading.

3.1. The Extent to which the children read

Findings from the participants' collages, some of which are figures 1, 2, 3 and 4 below, reveal that the extent to which the participants read for pleasure varied. In the collages, reading is represented by the colour, yellow:

| *Figure 1* | *Figure 2* | *Figure 3* | *Figure 4* |

Like data from the collages, the interview and questionnaire data indicate that the participants had a range of reading engagement and attitudes; some of the children were engaged readers who read a lot, the majority of participants read moderately, and a few read minimally. Most of the children read for about 30 minutes each time they read, a few read for a longer period, and some read for a much shorter time than 30 minutes. Some of the participants only read printed materials, but most of them read printed as well as electronic materials, and a few listened to audio books in addition to reading both printed and electronic materials. Popular reading materials included fiction, comics, factual books, crime and detective books, and adventure books. Favourite authors included Jeff Kinney, Shakespeare, Ben Carson, R. L. Stine, Geronimo Stilton, Enid Blyton and Roald Dahl. The children had different motivations for reading, but many stated that reading was fun and interesting.

3.2. Factors that affected the children's reading habits

Layne (2009) argues that even though reading is a choice, children can be impacted by certain factors in such a way that they will more likely than not make the choice to read. In this section, I will analyse the different factors that affected the reading habits of my study's participants.

3.2.1. Pedagogy of reading. Studies indicate that children's attitude to reading and literary texts is often affected by the reading practices used (Layne, 2015; Rosenblatt, 1978/1994; Meek, 1988). A recurrent theme in the data of both group and individual interviews in my study was reading being accompanied by questions. Most of the children attended schools where the teachers did not read aloud to the class, but almost all the participants whose teachers read to the class reported that the teachers usually asked questions after the reading aloud session. The children stated that they did not like being asked questions after reading of any kind. Peter's comments below are representative of the views expressed by most participants on having to answer questions after a reading aloud session:

> **Peter**: It kind of makes me feel like they're going to give us an exam or a test afterwards. So, I'll have to really listen to it…If it's a story, they should read aloud and have no questions…

> Pennac (2006) advocates that children should be allowed to read purely for the pleasure that reading gives rather than as a means of teaching literary skills as doing otherwise would make the child cease associating reading with pleasure, which may have the likely consequence of making the child stop reading. Based on my study's findings, I argue that it is possible that many children who do not read much may have been negatively impacted by the pedagogy of reading both at home and in the school.

3.2.2. Choice of texts. Research indicates that the opportunity to choose the texts they read greatly affects children's motivation to read (Clark & Phythian-Sence, 2008; Cremin, 2015). All the children said that they always self-selected the books they read at KBC and were free to change the books at any time. Most participants also self-selected the books they read for pleasure at home. However, this was not the case for Mike whose father usually chose the books he read at home, most of which Mike did not like.

> **IA**: If you don't like reading it, must you still read it?

> **Mike**: Yes, I must…

> Mike described the books his father gave him to read as 'hard books'. He liked Enid Blyton books, but his father did not allow him read these. It is possible that by stopping Mike from reading the books which Mike liked and forcing him to read the books he did not like, Mike's father was reducing Mike's potential to engage in leisure reading. Adanna also complained that her father stopped her from reading *Diary of a Wimpy Kid* books because "they don't teach anything." A few other participants also complained that their teachers chose the books they read during the reading time at school, and that usually, they did not like the books and so did not read them. There are arguments that people should be encouraged to read what they enjoy reading in whatever format they prefer as doing otherwise may reduce the potential for pleasurable engagement in reading (Cremin, 2015). Findings from this study support these arguments.

3.2.3. Reading aloud. Reading aloud has been identified as a key factor in helping children foster a love for reading (Layne, 2009, 2015; Lockwood, 2008). A few participants said their parents had read to them when they were younger and that this had stirred in them an interest in leisure reading. However, most participants said that they never had the experience of being read to when they were young. For many participants, outside KBC, no-one read aloud to them. Six participants reported that someone at school, usually the class teacher, sometimes read aloud to their class while two participants reported that someone at home read aloud to them. Many participants claimed that they enjoyed being read to at KBC, and that the reading aloud made them interested in reading the book. It is likely that many Nigerian children would read more if they had someone regularly read aloud to them in their homes as well as in their schools.

3.2.4. Access to engaging books. Studies indicate that another factor that plays a critical role in children's engagement with reading for pleasure is the access to suitable and engaging texts (Anderson et al., 1985; Lockwood, 2008). Data from my study indicate that access to engaging texts also affected the extent to which the participants read. Nine participants gave a negative answer to the question that sought to know if they usually had access to the texts they would like to read, and the other children answered in the affirmative. Apart from one child, all the children who responded to the question of access to books with a 'yes' response gave further responses that showed that it was not always easy for them to access the texts they wanted to read. Findings suggest that outside KBC, some participants had no access to books they liked. The larger implication of this is that children whose parents could not afford to register them at KBC or a book club may not have access to engaging materials. It is therefore possible that more children would spend more time on leisure reading if they always had access to the reading materials that they liked.

3.2.5. An enabling adult. Studies on successful literacy achievement often appear to feature either a teacher or a parent (Westbrook, 2013; Cremin et al., 2014). Chambers (1991) places an enabling adult at the centre of the reading circle, a circle he draws to show the sequence of activities in reading. An enabling adult here refers to an adult who loves books and recreational reading, has knowledge of children's literature, discusses books regularly with the child in a manner the child finds engaging and appealing, knows the child's reading tastes, suggests suitable and engaging books to the child, and reads aloud to the child. Most of the children in my study said that their parents read a lot, and some discussed books with them. A few participants had enabling adults that were non-parents. For instance, Paul's 19 year old brother was an engaged reader who showed much interest in Paul's leisure reading and often discussed books with Paul. A few participants stated that their teachers sometimes discussed the books they had read with the class. Unfortunately, for some participants, it was only at KBC that they had an enabling adult as neither their parents nor teacher showed much interest in their reading. Data from my study indicate that one reason the children read the way they did is because they had one or more enabling adults in their lives, implying that some children may be better engaged readers if they had an enabling adult in their lives.

3.2.6. The reading environment. According to Chambers (1991), the reading environment is made up of the place (setting), the availability of books, time available for reading, interruptions the reader may experience, the mood of the reader, and the attitude of the reader; however, I would like to also include the weather as it is a part of the features of a place and also featured prominently in my data. When I asked the children to say what things stopped them from reading or completing a book at any time, the subject of the hot weather came up as one of the factors that prevented them from either reading or completing a book. There were also complaints about not having a comfortable place to read, and about having to read in a noisy place. Shehu reported that he could not read in his home in the daytime and only read at night because his house was "really noisy". Chambers (1991) argues that where readers read affects how they read and their pleasure, willingness and concentration. My data support this argument and lead me to suggest that perhaps more children would read more if they had the right reading environment.

3.2.7. Social networks and affordances that support leisure reading. According to Lockwood (2008), schools that successfully promote reading provide easy access to plenty of suitable texts. All the children in my study attended a school that had a library. However, the size of the school library and the number of books in the library varied and were largely dependent on how expensive the tuition fee in the school was. The more expensive the school fee was, the more equipped the library was, and vice versa. In addition, different schools had different rules and policies that governed the students' use of the library. In some schools, students were not allowed into the library, or where they were allowed, could not borrow books. For instance, in Rose's school, the children were not allowed into the library; the headmistress randomly selected books and gave the children to read, and the children had no say in this. Findings also show that in some of the school libraries, there were no spaces designed for reading. Therefore, though school libraries have the potential to encourage children to read and build a reading culture, in the schools my study participants attended, this potential was yet to be fully activated and realized. It is possible that many children would be motivated to read more if the library in their school adopted strategies that could help the children to become better engaged readers.

       Public libraries play a crucial role in nurturing children's love for reading and their development of a reading culture, and also help to close the book gap between children of different backgrounds by providing all children with access to high-quality reading materials (Celano & Neuman, 2001). In addition to exposing children to great quantities of a wide variety of high-quality books of various topics, genres, and perspectives, many libraries offer literary activities such as author readings and summer reading groups which nurture children's interests in reading and in books (Krolak, 2005). Unfortunately, 14 of the 15 children in my study had never been to a public library and did not know of any. The implication is that these children do not have the opportunity of benefitting from the many literary exposures and experiences that a public library could offer and have little or limited social networks and affordances that nurture and support their leisure reading. Although evidence points to the fact that the children in my study read, it is possible that they would be more engaged readers if there were public libraries that provided them with many books of different genres and organized literary programmes such as the summer reading challenge which provide exciting opportunities for children to read more.

4. Conclusion

In this paper, I have provided insights into some of the factors that affected the participants' reading engagement. I hope that these insights will lead parents and educators to reappraise their support of children's reading habits and adopt practices that will encourage children's appreciation of reading. This, I believe, will help more children in Nigeria to engage more in reading for pleasure and, ultimately, lead to a strengthening of Nigeria's education system and an improvement in student attainment.

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EXPANDING STUDENT SPATIAL INTUITION TO LARGER SIZE SCALES: A HYBRID HANDS-ON AND COMPUTER VISUALIZATION APPROACH

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Abstract

Most students have an intuitive understanding of how to gauge the distances to objects in their local environment. Through a combination of binocular vision and visual cues such as the perceived sizes of known objects, students can construct a three-dimensional mental model of their local surroundings, and use it to make sense of their environment.

They do not typically understand, however, that the same geometric principles behind binocular vision and depth perception are also used for quantitative distance determination by triangulation and astronomical parallax. We have built a hybrid exercise combining experiential learning with computer visualization for undergraduate students to explore distance determination in the local terrestrial and astronomical contexts in an effort to help them bridge their intuitive understanding to geometries where distance measurement is not possible visually, but is possible via more precise measurements made with instrumentation.

Students explore distance determination in an outdoor setting where the distances to objects (~50m) are too large for intuitive distance measurement, but can be determined quantitatively through a simple triangulation process. By measuring the direction to a target object from two different positions separated by a known distance, they can determine the distance to the target. This triangulation method is used by moving ships at sea, to determine the distance to, say, a visible lighthouse. It is also the method by which astronomers measure the distance to nearby stars (In this case, the "moving ship" is the Earth in its orbit about the Sun.).

The second component of the activity involves using the multi-perspective visualization capability of the WorldWide Telescope (WWT) virtual environment. WWT, originally developed by Microsoft Research, and now managed by the American Astronomical Society, is freely available to the world community. WWT represents real astronomical data in a three-dimensional environment that students can investigate from a variety of physical perspectives. With this software, students can compare the apparent locations of nearby stars from widely separated vantage points (much larger than the size of the Earth's orbit), making the shifts in star positions due to the parallax effect obvious. They can see how their view of universe changes as they change their observing location, connecting their intuitive understanding of distance measurement, and their experience with terrestrial triangulation, to the astronomical realm.

Assessment data indicate that, after participating in this hybrid activity, students better connect their intuitive understanding of distance determination to the quantitative calculations required for precise measurement of distance.

Keywords: Undergraduate science education, STEM, visualization, laboratory activities.

1. Introduction

Geometrical and spatial relationships play an important role in many STEM disciplines. From the folding structure of biochemical proteins to the stratigraphy of the Earth's crust to the relative positions of stars in the universe, spatial structure influences the function and evolution of the natural world. Consequently, STEM learners must develop some facility in visualizing, interpreting, and mentally manipulating spatial structures in order to better comprehend the physical processes that drive phenomena in their field-specific environment (Janelle, Hegarty, & Newcombe, 2014). Pedagogy that seeks to develop students' spatial thinking capabilities is likely to improve student understanding of STEM content, not only in the discipline under study, but possibly across disciplines where spatial thinking skills are essential.

The US National Research Council, in its landmark report "Learning to Think Spatially," defines spatial thinking as follows:

Spatial thinking is based on a constructive amalgam of three elements: concepts of space, tools of representation, and processes of reasoning. It depends on understanding the meaning of space and using the properties of space as a vehicle for structuring problems, for finding answers, and for expressing solutions. By visualizing relationships within spatial structures, we can perceive, remember, and analyze the static and, via transformations, the dynamic properties of objects and the relationships between objects. (NRC, 2006)

As learners develop spatial thinking skills, they become adept at interpreting spatial problems, and, moreover, create a formalism for processing new information and discerning new relationships.

One especially important aspect of spatial thinking is "perspective taking," the ability to visualize physical structures from a spatially different perspective (Liben & Downs, 1993). It includes, for example, the ability to visualize one's town or neighborhood from above, and thereby connect information on a map with real streets and buildings. It is essential for the investigation of three dimensional structures, as a single perspective provides only a two-dimensional projection orthogonal to the line of sight. Students can correctly visualize the appearance of a structure from a different physical perspective only if they fully understand its distribution in three dimensions.

Perspective taking is critically important for the study of fields where relevant geometries are not directly accessible by the learner. While it might be possible, for example, to ride in a hot-air balloon above a town to see its structure from a map-like perspective, it is not possible to view all of the layers of the Earth's crust from any perspective, nor is it possible (at least in the near-term) to view our solar system from a perch high above its orbital plane. Yet in these disciplines, structures are often best visualized from these inaccessible perspectives, and textbook authors often adopt these perspectives for explanatory diagrams (Fitzgerald et al., 2011). Thus it is implicitly expected that students possess perspective taking skills as a prerequisite for STEM coursework, and those with limited skill often struggle with course content (Plummer, Bower, & Liben 2016).

2. Computer visualization and the WorldWide Telescope

Visualization software can provide students with views from inaccessible perspectives, and can help students link views of complicated structures from a variety of perspectives. Though not immersive or fully experiential, such software generates visual cues that aid students in the perception of the simulated three dimensional environment. By dynamically shifting their observing perspective, visualization software allows students to "fly though" complex geometries, giving them a more intuitive view of their three dimensional structure. With this type of experience, students can make use of "embodied cognition," a process of using perceptual information to aid in complex mental tasks, such as perspective taking (Wilson, 2002).

The WorldWide Telescope (WWT) is one type of visualization software, specifically designed to display three-dimensional astronomical information in a pseudo-3D immersive environment. Originally developed by Microsoft Research and currently managed by the American Astronomical Society, WWT is freely available for installation on Windows computers, and now also available as a web-based client (see http://worldwidetelescope.org/ for more information). WWT offers free and spatially-oriented access to a worldwide trove of real astronomical data, including the positions and relative velocities of millions of celestial objects, scientific imagery, and results from all-sky surveys (Wong, 2008). In addition to its capability as an interrogative tool for these data, WWT can be programmed to provide scripted and controlled interactions with this simulated universe. These interactions are called "tours," and they provide a rich mechanism for the development of curriculum for learners of astronomy. Importantly for the application discussed in this paper, tours can seamlessly shift a student's observing perspective from one location to another, thereby facilitating the perspective taking required for a fuller understanding of distribution and relative positioning of stars in our local universe.

3. Understanding astronomical parallax: A laboratory exercise

One of astronomy's most fundamental measurements is also one of its most difficult. Ascertaining the distance to even the most nearby stars beguiled astronomers for centuries, mainly because, as simple points of light, they offer no visual cues regarding their distance. Moreover, our single Earthbound perspective limits our ability to use triangulation techniques to estimate a distance. Lastly, and perhaps most importantly, all stars, even the most nearby, are incredibly far away compared to any

terrestrial size scales. These distances were ultimately determined the method of astronomical parallax, a technique that makes use of the Earth's orbit around the Sun to obtain observations of the apparent positions of stars from different observing positions. The shift in a star's apparent position over the course of a six months (one-half an Earth orbit) is called the parallax shift, and it is inversely proportional to the star's distance. Because of the relatively small size of the Earth's orbit compared to the incredibly large distances to even nearby stars, this shift is incredibly small and cannot be detected via naked eye observations. Even with telescopes , this measurement is difficult, and it was first accomplished only in 1838, some 200 years after the invented of the astronomical telescope (Bessel, 1838).

The method of astronomical parallax is the fundamental building block for the cartography of the universe, and an understanding of this concept is essential for further student learning in astronomy. It is also an inherently geometric problem requiring perspective taking skills, as it depends on how views of stars differ when observed from spatially separated observing locations. To build student understanding of this concept, and additionally to foster student perspective taking skills, we have developed the curriculum for a laboratory activity focusing on astronomical parallax.

This laboratory activity is designed for a three-hour standalone period as part of a sequence of laboratory activities for an introductory astronomy course catering to non-science undergraduate students. It is built in a hybrid format, with a experiential, hands-on component focusing on the measurement of parallax in a terrestrial environment (sometimes called "triangulation"), and a WWT-based component designed to help students transfer their Earth-based intuition to astronomical environment (see http://wwtambassadors.org/bucknell-wwt-parallax-lab for more details and access to downloadable materials).

The hands-on component of the laboratory activity involves measurement of the parallax shifts for prominent objects in the outdoor environment. Here, the distances to objects are much smaller, and students can see directly how these objects appear to shift position (relative to the distant background) as the students move from one observing location to another. To mimic the astronomical geometry, measurements of the angular separation between the reference direction and the direction to the nearby object are made at several positions in an "orbit" around a central "Sun." The Sun is a pizza tin marked with twelve sections denoting the months of the year. Students use a surveyor's transit to identify the lines of sight to distant and nearby objects, and to determine the parallax shift of the nearby object. Based no the measured parallax shift, and the size of the circular "orbit" (four meters in this terrestrial case), they can then calculate the distance of the nearby object. The method is directly analogous to the astronomical case; however, in this terrestrial environment, students can profitably apply their Earth-based intuition to interrogate the geometry, and even more importantly, they can access this geometry experientially by walking around the open field.

Figure 1. Setup for terrestrial parallax measurements. Students lay out a circular "orbit" from which to make measurements (left). Using a surveyoor's transit, they measure the angular separation between a nearby object and an object in the distant background (right).

In the second component of the laboratory activity, students use WWT to transfer their parallax intuition from the terrestrial to the celestial environment. Using the pseudo-3D multi-perspective capability of WWT, students view the well-known asterism the Big Dipper from Earth, and from another location far from Earth. Though this second viewpoint is not physically accessible, the software can provide a simulated view from this location. Over the large baseline between these locations, the parallax shift is quite obvious (as it is in the terrestrial case), and students can easily discriminate between nearby and faraway stars. They make detailed measurements of the parallax shift, and determine the distances to several Big Dipper stars.

Figure 2. A WWT screenshot depicting the distances to the stars in the Big Dipper, viewed from a position very far from Earth. Note the apparent distortion of this common asterism.
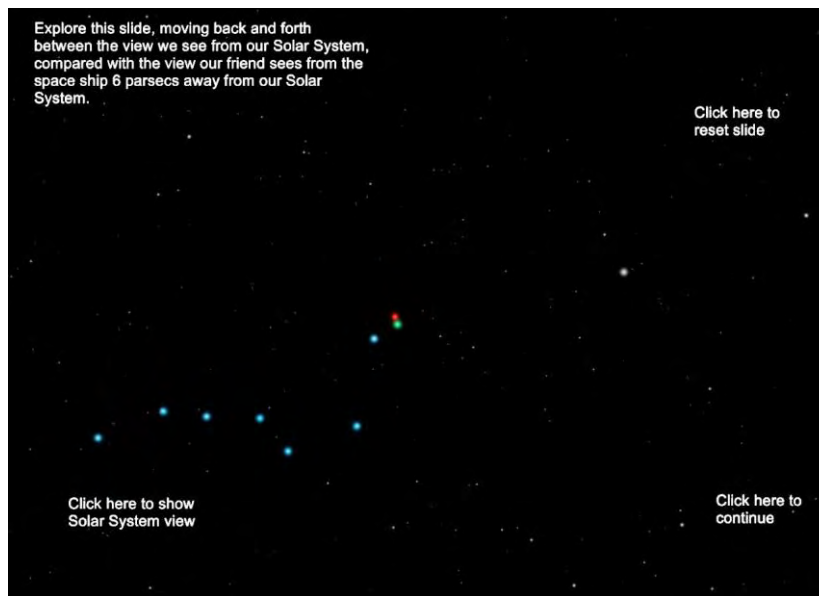
4. Assessment

This laboratory activity was piloted in an astronomy course in a small, predominantly undergraduate university in the northeastern United States over three consecutive years. Students participated in both pre- and post-instruction assessment activities consisting of a multiple-choice diagnostic text (Nottis et al., 2015), and post-instruction quizzes and exams. Our data suggest that after instruction, our students are better able to use their perspective taking skills to connect views of the parallax geometry from a variety of observing perspectives, including the detached, "overhead" view often presented in textbook discussions of this phenomenon. Students also appear to be able to correct apply geometrical principles to calculate the distance to an object, given inputs of parallax shift and the separation between observing locations.

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MATHEMATICAL VISUALIZATION, MANIPULATIVES AND GEOMETRIC PROBLEM SOLVING: A CASE OF STUDY

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Abstract

The role of mathematical visualization in problem solving process and the incidence of material tools on apprehension of mathematical concepts have been subjects of intensive research for a long time.
In the present paper we analyze the use of a manipulative in solving a space Geometry problem, providing a critical account of its theoretical framework and its effectiveness in various teaching contexts.
Previous researches (Leikin, Stylianou, & Silver, 2005) examined students' use of visual representations, across various ages and mathematical education levels, proposing a challenging task to the study participants: describe the net of a truncated right cylinder. Given the visual nature of the problem, any solution strategy required a translation between 3D and 2D representations, regardless of the more or less advanced mathematical knowledge. In the behavior of the successful visualizers, similarities were identified, such as selection of what needs to be visualized and transfer of visual images in a "symbol system", see Nemirovsky (1994); while both young and older low-achieving students reported difficulties in isolating object's relevant characteristics.
About the same problem, a physical manipulative was designed (Cumino, Spreafico, & Zich, 2017) in a dissemination context where Geometry was a tool for understanding architectural shapes, under the need of quickly and correctly communicating the solution, avoiding mathematical formalizations: It shows a right cylinder truncated by oblique planes of various inclination and allows to obtain its net by a simple unwrap.
Currently, this manipulative is being tested at the university level, on first year students of the bachelor program in Architecture and at the middle school level, on second year students of a Technology course; in both teaching contexts, different for age and levels of mathematical knowledge, it is proving useful in making students able to elaborate individual solving strategies, to set up the problem correctly and to improve its translation in symbolic language for the holders of advanced mathematical tools, speeding up teachers' interventions.

Keywords: Visualization, geometric problem solving, physical manipulative, mathematical teaching strategies.

1. Introduction and literature review

Despite 3D Geometry is recognized as a way to develop spatial awareness and 3D thinking is suggested to be essential to creative thought (Presmeg, 2006), in school curricula Geometry is still being reduced in favor of numeracy skills, although by the end of the last century many scholars had begun to oppose this trend (Mammana & Villani, 1998).

Even in author's teaching experience, a growing number of students accessing engineering or architecture studies encounter difficulties in dealing with 3D geometric problem solving, due to lack of practice in spatial reasoning and in those simple visual aspects of Geometry, which are at the basis of most STEM disciplines.

Therefore, the need is felt to improve teaching strategies at every school level, relying on investigations about the nature of growth in students' insight and mathematical competence into 3D Geometry.

In the last decades a consistent amount of research was focused on students' 3D geometric abilities and on their visual activities, see e.g. Presmeg, (2006). Mathematics indeed relies heavily on visualization and mathematical reasoning is part of a visualization process (Duval, 1999). Some scholars explored and

coded the nature of students' reasoning about geometric solids (Lawrie, Pegg & Gutierrez, 2000; Pittalis, Mousoulides, & Christou, 2009; Stylianou & Pitta-Pantazi, 2002) by examining and characterizing visual elements in the problem solving of persons with varying levels of mathematical knowledge and experience and their difficulties in finding relationships between the various parts of a solid; others, (Meng, 2012), investigated if achievements in 3D Geometry could be enhanced through phase-based instruction, in the sense of van Hiele (1986), using material tools (manipulatives).

Much of the research focused on spatial transformation tasks and on the abilities to translate between 3D solids and their 2D representations; a way in which these abilities can be observed is through recognition and construction of nets of solids (Lawrie et al. 2000; Stylianou, Leikin & Silver, 1999; Cohen, 2003), that is the 2-D shape, sometimes called development, obtained by "unfolding" on a plane the whole surface of the solid or part of it. Visualizing solids nets, in particular nets of curved solids such as cones and cylinders, requires manipulation of visual imagery and transformation of one visual image to another. In their exploration of expert and novice visualization practices, Stylianou and Silver (2004) stated that novices produce visualizations, but they generally lack the necessary procedural knowledge that would allow them to use visual representations efficiently.

Instruction might help students develop awareness, analysis and connections between visual representations. Studies on using material objects in mathematical education (Sarama, 2016) generally indicates that physical representations play an important role at all school levels and that they can help students to improve not only learning processes of mathematical ideas but also problem-solving settings, although teacher guidance is required to ensure understanding and meaningful learning.

The present paper aims to provide a theoretical framework for a particular manipulative which has proved to be useful in a geometric problem-solving context at different school levels and to motivate its effectiveness, drawing on the previous researches.

2. The case of study

To investigate characteristics of visual representations underlying successful problem-solving, across students' ages and levels of mathematical knowledge, Stylianou et al. (1999) proposed the following mathematical task: given a right circular cylinder intersected by an oblique plane with respect to the cylinder axis, describe the truncated cylinder's net (see Figure 1 below).

Figure 1. Truncated cylinder: development of the lateral surface (elaborated from Leikin et al. (2005), p. 10).
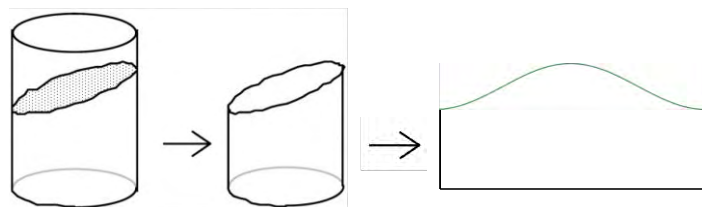
The problem appeared both challenging and nonroutine to subjects from different age groups (students from secondary school to university) and could be solved by everyone from an intuitive or a formal mathematical point of view. Formal solution involves sophisticated graphical construction (see Figure 2 below) or symbolic representation of the 3D and 2D figures and the ability to form connections between different symbolic representations. In particular, to describe the shape of the net's upper curve and formally prove that it is actually a sine wave, some advanced mathematical tools are necessary, such as the knowledge of trigonometric concepts and basics of Analytic Geometry; on the other hand, this problem could be approached intuitively yet rigorously by a student that does not have formal geometry or algebra knowledge.

Given the visual nature of the problem, any solution strategy requires a translation of a pictorial representation of the 3D truncated cylinder into its 2D net representation, regardless of the more or less advanced mathematical knowledge.

Figure 2. Truncated cylinder's net: technical drawing.
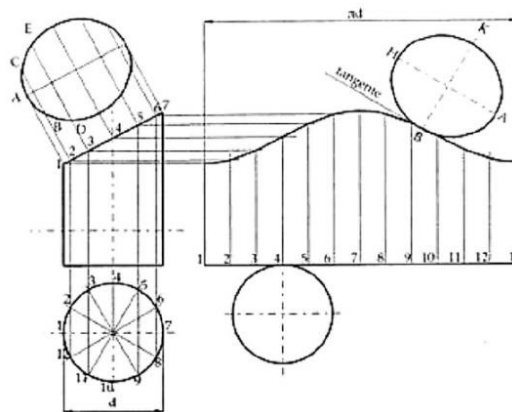
In the behavior of the successful visualizers Leikin et al. (2005) identified some re-occurring patterns, such as selection of what needs to be visualized and the transfer of visual images in a "symbol system" (in the sense of Nemirovsky, 1994), namely the mathematization of objects; while both younger and older low-achieving students reported difficulties in isolating objects relevant characteristics.

To approach the same problem, a physical manipulative was created (Cumino & al., 2017) during the design of a set of guided tours in a Cultural Heritage context, involving people of different age and cultural background; the purpose of the project was to let visitors discover architectural shapes of an historical complex, using Geometry as a tool for understanding them; among the topics, it was planned to introduce typologies of vaults generated by intersections of cylinders, such as groin vaults and cloister vaults; various educational materials were proposed to enhance visitors observation, including origami like paper models; small groups of secondary school students of different age were involved in dissemination mathematical workshops to understand the geometric concepts underlying those models, in particular to study intersections of cylinders with a plane and their developments: thus, there was a need of conveying in an intuitive, quick yet correct way the solution of the truncated cylinder problem, avoiding mathematical formalizations.

The manipulative consists of a plank of rigid material (cardboard or plexiglas) with holes of various shapes and a right circular cylinder of the same material; after having wrapped a sheet of paper around the cylinder and having inserted the cylinder so wrapped in the different circular and elliptical holes, it is thus possible to draw the plane-cylinder intersection curve: then, unfolding the sheet of paper allows to perceive by direct experimentation the top profile of the net and to realize how it varies when the plane changes inclination.

Figure 3. Studying cylinder plane sections and their development.

In the first feasibility checks on pilot groups of middle and high school students, this educational artifact proved to be useful to make people elaborate individual solving strategies and to set up the problem correctly.

Subsequently, this experience was applied in other contexts. Currently, this manipulative is being tested at university level, on first year students of the bachelor program in Architecture in occasion of interdisciplinary activities about vaulted systems between the courses of Calculus, Architectural Drawing and Survey Laboratory (Cumino & al., 2019); in this situation, learners have tools of trigonometry and are acquiring basics of analytic geometry and graphic language: the use of the manipulative seems to quickly lead them to a correct problem setting and to improve translations between different representations, speeding up teachers' interventions.

A similar investigation is planned in a completely different environment, after a preliminary analysis phase: namely on second year students of a Technology course, at middle school level, where one of the objectives of the educational program is to observe architectural shapes in the surrounding world with particular attention to examples of roofing and vaulted systems and learners are asked to construct simple paper models of buildings, so they have to consider nets of solids. To approach the truncated cylinder problem these students initially behave like the older ones: as remarked by Leikin et al. (2005), they try to identify those properties of the truncated cylinder which may be important to find the net, but a lack of mathematical knowledge and spatial reasoning experience prevents them from going beyond their initial observation of the object as a whole. The manipulative in this case allows them an intuitive but rigorous approach, letting them overcome conceptual obstacles.

3. Conclusion

The purpose of the present paper was to investigate the reason why a specific educational tool works with students having different mathematical literacy. The study is part of a research program dedicated to the dissemination of Mathematics, with the aim of presenting topics of 3D Geometry at any scholastic or university level as rigorously as possible, stimulating an inclusive perceptive-motor learning, proposing calculation or graphic construction only when necessary and in a functional manner, depending on the students' background.

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STUDENT EVALUATION OF TRANSFERABLE COMPETENCES AND REQUIREMENTS FOR THEIR STUDIES

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Abstract

At present, the quality of education is getting more and more important at the level of educational processes, educational institutions, and overall the education system. This trend is also related to so-called accountability, when educational institutions are responsible for both consequences and quantity and quality of their services. In this way, various evaluations are carried out at universities trying to identify, evaluate, measure and compare quality. However, attention is often paid to tools for measuring learning outcomes through didactic tests, or to different ways of engaging learners' opinions through questionnaires focused mainly on the evaluation of learning environment and performance of the academics. Nevertheless, apart from above mentioned, student evaluation is also necessary to focus on aspects related to students themselves, it means on their complex skills. In this context, the paper deals with transferable competences and methods of finishing university courses. A questionnaire exploratory survey maps the degree of saturation of transferable competences and preferred methods of completion of courses by means of subjective evaluation of the target group, i.e. students of bachelor and master study programmes of a selected Czech university. The results can be used for the administrative decision-making apparatus to help to improve the planning and implementation of the educational processes of the university, both at the curricular level and to ensure optimal conditions for the completion of courses.

Keywords: Evaluation, transferable competences, saturation, university exams, employment during studies.

1. Introduction

At present, the quality of education is getting more and more important at the level of educational processes, educational institutions, and overall the education system. As for university graduates, in pace of rapidly changing environments, internationalization and globalization, employers expect them to be fully equipped with various professional skills and knowledge in order to deal with complex situations effectively and solve problems quickly (Murakami et al., 2009). This trend is also related to so-called accountability. As reported by Foley (1999) or Chanock et al. (2004), in recent years, universities have been under increasing pressure to make themselves accountable, among other things in terms of preparation of their students for the rapidly changing world of employment.

Transferable competences (also referred to as transversal, cross sector skills or capabilities, or competences for employability) are considered to be most valued in industrial, commercial and professional life as well as in public and social administration. As they are important to society and to the individual, they should figure prominently in the curriculum (Assiter, 2017).

The fact that the issue of transferable competences is of growing interest not only in Europe is evidenced by many researches, such as for instance Atlay & Harris (2000), Farrington et al. (2012), Stevens & Miretzky (2014), Savitz-Romer et al. (2015). The significance of transferable competences acquired during studies in relation to professional development and support of employability of an individual in the labour market is further referred to also e.g. by Rocha (2015), Miština et al. (2016). Further, transferable competences are set of competences related to attitudes and values (knowing how to be) and procedures (know how). They can be transferred from one specific professional field to another.

The following researchers describe various types of transferable competences (e.g. Andrews & Higson, 2008; Gisbert & Bullen, 2015; Carvalho, 2016; Smékalová et al., 2016).

Based on the above-mentioned, various evaluations are carried out at universities trying to identify, evaluate, measure and compare the quality of education. However, attention is often paid to traditional tools for measuring learning outcomes through didactic tests, or to different ways of engaging learners' opinions through questionnaires focused mainly on the evaluation of learning environments, content of courses and performance of the academics. Nevertheless, student evaluation is necessary to focus on aspects related to students themselves, too, it means on their complex skills, needs and preferences based on current trends and requirements of practice. *In this context, the paper deals with transferable competences, and methods of finishing university courses as perceived by the students.*

The issue of the quality of education, evaluation of the educational process, and transferable competences is the focus of the authors on a long-term basis on both secondary and tertiary level and thus they build on their previous experience and research. In transferable competences, they focus mainly on the benefits of studies to develop these competences, on the saturation (acquisition) of transferable competences, or on the significance of transferable competences for the labour market as seen by students of various fields of study (e.g. Smékalová et al., 2016; Smékalová & Němejc, 2016).

2. Methodology

The aim of the exploratory survey was: *to map the degree of saturation of transferable competences of university students enabling to increase their employability*, *to find out whether university students have a contract of employment during their studies*, and *to determine current and preferred methods of completion of university courses*, all by means of evaluation of the target group, i.e. students of bachelor and master study programmes of a selected Czech university.

Qualitative data for the analysis of the issue concerned was obtained by means of a questionnaire survey. The questionnaire investigated the subjective view of students on the development and application of competences in connection with their university studies, and on the evaluation of requirements for completion of courses finished by credits and exams during their university studies.

The questionnaire was administered in a paper form. Clear instructions were given to respondents to fill it out. The response rate of the questionnaires was 100% due to the presence of researchers in the lecture rooms. Because of the focus of the paper, results of the following exploratory questions are presented.

The exploratory question no. 1: The acquisition and development of transferable competences

Indicate to what extent (in %) you believe that university studies have enabled you to acquire and develop transferable competences, that is, those that enable people to increase their employability. These include mainly, in particular, the following skills: communication in a foreign language - ICT skills - learning to learn competence - problem solving skills - teamwork skills - a sense of responsibility, etc. The degree of saturation of transferable competences was indicated on a scale from 10 to 100 %, with a range of 10 %.

Given that transferable competences are closely related to the employability of the graduate in the labour market, the questionnaire contained a follow-up question dealing with the phenomenon to be employed during studies. **The exploratory question no. 2:** Having a job while studying

Answer whether you have a job during your university studies, meaning being employed on the base of an employment contract (not based on the employment agreement). The answers were yes - no.

As the education system is influenced by new trends and changing students' requirements, a question has been included on the ways of completing subjects with exams (current status versus preferred methods of finishing university courses) as perceived by the students.

The exploratory question no. 3: Examination requirements

Choose the ways you most often take the exam when finishing your courses; secondly, choose the methods that you would consider optimal, i.e. those you would prefer. There were six of the most common ways to complete the course by the exam.

The research sample of a questionnaire survey conducted at a selected university in the Czech Republic in the academic year 2017-2018 comprised a total of 213 respondents. Specifically, there were 166 undergraduates of bachelor studies (71 - the 1st grade, 61 - the second grade, and 34 - the third grade). The follow-up master's study programmes are implemented as two-year studies in the Czech Republic, i.e. there were 47 respondents included in total; of whom 21 were 1st grade students and 26 were the second grade students.

3. Results and discussion

3.1. The acquisition and development of transferable competences (degree of saturation)

The degree of saturation of transferable competences was indicated on the scale from 10 % to 100 %, with a range of 10 %. The students expressed themselves based on their overall subjective view. It means they evaluated all the offered transferable competences during their studies as a whole, based on the degree of saturation. The favourable result is clear from Table 1 that that most students (up to 22.1 %) agree that through their university studies, they can perceive the development and saturation of competences up to 70 % out of 100 %. Even higher degree of saturation, i.e. up to 80 % out of 100 %, is reported by almost one fifth of the students (i.e. 17.4 %).

If we divide the response scale (the degree of saturation of transferable competences) into 3 intervals, then the following results can be found: (a) in the range of the degree of saturation of competences of 10 - 30 %, there is an average of 4 % of respondents' answers; (b) in the range of the degree of saturation of competences of 40 - 60 %, there is an average of 14 % of respondents' answers; (c) in case of the interval of 70 - 90 %, there are on average 14 % of respondents' answers. Only two respondents indicated the ideal state of the degree of saturation of transferable competences, i.e. of 100 %, which is an unexpected and surprising result.

Table 1. Saturation of transferable competences in bachelor and master students (frequency, percentage in totals).

The degree of saturation	Bachelor Studies				Master Studies			Total
	Grade 1	Grade 2	Grade 3	Total	Grade 1	Grade 2	Total	
10 %	2	2	1	5 (3.0)	0	0	0 (0.0)	5 (2.3)
20 %	2	3	0	5 (3.0)	0	0	0 (0.0)	5 (2.3)
30 %	7	6	1	14 (8.3)	1	1	2 (4.3)	16 (7.5)
40 %	15	9	4	28 (16.9)	4	1	5 (10.6)	33 (15.5)
50 %	12	12	4	28 (16.9)	2	0	2 (4.3)	30 (14.1)
60 %	9	9	4	22 (13.3)	4	2	6 (12.8)	28 (13.1)
70 %	10	15	10	35 (21.1)	6	6	12 (25.5)	47 (22.1)
80 %	10	4	8	22 (13.3)	3	12	15 (31.9)	37 (17.4)
90 %	3	1	1	5(3.0)	1	4	5 (10.6)	10 (4.8)
100 %	1	0	1	2 (1.2)	0	0	0 (0.0)	2 (0.9)
Total	71	61	34	166 (100.0)	21	26	47 (100.0)	213 (100.0)

It is apparent that, on average, one-seventh of the respondents' answers show the degree of saturation of transferable competences in the interval of 40 - 90 %. Every seventh respondent was able to acquire transferable competences in this range during their university studies. The most frequent interval appeared in the degree of saturation of 70 % and 80 %, respectively. It can be said that that the curriculum of the university and the quality of educational mechanisms allow students a sufficient development of transferable competences. This corresponds to the fact that only 4 % of the respondents show 1/3 of the scale of answers in the degree of saturation of 10 - 30 %.

The number of respondents for bachelor studies was 166 (78 %) and 47 (22 %) for master's studies. The differences are because there are three grades in bachelor studies, while in master studies they are two. For this reason, the results are comparable.

The specific form of the development and saturation of transferable competences for individual grades and levels of studies looks like this. Individual grades of bachelor's and master's degree programmes do not show big differences between them within the degree of saturation of competences in the interval 10 - 100 %. According to the criterion of 1/3 of the highest values in the total of respondents' answers for bachelor and master studies, it is evident that master students have acquired competences to a greater degree (60 - 80%) than the respondents of bachelor's degree (40, 50, 70 %). This means that a longer study period allows a higher degree of competence saturation. Similar can be observed for individual grades, when the values in the first year of bachelor students are higher for the degree of saturation of 40 - 50 % (where the frequency is 15 and 12) and lower for the degree of saturation of 70 - 80 % (with the frequency of 10 and 10). In the second and third grades, the degree of saturation then changes in favour of higher frequencies for higher saturation degrees.

3.2. Having a job (employment contract) during university studies

In the detailed view of the results of the second questionnaire item it is obvious that 38 respondents (17.8 %) out of 213 work based on the employment contract, including 34 (20.5 %) of bachelors out of 166. It is worth noting that up to 1/4 of the second grade bachelor students (24.6 %) work contractually. Four (8.5 %) working respondents were among 47 master students (see Table 2).

Table 2. Working university students based on an employment contract (frequency and percentage).

Bachelor Studies				Master Studies			Total
Grade 1	Grade 2	Grade 3	Total	Grade 1	Grade 2	Total	
14 (19.7)	15 (24.6)	5 (14.7)	34 (20.5)	3 (14.3)	1 (3.8)	4 (8.5)	38 (17.8)

Let us underline here that the results can be influenced by a higher-level of working bachelor students compared to master studies. The effect may be that bachelor students acquire competences in higher grades, and, more would be evident from the results of the exams compared to the employment workload of the students. On the other hand, master students can be assumed to focus more on learning and therefore they do not work in such quantity. However, this phenomenon, which the authors have been dealing with for a longer period (e.g. Němejc & Smékalová, 2018).

Comparing the degree of saturation of transferable competences and contract employment of the research sample of the respondents, the vast majority (i.e. ¾ or 76.3 %) of those who expressed they worked (n = 38) they had acquired and developed transferable competences in the degree from 40 % to 70 %.

3.3. Examination requirements

In case of the last observed aspect, it can be concluded that there are 627 of responses in total to the current ways of completing subjects (472 in bachelors, 155 in masters). Regarding the preferred ways of completion of subjects by exams, the results are based on a total of 421 responses (of which 322 are in bachelor students, 99 in master students).

Table 3. Completion of courses by exams (current requirements versus respondents' preferences).

Most common ways of finishing a course				Course completion	Preferred ways of finishing a course			
Count	Bachelors %	Masters %	Total %		Count	Bachelors %	Masters %	Total %
86	14.2	12.3	13.7	A multiple-choice test	150	39.1	24.2	35.6
176	29.9	22.6	28.1	A written exam with given open-ended questions	63	13.4	20.2	15.0
108	16.5	19.4	17.2	An oral exam with time to prepare	108	24.5	29.3	25.7
80	12.1	14.7	12.8	An oral exam without time to prepare	20	4.7	5.1	4.8
108	16.9	18.1	17.2	An oral exam with a random selection of questions by the student	57	13.6	13.1	13.5
69	10.4	12.9	11.0	An oral exam with questions given by the teacher	23	4.7	8.1	5.4
627	100.0	100.0	100.0		421	100.0	100.0	100.0

Table 3 demonstrates that today, the students are most likely to complete the course by a written exam with given open-ended questions. This is similar in bachelor, as well as in master studies. In the latter mentioned, an oral exam with time to prepare answers, or an oral exam with a random selection of questions by the student are also common to a similar extent.

As for the preferred ways of completion of the courses, the bachelor students would prefer the written test with the choice of the answer options (so called multiple-choice test). Master students would prefer an oral exam with time to prepare answers, the preference of a multiple-choice test was chosen as second in the order of preference.

Overall, the least favourite ways of completion of courses include an oral exam without the time to prepare the answers (direct answering), and an oral exam with questions given by the teacher. We believe that a multiple-choice test is easier in the eyes of students as they see the answer and do not have to think about it for a long time, as opposed to an oral exam. They also do not have to demonstrate their communicative skills and the ability to apply the issue in practice.

4. Conclusions

The paper confirms the fact that the attention and significance of transferable competences is growing at a university level, which also corresponds to the findings of this exploratory survey. Similar conclusions can be stated for the developing trend of employment of university students during their studies (as evidenced e.g. by Murakami et al., 2009; Němejc & Smékalová, 2018). Finally, yet importantly, our results underline the importance of the adaptation of the completion of courses by exams. Here, it is desirable to keep up with current trends such as e-learning platforms. The university should also adapt to various tests, i.e. to have a combination of tests and exams based on the particular type of study.

It can be concluded that the results can be used for the administrative decision-making apparatus to help to improve the planning and implementation of the educational processes of the university, both at the curricular level and to ensure optimal conditions for the completion of university courses.

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A VISUAL CONTENT ANALYSIS OF SCHOOL IMAGES AND SIGNS: THEIR EFFECT ON HIGH SCHOOL STUDENTS

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Abstract

Visual methods are often marginalized in educational research and have not been employed to collect information about cultural identities of the school and its effect on the students. The aim of this presentation is to examine visual methods for understanding the visual culture of schools and how these images are perceived and processed by high school students in Greece. It reports on a participative research project in four secondary schools in Greece from distinctively different cultural and economic backgrounds. The strategy of research applied in this study is grounded theory and the qualitative methods of research are: structured interviews (4 interviews done and transcribed during one month), scaled questionnaires were distributed (80 done during one month and transcribed) and photography (800 photos done during one month and described) and repeated visits in schools. There were at least 80 students involved at the project during one month. Moreover this presentation draws on content analysis as a systematic, rigorous approach to analyzing documents obtained or generated in the course of research. Finally the presentation will conclude that these approaches provide a comprehensive view of how visual images are produced and interpreted, and of what their potential social consequences may be. The use of visual methods is not without challenges however. Securing ethics approval and school participation along with problems with camera retrieval and protecting participant agency were some difficulties encountered in the current study. For those wishing to pursue less conventional research methodologies in educational settings, this presentation will also highlight potential benefits and struggles.

Keywords: School culture, visual images, multimodality, participatory social research, hidden curriculum.

1. Introduction

Being a language teacher nearly every text that I looked at and implemented in my teaching, used two modes of communication: (a) language as writing and (b) image. However, when I was to teach and involve my students in activities I realized that I merely focused on language as the only medium that represented fully the meanings I wanted to encode and communicate. Images were used as stimulators of a pre task activity at their most. They were in my mind simply somebody else's job.

The same applied to all the images put around school. Me, as well as most educators, considered them either as purely decorative or a as just a visual aid to attract attention to the text. In our mind it was the text that forged the values, beliefs, customs that hold the social group together. Drawing predominantly on the work of Kress (1997) and others (Kress & Van Leeuwen, 1996) in social semiotics and multimodality, I thought it was time to unsettle this common sense notion and take things a step further. I began this process by conceptualizing the school environments as semiotic spaces in which human beings, who are the agents of their own meaning making produce multimodal texts—visual, written, spoken, performative, sonic, and gestural. In the act of making meaning and expressing their ideas students/teachers, produce multiple signs in textual and non-textual forms across semiotic modes, drawing on different representational resources in order to succeed in that domain. Furthermore, students shape their understanding of the world not only through the texts we present to them. Rather, they form their ideas through these implicit powerful forces, hidden in images and visuals. Moreover, we must note that the design/presentation of such texts/images is constrained by the genres, languages, and discursive practices that are valued within the broader sociocultural and political context of education and the nation-state. I felt that our duty as educators was to collect these images and analyze their meaning in order to better understand the social cultural forces of a school, since as it is argued that they shaped the organization's outcomes (Rutter et al. 1979).

2. Methodology

Our sample consisted of 10 schools chosen from areas, with a wide variety of economic and social background. Economic zone ranking of the Ministry of Economics was used in order to indicate the extent to which a school draws its students from low or high socio-economic communities. Moreover, rankings from the Ministry of Education, that rank schools according to their performance in university entrance exams were also taken into consideration, while selecting the schools. Student population was ethnically diverse comprising mainly of Greek students, but with a significant number of students from Albanian and Middle East origins. The staff was only from Greek origin however. Two hundred students and 50 teachers participated in the research. In total, 65% of the participants self-defined as European the 20% as of Balkan origin and the rest as of Middle East origin.

The procedure followed was: First the researcher, applied for the consent of the Ministry of Education to ensure access to the schools and their collaboration to research. This process took about 3 months to be completed. Afterwards, the researcher contacted the principal of the school to arrange a convenient date to visit the school and take pictures and video of the images in and outside school premises. Also, she emailed the school the parent consent form that should be distributed to students in order to have their parents' permission to answer questionnaires and participate in the research. Then, in the arranged date she took photos of the school, in one day after school hours, in order not to interrupt school life but also so as not to have issues of shooting students while trying to capture an image. This made the research logistically possible while offering a discrete moment of school life to analyze. Afterwards, the images were examined and ten most prominent regarding their place in school as well as their frequency of message, were developed. The images were classified in the following categories: *Classification of visuals*

The visuals were first classified in categories relating to who was responsible for producing and placing them. Teacher-Students or Other. Then they were classified in one of the 20 categories: related to courses, racial, insults, sexual insults, general insults, sexual humor, general humor, dominant gender (male female) romanticism, politics, drugs, religion, morals, names, sports, personal problems, art, music, sexuality, philosophical remarks, and miscellaneous. The researcher then returned to school, usually after two days, to distribute questionnaires to both teachers and students (usually 20 students participated). After the questionnaires were collected the researcher displayed in print the ten collected images (the most prominent in school) and initiated an informal discussion on students' feelings about these images or about any other images the students wanted to talk about and the researcher had not put forward. The researcher kept notes of their responses.

3. Results

From the visual collected 81% was placed in the school by teachers particularly Technology, Biology and IT teachers. The messages teachers displayed, were either mainly related to courses 20% or to general issues. The most common being Environmental issues with smaller percentages of Art. The remaining percent of schools visuals involved graffiti and visual messages carved or drawn by students on desks, chairs or outside school usually during lessons or after school hours. Most of these visuals and messages, concerned sexuality (18.9%) and sports. The proportion of student produced visuals concerned sexuality in addition to the categories of sexual request, sexual humor, sexual insults and remarks was 41%. The second highest proportion was reference to sport teams (15%). Of the 20 categories of graffiti, sexuality, sports-music and politics were those found most frequently in student produced messages. (18.4% and 15.4%, respectively). What seems to be particularly interesting is that schools that could be classified as of a high socio-economic status had political messages put by students' supporting left wing political parties that are traditionally associated with the working class. Another interesting finding is that of the "non legitimate" and offensive messages 70% were produced by male students while female students appear to produce messages relating to philosophy, art and courses. Also reported in the study is that visual with romantic content were found more frequently in women's desks chairs or restrooms than in men's. This anonymous school testimony bears witness to the importance of emotional relationships for women (Mellen, 1998). All the categories of visuals were present at some level in the male's visual messages, whereas racial insults, references to drugs, and references to sex were absent from the women's. Female's visual messages were more conservative and conventional than male's; morality and religion represented 1 1.6% of the content of the female's visual messages but only 2.1% of the male's. We also need to note that male's visual messages were prevalent and dominant outside the schools building while female's were limited inside the premises. A final point that needs to be pointed out is that although the messages students of all backgrounds produced could almost be equally fitted in the above classifications, in school of low economic background the percent of racial, ethnic and racist remarks was

very high. Also, as it can easily be seen from the sample of the images shown. In the schools of low ranking and socioeconomic background there is a distinct absence of visuals and images "formally" displayed, while this gap is "filled" by students' own messages on school walls and equipment. Finally in no school discussion among staff and students, as of what should be on the school space was ever conducted. The most that was asked of the students was to draw a theme that would later be displayed by staff around the school.

4. Discussion

Drawing on the results of the survey we could argue that schools of low socioeconomic background were exposed to very few visual messages and where visual were present they only portray images that showed school values and rules. In Schools of high socioeconomic rank, however, there are more and more images of school activities in schools particularly since digital photography has made it so easy to capture events and activities for displays. Many of these images reinforced positive messages about pupils and about the opportunities the school provides for excitement, enjoyment thereby playing a significant role in reinforcing/promoting desirable norms and establishing ideals. However, this use neglected much of their potential contribution to educational processes and to the development of school as educational institutions. There were groups of teachers, as well as students that wanted to portray images that showed their pride in their school and images that portray school values that otherwise could be lost. Many teachers mostly focused on the displays and pictures that showed school performance in certain subjects such as technological projects and participation in European programs i.e youth parliament, Erasmus etc. We need to point out though an important finding. In the low income schools students felt freer to place messages around the school. However, at the same time they felt unsatisfied with the appearance of the school that seemed to them as neglected.

In the case of the high income schools most students however focused on images that were linked to aesthetically pleasant results and on messages, and again on images mainly produced by students. Then, there were some mostly older students that focused on images linked to school management and relationship with their peers. This last point highlights the contribution that images can make to informed discussion of the perspectives of those whose critical voice goes unheard.

The students thoughts and feelings interestingly matched the percentages of visuals. Meaning that where, for instance, sports were more prominent the interests of students and the discussion did evolve around this topic. Accordingly, in schools were visuals of cultural issues were present students seemed more aware, sensitized and willing to talk about issues in such areas. They felt mostly satisfied with the appearance of their school, though not free to put visuals or interact with the school space. We must note that every month they were asked to clean their desks of any messages and the schools was maintained and painted annually. Another finding, was that in high income schools the community, especially the parents association were allowed and given space to put messages inside the school, usually of informative nature about forthcoming activities.

We need to say that while the perspectives of teacher and even parents are often well represented in qualitative school based educational research the perspectives of students are often marginalized if not ignored entirely (Elliot 1991). Since pupils have the least amount of power in school communities (only through the 15 elected board) and the least say in terms of their education, authorities make it even more complicated and difficult for students to engage in research. Yet in my opinion it is these marginalized pupils opinions that are of most value in stimulating institutional change. Because they are the most strongly subject to the taken for granted and unquestioned by those who are more powerful. Interviews and questionnaires although difficult to obtain were not adequate methods to unravel students' perspectives. Student's also reported that our research offered the students and staff an opportunity to view their school from their and other's perspectives. Our research was thought by students, as something "out of the ordinary" an interruption of the routine. Some of the students also valued the fact that their opinion not only was asked but also that it was treated as equal to those of their teachers. They valued that they were treated as equals in the process, although in practice their different status afforded them minor involvement in the educational processes.

It was interesting to find that images such as (01) signified different things and provoked different to students and staff. Image (02) in most students of the school provoked feelings of happiness and joy while for teachers it seemed as self-evident, unimportant signifying emptiness and loss. However, it was also found that certain images provoked a shared perspective between teacher and students mostly images that had to do with litter and environmental issues.

However, we must point out that, there were many hurdles that needed to be overcome for our research to be feasible. Obtaining consent to enter the school was time consuming and involved a lot of bureaucracy. Another major challenge this project faced was securing schools' participation. Even with

the ministry's permission most schools were reluctant to participate and posed several hurdles on the process. Particularly most school principal wanted to check the photos taken and usually insisted on deleting photos that contained messages/signs that could diminished authority or could portray the school as neglected by the principal. Faced with a method not commonly used and not anticipated the principal expressed considerable anxiety and skepticism. The teachers' and principal's reactions reflect wider anxieties about camera-use at school. A number of high profile media cases involving students taking photos on mobile phones and distributing them via the internet have heightened fears about this issue (Netsafe 2005). Some of the schools enforce strict rules around camera phones and punish students for inappropriate use. When cameras were routinely perceived as problematic their research use was perceived too perilous and as undermining school authority. Anxiety about cameras appears to invoke a 'double standard' with photographs viewed potentially more exposing and dangerous than written text. Emmison and Smith (2000) reveal this point in their discussion of authors' and editors' reluctance to include photographs in published works:

> What is ironic, we suggest, is that whilst photographs are often deemed to be unacceptable by authors and editors, textually explicit descriptions of morally suspect materials are considered less so. Such a 'double standard' tells us quite a lot about the relationship of our society to the image as opposed to the text. Whilst texts are associated with reason and higher mental faculties, images are seen as subversive, dangerous and visceral. (Emmison and Smith 2000, 14)

This unease related to the school being identifiable even with the use of a pseudonym. The research was only allowed to proceed on my guarantee measures would be taken to prevent the school's identification.

School-based research can also be hindered, by congested timetabling also hampers accommodating 'an extra' like research, when academic pursuits take precedence. In addition, the need to negotiate alterations to ethical approval prolonged fieldwork. Although time-intensive, acting on teachers' suggestions was a means signaling their concerns were valued. Key to participation in schools was the ministry's consent and supportive teachers who considered the research beneficial to students and helped quell senior management's anxieties. Securing school participation was subsequently a challenge as the research was constituted as 'too risky' by principals anxious to avoid unwanted publicity.

During our research issues of gender, sexuality emerged since, visual images/messages regarding gender and sexuality were the second most commonly produced by students. However, researching issues of sex representation and gender issues in schools is challenging because it asks questions about an issue which is socially constituted as 'private', 'embarrassing', 'non relevant to educational goals" "political" and subsequently 'problematic'. As a result, the researcher was not allowed by the present class teacher to discuss such issues with the students even though students did point out several times such issues, drawing from the pictures shown to them. In some occasions, even such visual were not permitted to be shown at all to students, though they were collected in the school and had a prominent presence in the school space.

To conclude, it was of major interest to see that visual around the school do shape and express the values of the school and the local community. To take things further, the researcher shape the belief that using visual methods can provoked students into thinking further of what they took for granted. Also, Images of a school can act as a contact zone, where teachers and students of different ages of ethnic groups can come together, if not on equal terms, nevertheless in a place were communication is possible. The images and texts can foreground different perspectives which provide different questions and alternative to the dominant accounts of schooling. None of this however is possible if visuals are not "seen" and explored in the educational process.

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"INVISIBLE" STREET CHILDREN - EDUCATIONAL PERSPECTIVES AND / OR SOCIAL PROBLEM

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Abstract

This paper uses available literature to theorize, analyse and define the syntagma of "street children" and describes the descriptors of implication of the namesake theme. Numerous research, both psychosocial and other perspectives, point to the increase in the number of *street children* that are becoming a growing global problem, especially concerning modern emigration flows during the so-called emigration crisis in Europe, but also in the world. The problem requires the finding of starting point of understanding who street children are, as well as factors that conditioned the existence of this phenomenon. Thus, this paper can be seen also as a possibility of potential prevention since once assimilated children on the street have a hard time becoming equal participants in society with equal opportunities. However, the problem of street children could also be observed as an unused social capital since these street children withstand the harsh reality, succeeding in assimilation often imposed upon them in their struggle for survival. Researches shows an increase in sexually transmitted disease such as AIDS among street children, as well as increase in hepatitis, prostitution and beggary. Despite the fact that street children represent a significant challenge to social workers, physicians, educationalists and other experts, majority of street children are literate, know basic calculations and poses exceptional diction despite the fact they never receiving school education. In conclusion, the paper tries to present global and national perspectives of street children.

Keywords: Street children, education, social capital, prevention.

1. Introduction

The phenomenon of street children is found in the media and in scientific and professional literature under the terms "street children", "children in the street", "children of the street", "children left to the street", "street-connected children", "street-connected youth", "runaways", "community children", "rough sleepers", but are lately also referred more and more as "invisible children" (Gaon-Grujić, 2014), often if they do not have their first and last names – i.e. birth certificate, or "children on the move". Many scientists have tried to make these expressions operational, but it is important to note that these terms, as well as the street children's perspectives, differ from city to city, from state to state and from continent to continent. However, regardless of whether we are examining economically poorer or richer countries, there is no country that does not experience street children phenomenon, so the question arises as to how children become street children and how to maximally prevent this burning problem, when it comes to contemporary migrant flows, and redirect it to potential social capital. The fact that street children problem is more and more present is attested by the *International Day for Street Children*, which is marked on April 12th. The *International Day for Street Children* was established in 2011 by the *Consortium for Street Children*, a leading international network dedicated to advocating for the rights of children living and / or working in the streets around the world. However, in order to talk about street children, it is necessary to know first what this term determines, since some authors do not identify in their works street children with children of the street and children in the street. Moreover, the term "invisible children" is increasingly used in the media. The aim of this paper is to present this growing global problem through national and global perspectives. The paper tries to sum up the reasons for this phenomenon, bearing in mind that each state has its own specifics. As street children are mostly semi-literate and are not in contact with their own families, but still manage to settle down in a unique way of living, which is surprising and at the same time requires closer observation and explanation. Creating subculture and substitute families, a type of assimilation and independence, acquiring basic knowledge in mathematics and street discourse, necessary for survival, are topics also discussed in this paper.

2. Global and national perspectives of street children

According to the UNICEF's definition and definition of numerous organizations of similar type, street children are defined unambiguously as the so-called *market children*, i.e. children who work in city streets and squares, selling or begging, but still living with their families, and as *homeless street children*, i.e. children who work, live and sleep in the streets and usually have no contact with their families. UNICEF's definition is close to the later, but street children is a term that includes children who spend most of their time in the streets fighting for their own existence, but occasionally return home, as well as children living in the street with their parents (UNICEF, n.d.). But street children are children who are "migrating", regardless of whether it is within the state, between cantons, between cities, or between states. These children are on the move and are potentially at risk of inadequate care, economic or sexual exploitation, abuse, neglect, etc. These children are forced to do certain things. These are children who mainly beg. They are forced to do this (Bilić, 2014). These children are not able to become emotionally, socially and economically independent adults. The *Council of Europe* in the *Guidelines of the Committee of Ministers of the Council of Europe on child-friendly justice* classified street children under the category of "vulnerable children", together with children of migrants, refugees and asylum seekers, unaccompanied children, children with disabilities, homeless children, Roma children and children in accommodation facilities (Council of Europe, 201 4, p.18). Horvat et al. (2012) in a case studies on at risk groups emphasize the Roma, the youth in foster families, the youth with behavioural problems, refugees, the unemployed youth and the youth with disabilities, and the youth from children's and educational centres. In future perspectives, any individual in these social groups can become a street child. Particularly at risk are the Roma and the youth with behavioural problems characterized by deviations in different areas of functioning of children and the youth, from relationships with their relatives and the social environment through difficulties regarding nutrition, sleeping and reluctant activities, lying, theft, use and resale of illegal psychoactive means, running away from home and vagrancy, aggression, violence, burglary, arson, rape and other extreme forms of asocial, antisocial and criminal behaviour (Horvat et al., 2012, p.23). The youth with behavioural problems often have difficulties in achieving school success and may leave the education system before acquiring qualifications. They need to be encouraged to engage in vocational training and to participate in various education where they will be given the opportunity to acquire knowledge, but also to develop social skills. Exclusion from the sphere of education leads to exclusion from the world of work, which can have serious social and economic consequences. Ultimately, such consequences may guide a person to the margins of society as a member of a deprived or deviant subculture (Horvat et al., 2012, p.25).

Ennew and Swart-Kruger (2003) state that street children and youth in the street are in the centre of research of academic communities interested in the common social good for over two decades, and this research has resulted in a phenomenon called "gushing" (publication of the large number of papers on a certain topic). Indicative explanations point to the fact that street children are discarded or "escaped children", which refers to children who intentionally left their homes. These definitions point to several important phenomena - increase in the number of street children, adaptation to survival in street conditions, etc. While street children are the most noticeable citizens, working and living on roads and public squares, public transport stations etc., they are also paradoxically the most invisible, the most subdued group of citizens, so it is much harder to find them and provide them services such as health care and they are the most difficult to be removed from the streets. Every child, just like the cause of his/her life in the street, has a unique, specific and unified, often very strong, view of what surrounds him/her. The research carried out by the Swiss Government, *The Street Link Project Monitoring and Evaluation* (1998-1999), provides results regarding the street children's perspective (WHO, 2012). Most of the children involved in the project are aware of the risk of getting infections during unprotected sex activities. Likewise, they are aware of the dangers of HIV and AIDS as unique problems, but they also feel that they cannot influence the possibility that one day they will be infected. It is proven that street children develop and acquire the knowledge necessary to survive. Regardless of the low level of general knowledge and level of knowledge regarding sexually transmitted diseases, the low degree of self-confidence and the lack of positive image about themselves, in order to be able to face the difficulties of certain situations, but also peer pressure to engage in sexual activity, these children possess certain knowledge regarding sexually transmitted diseases. Another reason for this is the turndown by the world of adults, but also the violence against them (rape, prostitution, usury, hitting, torture, which often results in deaths). Speaking of sexually transmitted diseases, deficiencies are most noticeable in the empowerment of street children's skills, especially those assertive, in order to help them take more account of sexual preferences and choices, all with an aim of protecting against sexually transmitted diseases. The same group of researchers has come to important knowledge: as many as 60% of the street children permanently hold a negative attitude on drug use and narcotics. Like in many other countries, Russia faces a large number of street children, but when it comes to their number, there is no official data. Kissin et al. (2007) state that street children in St. Petersburg, aged between 15 and 19, exhibit an extremely high rate of HIV infection. Among street youth, who inject drugs, HIV seroprevalence has

been the largest ever reported in the Eastern Europe and is among the highest in the world. The research carried out in Iran (Foroughi et al., 2018) shows that the existence of street children and children who work in the street in that country is unquestionable. The uncertain conditions affecting the emergence of this population are disrupted families, poverty, high prevalence of crime among kindred, family members and colleagues. These are the factors that create social harm and high-risk behaviour, including drug addiction, prostitution, and sexual relationships with adolescents or peers. The study, conducted on a sample of thousands of children aged between 10 and 18, including blood tests, shows the following: "4.5% of children were HIV infected, 1.7% were infected with hepatitis B virus and 2.6% were infected with hepatitis C virus (HCV). Having parents who used drugs, infected with HCV and having experience in trading sex significantly increased the likelihood of getting HIV among the street children of Tehran", (Foroughi et al., 2018). The conclusion is that "HIV prevalence among street children is much higher than the general population (<0.1%), and in fact, the rate of positivity comes close to that among female sex workers in Iran. These findings must be an alarm for HIV- related policy makers to consider immediate and special interventions for this at-risk group", (Foroughi et al., 2018).

The life of street children and their interaction with multiple factors in their environment has often developed a special conversational language, a language of subculture (Beazley, 2003), or, specifically, a completely new subculture. Both discourses may exist in these children – both home and street because some children, as has been explained earlier, return to their families. Therefore, both street and family discourse and constructed subculture exist outside homes and families, but children and the youth are generally not homeless. For them, the home still exists in some sense if we use social determinant of a *home in an inhuman world*. The same authors (Ennew & Swart-Kruger, 2003) state that, regardless of whether they sleep in the streets or not, street children construct and reconstruct the meanings of their daily reality in the narrow sense of the word. Adults who look for them in order to work with them have developed social constructions that are basic, or are inwrought through public discourse regarding street children and street youth. Morally powerful social structures of family, home, family life and childhood cannot exist without the construction of "*the other*" – dangers of the street, the amorality of life in the streets and above all, street children outside the sphere of households and the challenge of social existence. In Africa, for example, a home does not have to be permanent in terms of location and material it is made of. When the home is simply on the sidewalk, it is factually in the street. When street children return home, at least periodically, they figuratively also bring with them a part of the street. Contrary to situation in Africa, Stephenson (2002) depicts the economic and social turnarounds in Moscow, created in the streets, not in a private space, the dominant environment of urban life. Apart from being labelled by public discourse as homeless people, street children are often referred to as those without a family or as victims of a family breakdown. Their day-to-day interactive construction of reality captures the entire environment as a potential habitat irrespective of adult tags. They identify and use urban niches for their own safety and pleasure by competing with adults for space and conquering their own space as well as building subcultures and identities of which both, or more, are multiple and alive.

Studies show that street children use public places as means of socialization, work, recreation, personal achievement, learning, survival, but also as all other means. Spaces and use are culturally constructed, often through negotiation of meanings with adults. Street children take advantage of open spaces such as beaches and parks, indoor cinema venues, dance halls, malls, etc. and also turn such places into private workplaces by charging for certain areas like parking places, cleaning or guarding cars. However, there is a question as to how street children are created. Vdović (2008: 67, according to Lalor, 1999, p. 8) lists the classification of delinquency development in three phases, on an example of Colombian children. Thus, pre-gamin child is in the street that makes an income there, but has contacts with his/her family. If there is an opportunity, such child will do minor offenses. The second stage is gamin, a child with very poor contacts with his/her family and a child living with a group of friends and earns a living in the street performing criminal acts. The final stage are older minors who have adopted street norms and ethics. It is very likely that such children will develop into serious criminals in adulthood.

There is no specific information regarding the situation in the Republic of Croatia. Statistical data on children under fifteen years of age are inadequate, as are the data on the nature of such work. Such data would largely help to address the problems of street children in Croatia as well as presenting the actual picture of the situation. Children's rights fighters and members of the Children's Rights Committee are particularly concerned about the lack of classified statistics and other information on the status of children, especially those belonging to different ethnic groups and the most vulnerable groups. This type of data is missing especially in relation to female children, street children, children with disabilities, displaced children, refugees, members of minority ethnic groups, etc. On the website of the *Government of the United States of America*, under the *Office for Democracy, Human Rights and Labour,* there are exhaustive data from this domain for all countries of the world, as well as for Croatia, but data on street children in Croatia are insufficient. The *International Committee for the Rights of Children* expresses its concern that a large number of children in Croatia is without parental care or children who have lost contact with their families, and as one of the main causes is the poor state of the country during the war period from 1991 to 1995. Bad conditions imply underdeveloped economy, poor management,

underdeveloped tourism, high unemployment rate, uneven regional development and a growing national deficit, all caused by the long and severe war. However, as long as no valid research is carried out, the real image will be inadequate and everything will be based on mere assumptions. This pointing to the lack of statistical data and scientific research requires new research that will bring a real insight into the real image of things. In this context, important is *Case Study of Young Members of Socially Excluded Groups* that, apart from bringing individual case studies, also makes recommendations for each individual social group. Only when problems and the reality of the situation in which a particular country are identified it will be possible to act preventively. Since the Republic of Croatia is mainly a transit country during this immigration crisis, it is unlikely that the number of immigrants and refugees will increase. However, some of immigrants will remain in Croatia and increase the numbers of this extremely vulnerable group.[1] A special problem are the children who are lost during the migration or who serve as a "means" of illegal entry into Europe, as was the case with the five-year-old Syrian girl Allsom, whose father probably lost her in the Republic of Croatia, according to media reports, (Pušić, 2018). Such children, if they really existed and if they are not found in time, can potentially become white slaves, victims of human trafficking.

3. Capital creation

Street children, no matter which state or city they are in, often come to criminal acts and pathological behaviour (especially street prostitution) to earn money for food and drinks. The term *social capital* is widely used when looking at the property created by children living in the street. Stephenson (2006) advocates for inclusion of this concept in the discourse on street children. In order to create capital, street children need to be able to cope with the ability to calculate and pay with money. These ideas are a challenge, from the perspective of children as economic factors, and are often of vital importance for the survival of their families and look at children's attempts to reconstruct lost families and create a supportive social network. Many children are becoming involved in the criminal community and the "de-capitalization" of their diminished social capital. Children, forced to earn money, are also involved in non-criminal and criminal subcultures as a way of gaining access to important networks and resources. The youth use their social skills and appropriate subcultural standards and values to build alternative careers. For example, homeless children in Moscow are resourceful and socio-active actors who find alternate families and create *ad hoc* social benefits. In order to earn in the streets, these children must have developed many knowledge and abilities. Spatial skills and highly developed visual and acoustic abilities are important for avoiding, escaping, and detecting risks. Street children, often with very developed diction, are very capable of exchanging money (returning change, etc.) at marketplaces. What adults see when it comes to street children are "dirty children, delinquents, who always have problems with the law". This is precisely the negative construct of adults and the connection to the disorder of the public in such an understanding. In a factual, provable sense, it can be argued that the streets are dirty and unhealthy environment. Strangely and ironically, there is limited interest in the health of street children in relation to this general attitude. Namely, there is some evidence that street children are actually healthier and perhaps less malnourished when compared to their contemporaries living in slums and favelas. The reason for this may be the fact that the strongest and most active children will most likely have the courage and energy to try for street life (Ennew & Swart-Kruger, 2003). Their moral, spiritual and intellectual health is often better than that of their peers who do not live in the street. Children in the streets do not replace moral values with asocial attitudes, street children seem to have extraordinary norms of behaviour and aspiration. Although they rarely state it, street children often have a clear religious attachment and loyalty. Life and life skills learned in the streets can be more useful than knowledge learned in inadequate schools, with the ignorance or insults by the teachers. Similarly, some researchers say, according to Ennew and Swart-Kruger (2003), that results derived from the use of psychometric tests and clinical assessments of street boys in South Africa show that cognitive abilities are "contextually structured, stimulating and mediated".

4. Conclusion

Street children are a growing global problem we cannot turn our heads from. A growing number of more than 100 million such children favours this thesis. This problem, often referred to as a disease, is also present in Croatia, but there is little or no knowledge about it, which is proven by insufficient relevant data and research, as well as the bleak media image of these children, but without an explanation how and why children become street children. This paper presents possible reasons for why and how children become street children. They are not just a term, they live and exist among us, and often we are

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[1] According to the Ministry of Interior statistics, out of 10 asylum seekers, as many as 8 (77%) leave Croatia before the procedure is completed, with an aim of ending up at the desired destination. And from 2016 to today, 14 asylum-seekers of 1042 who filed for asylum in Croatia have been deported, (net.hr, 2018).

not aware of it. Switzerland is among the first to make important steps to understand this phenomenon, but it is still insufficient. Since the majority of children in the street are illiterate, undesirable, and marginalized in society, there is a problem with coming to legitimate data, and thus prevention. What is mentioned as one of the main problems that turns children into street children is abuse and neglect in the family, which encourages children to leave their families completely and surrender themselves to the street. Thus, the family is being imposed as the primary and the main social factor of this problematic phenomenon.

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TEACHERS' FIRST LANGUAGE USE IN A SECOND LANGUAGE LEARNING CLASS ROOM ENVIRONMENT

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Abstract

The aim of this study is to investigate teachers' belief and perceptions about First Language (L1) use in English as First Additional Language (FAL) in a learning environment. This is a descriptive survey in which seventy two Second Language (L2) teachers from Motheo district in South Africa volunteered to participate in this study. A questionnaire which probed into beliefs and perceptions about employing learners' L1 (Sesotho) in L2 (English) learning was used to collect data. The data obtained showed that L2 teachers used L1 mainly to provide feedback; teach new vocabulary; explain grammar; build rapport; manage the class; give individual help to learners and save time in lengthy task explanations.

Keywords: Bilingualism, first language, multilingualism, first additional language.

1. Introduction

The recent findings of L2 studies examining the use of L1 in L2 learning studies undermine the strong L2 – only attitude advocated regularly in the policy documents. In the process of teaching a second language, the teacher's use of mother tongue can influence the learner's acquisition of the target language. The existing body of L2 research in the area of L1 use has shown positive effect of L1 use on prompting L2 learning (e.g. Atkinson, 1987; Brooks-Lewis, 2009; Oguro, 2011; etc.).

Nevertheless, maximal use of L2 is encouraged due to the fact that for most of L2 learner's language classroom is the only context they have at their disposal for L2 exposure (Mohebbi & Alavi, 2014). It is also claimed that if language teachers have recourse to learners' L1, the amount of comprehensible L2 input decreases (Mohebbi & Alavi, 2014). Although L2 teachers are in favour of minimal L1 use, in practice L1 is used more widely than L2 teachers ponder ideal for prompting L2 learning (Oguro, 2011).

Mohebbi & Alavi (2014) point out L1 use as a natural spontaneous cognitive strategy. On the same attitude, Sampson (2012) avers that prohibiting L1 use in language classroom might be detrimental to L2 development. Grim (2010) considers L1 use as a scaffolding instrument for L2 learners which might result in more result in more effective L2 output. In a similar manner of research, code switching, defined as a systematic use of L1 within a conversation or utterance, is treated as a competence, even an advance one, which permits the bilingual speakers to negotiate more fluently (Mohebbi & Alavi, 2014). To be exact, code-switching requires competence in all languages involved, and it is simplistic to consider it as simple mixture of two languages (Cook, 2008). In most cases, code switching is observed whenever bilingual speakers speak to each other.

In summing up, recent studies investigating the use of L1 in L2 learning from different perspectives have provided support for the effectiveness of employing learners' L1 in enhancing L2 learning. Nevertheless, there is a limited L2 research investigating the belief and perceptions of L2 teachers about L1 use in English as a second language context. The purpose of this study is to inquire into L2 teachers' perceptions and beliefs in English as a second language context to find out L2 teachers' perceptions about potential functions of L1 in mastering L2 in English as second language context in South Africa.

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1.1. Functions of learners' first language in a second language classroom

According to Mohebbi & Alavi (2014: 59), teachers generally employ learners' L1 for three main purposes, namely instructional, i.e. facilitating comprehension, explaining grammar, new lexical items and concepts, managerial such as classroom management, providing feedback, and for affective purposes, particularly encouraging and providing comfort for learners.

Wilkerson (2008) in Mohebbi & Alavi (2014) observed that teachers employed L1 mainly to control the speed of classroom interactions and activities eliminate waiting or lag time and restrict turn-taking by learners. Additionally, the teachers' resorted to L1 to avoid ambiguity, save time, establish or assert authority, and manage classroom.

1.2. Second language teachers' perception about learners' first language use in second language classroom

Mohebbi &Alavi (2014) observed that there is a gap in L2 research inquiring into teachers' and learners' perceptions and beliefs about employing L1 in L2 learning classroom environment. Lavine (2003) in Mohebbi & Alavi (2014) encourage the teachers to accept that L1 apparently serves numerous effective functions in L2 classes and ignoring the crucial role of L1 would appear to be a futile exercise. It also stated that students should be assigned an active role in striking balance between target and first language use in classroom.

Crawford (2004) surveyed the language teachers' attitudes towards L1 use in Australia. She argued that despite the finding that the teachers' own proficiency exerted some effect on levels of L1 -L2 use, improving teachers' proficiency will not by itself bring changes due to the fact that even highly proficient native speakers resort to L1 at almost all level of the course.

2. Methodology

This study was undertaken in different private schools in Motheo district, Free State province in South Africa (i.e. English as First Additional Language); the main focus of the syllabus is on reading, writing, listening and speaking skills. Teachers and learners are required to shy away from using L1 in the classroom environment.

2.1. Participants

The study was conducted in various private schools in Free State province in South Africa. The questionnaire was distributed to more than hundred -twenty L2 teachers and they were asked to participate in the study. The participants were forty females and thirty-two males ranging in age from twenty-one to thirty-nine. Thirty-eight of the participants held a bachelor's degree in teaching English as First Additional Language (FAL), English literature and linguistics; ten of the participants held bachelor's and master's degree in other majors who had learnt English in private language schools.

2.2. Instruments

The data was obtained through two instruments, a biodata questionnaire and a questionnaire developed to inquire L2 teachers' beliefs and perceptions about L1 use in L2 teaching.

3. Results

The data obtained through the teachers' perception and beliefs questionnaire were analysed to find the teachers' perception and belief about using learners' L1 in English as a FAL context. Below is the Table 1 summarises the main findings of the data analysis in favour of L1 use. While on the other side, Table 2 summarises the main finding of data analysis against First Language use.

Table 1. The main findings of the data analysis in favour of L1 use.

First Language functions in Second language Classroom	Always	Usually	Sometimes	Rarely	Never
I use learners' L1 to provide feedback	54.16	40.27	-	-	5.55
I use learners' L1 in dealing with discipline problems in class	69.44	15.27	6.94	4.16	4.16
I use learners' L1 in giving individual help	51.38	13.88	-	-	34.72
I use learners' L1 to teach new vocabulary	48.6	22.22	23.61	-	5.55
I use learners' L1 to build rapport with learners	43.05	22.22	29.61	4.16	1.38
I employ learners' L1 in giving personal comments	81.94	15.27	2.77	-	-
I use learners' L1 to explain grammar	77.77	12.5	8.33	-	-

Table 2. The main findings of data analysis against First Language use.

First Language functions in Second language Classroom	Always	Usually	Sometimes	Rarely	Never
I use learners' L1 to encourage and comfort learners	6.94	15.27	16.66	26.38	34.72
I use learners' L1 in administrative issues like exam announcement	29.16	9.72	2.77	34.72	23.6
I use learners' L1 in making contrast between L1 and L2	8.33	9.72	9.72	6.94	65.27
I use learners' L1 to explain instructions for assignment or projects	18.83	13.88	15.27	5.55	40.27
I use learners' L1 in giving written corrective feedback on learners 'compositions.	6.94	2.77	18.05	11.11	61.11

Figure 1 shows the main functions of Learners' of learners' L1 based on the data obtained through the questionnaire.

Figure 1. Main findings regarding the functions of L2 learners'L1.
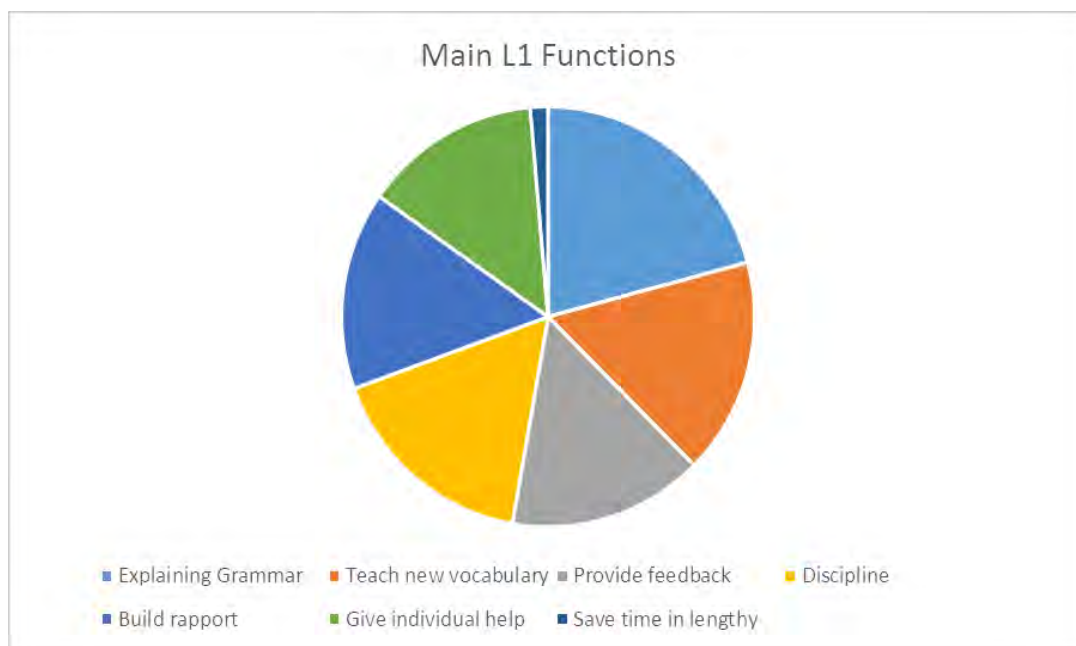
4. Discussion and conclusion

This study specifically probed, into teachers' perception and beliefs with respect to using L2 learners' L1 in FAL class environment. The results showed that teachers employed L2 learners' L1 mainly to teach new grammatical lexical items provide feedback and explain learners' mistakes. Teachers also took advantage of learners' L1 to build rapport with learners. The findings of the study emphasise the importance of learners' L1 in enhancing L2 learning, in particular in L2 vocabulary and grammar teaching.

Amazingly, teachers' responses indicated a number of findings which are in contrast with previous studies. In contrast to the findings of the studies to date investigating the L1 use in L2 learning, most teachers expressed that they never fall back on learners' L1 to explain instructions for assignment or projects (Mohebbi & Alavi, 2014). Furthermore, they asserted that they never employ learners' L1 in encouraging learners and in giving written corrective feedback. It can also be argued that learners' L1 has the potential to prompt L2 learning and its use should be encouraged. But this does not mean that L1 use should be used expansively. It is argued that learners' L1, as an invaluable asset, need to be employed effectively prudently. Second language teachers should be encouraged to maintain a steadiness between L1 and L2 use in L2 learning environment.

There are some limitations in this study that should be acknowledge and that could serve as lines of future studies in this field. Apart from these limitations, the study holds substantial implications for language teachers, particularly in teaching English as a second language context. Second language teachers need to consider L2 learning classroom environment as multilingual social space in which teachers and

learners take advantage of "dynamic, creative, and pedagogically effective use of both the target language and the learners' L1 (s)" (Mohebbi & Alavi, 2014, p.67).

To sum up this discussion, it is mandatory to stress that teachers play the most crucial role in L1 use, Mohebbi & Alavi (2014), observed that majority of teachers opted for L1 considerably in spite of their training and the policies stated clearly sanctioning exclusively target language use.

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INSTITUTIONALIZATION PROPOSALS OF ATTENTION TO DIVERSITY AT UNIVERSITY FROM THE VISION OF LEADERS

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Abstract

This paper outlines a descriptive and interpretative qualitative research project that is framed within a larger study[1], the general aim of which is to diagnose university policies and practices in order to propose an Institutionalization Plan to Address Diversity in Higher Education. We have investigated the vision of university leaders as a key part of this process. To this end, 26 institutional leaders from the University of Córdoba (Spain) have been interviewed, selected intentionally in accordance with the following criteria: leadership level (Vice-Chancellor, Department Director, Dean, Director of Specific Services, President of the Student Council, Representatives of Administration and Services Staff), representation of the entire university community (Teaching and Research Staff, Students, and Administration and Services Staff), encompassing all areas of knowledge, and gender balance. Discourse analysis was used to code all the information produced - deductive and inductive -, followed by recoding and categorization, with code validation by means of intercoder agreement and expert judgment. The findings highlight existing "good practices" but also recognize difficulties. Proposals for institutionalization pertain to the following areas: management (policies and strategies, infrastructure, recognition, external entities and resources); education (awareness and sensitization, training and specific measures for students from protected groups); innovation, research and transfer, dissemination, evaluations and culture. The discourse of these leaders highlights training, awareness and dissemination as fundamental lines of action. In addition, we found certain intergroup differences between the different levels of leadership. The conclusions coincide with previous studies with regard to some of the proposals. However, in this case, a greater volume of more specific categories and subcategories is obtained. Consequently, this study contributes greater applicability and functionality to the context studied with a greater possibility for transference. Furthermore, unlike the international studies developed that focus on the body responsible for addressing or dealing with diversity, this paper takes into account all levels of organizational leadership and sectors of the community. This is important if we intend to address or manage diversity as an integral part of university life.

Keywords: Institutionalization, addressing diversity, higher education, leadership, policy development.

1. Introduction

University institutions are engaged in a process of complex transformation on a global scale that affects interaction between how learning processes develop, how knowledge is constructed, and how they relate to society. Specifically, we could say that they are immersed in a dilemma between two perspectives: the commercial angle that engulfs universities, according to the regulations of the World Trade Organization (Santos, 2017); and a necessary response from the perspective of social justice that offers a commitment to inclusion (Gibson, 2015).

The second of these two perspectives, which emphasizes the social responsibility of universities, involves moving away from a paradigm of exclusivity, based on the merit of a few minorities that access higher education and whose policies and measures are aimed at these groups that are already 'in', in order to achieve their continuation and achievement (Gavino, Eber & Bell, 2010); towards a paradigm of inclusivity, whose raison revolves around the principles of democracy (Stefani & Blessinger, 2018). Change directed towards a new organizational culture in which leaders need models with empirical evidence and tools that guide them towards new practices and realities.

This paper is part of a larger project, the general purpose of which is to diagnose key dimensions of an institutionalized approach to addressing diversity by designing a transfer plan. The first stage involved carrying out a national and international exploration of the current situation of university institutions in

relation to addressing inclusivity in their policies and the way in which it is discussed by the university community.

This study focuses particularly on one of the dimensions of institutionalizing the inclusive management of diversity in higher education: leadership, considered by the literature to be a decisive component (Adserias et al, 2016) to ensure that diversity does not remain merely a declaration of intent but instead reaches the necessary institutional culture (Kezar, 2007).

2. Theoretical framework

In national and international literature in the fields of education and business, the concepts of inclusion and leadership are increasingly found in conjunction. Analysis of leadership in education has been carried out chiefly by analyzing its role in the early stages of education (for example, Bolívar, López & Murillo, 2013); however, references to research in higher education are decreasing. Hence, the demand expressed by various authors to highlight this gap in knowledge (Bryman, 2007).

In relation to the literature about the inclusive management of diversity, as argued by Shore et al. (2009), diversity has been studied from a reactive stance towards the prejudices and discrimination present in society, not obtaining positive results for people or institutions. Consequently, there is an urgent need for theoretical and empirical research that, through a more positive and proactive change of paradigm, raising new questions that are more closely linked to when and how diversity assists the success of the organization, provokes new approaches to management and promotes new opportunities.

For Manzano Arrondo (2015), the problematic situation in which university education finds itself today is rooted in growing pressure from the market in the face of the promotion of social change and the common good. Through the analysis of publications and interviews with academics and activist teachers, the author presents the difficulties faced in terms of teaching (training, availability, adaptation and anticipation of market changes), research (technology transfer to companies, competitiveness, partnerships with private organizations) and institutionally (reduction of public funding and staff, mergers between universities, business management styles). Based on these obstacles, he offers proposals to stimulate the social commitment of universities related with the promotion of an ethical university culture and partnerships with the tertiary sector.

Pérez and Sarrate (2013), on the other hand, focusing on the student collective, develop proposals to promote inclusive education from the perspective of university social responsibility in cultural diversity. These include policies and participatory action plans with values of diversity and fairness, and which pay attention to problems originating from social and cultural differences (induction programmes, adaptation and technique development courses, spaces for dialogue and mutual knowledge), teachers who are sensitive to diversity (offer of distance education to adapt to different needs and fit in with the work/life balance of students), artistic, sporting and charitable activities designed by the students, peer tutorials, methodological education resource centres, advice for training and experience exchange, financial assistance (grants, loans, exemptions, quotas and differentiated fees), didactic/methodological research and innovation that fosters the inclusion of immigrant students.

Devlin (2013), in contrast, looks at the results of two national studies in 16 Australian universities with successful workers and students from low socioeconomic backgrounds. She proposes new lines in relation to the leadership and management of the teaching and learning process for university diversity: institutional strategic alignment, reward and recognition of teaching staff, appropriate resources, and an effective support structure.

Given that the bibliography flags up the general lack of research focusing on the leadership required to implement diversity agendas and highlights the need for research to guide leaders (Adserias et al., 2016), we have decided to investigate leadership by analyzing the discourse of leaders at the highest organizational levels of the university institution. We understand that these individuals have the power to legitimize and give meaning, through their decisions, thereby generating social discourse.

These are the questions that guide the research presented here. The aim of this paper is to interpret the discourse of leaders within universities in relation to proposals to institutionalize the inclusive management of diversity with a view to ascertaining their understanding of diversity in relation to the priority areas of action for the university.

3. Methods

The research conducted here is developed from a qualitative perspective through the case study of a medium sized university located in Andalusia, Spain. For the purposes of this paper, we focus on analyzing the discourse of 26 institutional leaders at different levels of leadership (Vice Chancellor, Dean, Director of Department, Director of Specific Services, Head of Administration and Services Staff, and

President of the Student Council), using a balanced sample in terms of gender and affiliation with different areas of knowledge.

The instrument used to generate data was a semi-structured interview that was recorded and subsequently transcribed. Thematic analysis was conducted by means of deductive and inductive coding, validated in accordance with intercoder agreement and using the software package Atlas.ti v.8.3. The participants were informed of the object of the study and the anonymity of the data provided, and gave their consent to participate therein.

4. Results

The leaders interviewed stated that they encountered certain difficulties when it came to responding from an inclusive perspective. These include:
- Lack of training. Lack of knowledge regarding how to act in certain situations, chiefly with students who have special educational needs or some kind of disability, which generates insecurity and fear.
- Lack of knowledge regarding the needs of certain collectives, especially invisibilized groups and those who do not declare their needs.
- Imposition of macro-level rules or pressures that exacerbate bureaucracy and increase work saturation.
- Overloading with information and work saturation that leads to a diagonal reading of documentation, lack of interest in events, and consequently a lack of awareness regarding issues that transcend their teaching and research tasks per se.
- Financial difficulties to transform spaces and eliminate architectural barriers.

In order to overcome these difficulties, the leaders interviewed from the different levels have made proposals that we have grouped into the following areas: management, education, research, innovation and transfer, dissemination, evaluations and culture (Table 1).

Table 1. Categories of proposals made by institutional leaders.

CATEGORIES		PROPOSALS
MANAGEMENT	POLICIES AND STRATEGIES	University policy as a transversal lynchpin
		Universal accessibility plan, both in physical and curricular terms Promote Diversity
		Specific policies that increase visibility
		Specific programme to engage diversity in University Access (SEN/Disability, Socioeconomic background)
		Find mechanisms so that students from protected groups have more room to grow at University and are always accepted
		Retention and progress of students from protected groups using less exacting grants systems
		Fundamental component of the education pact
	INFRASTRUCTURE	Adaptation of buildings, eliminating architectural barriers
		Design new buildings from the perspective of universal accessibility
	RECOGNITION	Academic and professional recognition of people who develop measures for Addressing Diversity (AD) because these are professional improvements that assist dissemination
		Include AD as an item on the Contract-Programme used to evaluate Departments
		Maternity leave should not count as a result in terms of scientific production
		Lighten the load for teachers involved in AD and/or for collaboration with the Diversity Management Service (DMS)
		Create an AD award to increase visibility
	EXTERNAL ENTITIES	Establish synergies with other institutions, organizations and associations of underrepresented groups and underprivileged areas that contribute knowledge, experiences and resources
	RESOURCES	Economic and human resources
		SEN Specialists that work in closer collaboration with teaching and research staff
		Promote the DMS

EDUCATION	AWARENESS AND SENSITIZATION of the entire university community	Campaigns with and without the collaboration of External Entities that allow for reflection
		Dealing with diversity as a transversal subject that permeates all study plans
	TRAINING	How? VOLUNTARY for the whole university community RECOGNITION for faculty and administration staff COMPULSORY for students
		Design teaching actions from the perspective of universal accessibility
		TRAINING on two levels: Open courses, and ensuring teacher receptiveness
		Inclusive methodological approaches that adapt to the diversity of the students in all branches of knowledge (not only in the discipline being taught or researched but also with regard to how)
		Foster reflective teaching practices
		Incorporate AD contents in the masters' degree for new university teachers
		Transversal subject that permeates all study plans
		Foster the advantages of technology by rolling out online subjects
	SPECIFIC MEASURES AIMED AT PROTECTED GROUPS OF STUDENTS	Academic support with well-balanced assistance
		Professional guidance
RESEARCH	**INNOVATION TRANSFER**	Encourage research in AD, ground practices in scientific evidence.
		Ground practice in scientific evidence
		Innovative initiatives in AD.
		Simple questionnaire with open-ended questions conducted periodically with the governing teams of centres, to analyze the current situation in terms of AD.
		Encourage agreements with external entities.
	DISSEMINATION	Give a voice and visibility to all people from protected groups and to their progress.
		Scientific Dissemination Office and UCO News to regularly tackle diversity.
		Towards society in general, and influencing the role of families.
		Disseminate good practices between Departments and Universities
		Foster the function of the Social Council.
	EVALUATIONS	Development of evaluations of the AD measures implemented
	CULTURE	Create continuity for the work initiated in favour of Gender Equality
		Change Disability to Diversity in a broad sense that encompasses gifted students, SEN Support, Socioeconomic background, Sexual Identity, …

Note. Authors' own

Intra-group analysis highlights a greater concern for training, awareness and sensitization within the university community, as well as the importance of dissemination throughout this entire process. On occasions, more intra-group (leaders from the same level of management or group represented) than intergroup difference is observed, which leads us to deduce that the influence of personal experience is greater than the group represented.

In spite of all of this, we see preferences towards certain issues over others between the different levels of leadership. For example, Vice Chancellors are more likely to cite the issue of training, above the other leaders, whereas this issue is the least cited among leaders of centres (Deans). As for professional or institutional recognition, this is the most important issue for Directors of Departments, after training, but it

is not so for those who manage at the top level, such as Vice Chancellors. As for resources, whereas this issue is proposed by Vice Chancellors, Deans, Directors of Departments and Specific Services, it is not seen to be a priority for students and administration and services staff.

5. Conclusions

For the development of inclusion policies, the role played by the highest tier of university leaders is a priority. Hence the importance of knowing their perceptions as well as the difficulties encountered and their proposals, in order to create a more inclusive university life, because this is not a parallel charitable activity; rather it is part of its main function. Therefore, universities have the responsibility not to spare any expense or effort to ensure that the inclusive management of diversity becomes part of the institutional culture.

Commitment to inclusive higher education supports a diversity agenda that should not be present on paper only, but rather one that deploys a whole raft of measures. In this respect, our results coincide partly with the contributions made by authors such as Pérez and Sarrate (2013), focusing on student cultural diversity, Devlin (2013), who presents success stories in diversity according to socioeconomic background, and Manzano Arrondo (2015), who looks at establishing links with the tertiary sector. However, in this case, by focusing for the first time on transversal leadership, in other words, all levels of leadership with an institution, we have obtained specific proposals that could contribute greater applicability and functionality to the study developed, with a greater possibility for transfer.

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INVOLVEMENT IN COMMUNITY-BASED ACTIVITIES OF PERSONS WITH PROFOUND AND MULTIPLE DISABILITIES

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Abstract

In Portugal, regular schools embody the main context of learning of children with profound and multiple disabilities. Paradoxically the end of schooling – that aims to prepare the individuals for a full citizenship - often means a discontinuity on inclusion process, with less opportunities to be engaged in common contexts of participation. The Day Services or Centres for Occupational Activities comprise the main support services for youths and adults which complexity of disabilities prevents the access to employment. To value the individuals' social role and their involvement in the community encompasses the main principles of these services. In this study we examined to what extent the activities performed by individuals with profound and multiple disabilities – users of the Day Services - are based in the community and are of significance. Data was collected using a questionnaire that listed different categories of activities (within learning, communication, mobility, self-care, domestic, work, and recreation and leisure domains) that were identified in a previous study as characterizing the actions promoted by the Day Services. For each category, respondents were asked about the context of occurrence (i.e., inside the centre or in the community) and their significance for the users (with a 4-point scale varying from "low" to "a lot"). Respondents were occupational therapists responsible for planning and implementing activities held in 43 centres in the North of Portugal. From a total list of 19 activities, a mean of 5 were performed in the community and concern, predominately, to recreation and leisure category (including *shopping*, *tours and visits* and *laze*). Most activities were performed inside the centres, namely: the development of work tasks; training on domestic activities as preparing meals, and cleaning; and overall learning activities. Significance was judged? in a median of 4 – meaning "a lot" -, with exception to *audiovisuals* and *games and play activities* that, inside the category of recreation and leisure, were judged as having a reasonable significance. A rupture of traditional centre-based models, toward increased use of community resources and activities are discussed in terms of opportunities and challenges of an inclusive society.

Keywords: Profound and multiple disabilities, community-based service, day services, social inclusion.

1. Introduction

Although the existing wide diversity of functioning profiles, the circumstances of profound and multiple disabilities are globally described by intense support needs resulting from severe cognitive and neuromotor disfunctions frequently accompanied by sensory impairments and medical problems (e.g., seizures, respiratory and/or digestive problems) (Bellamy et al., 2010). In Portugal, precise statistics over the prevalence of individual´s with profound and multiple disabilities is unknown; being estimated, however, that during the school-age the number of children using specialized units within regular schools are around of 2.087 (DGEEC for the school year of 2015/2016). Although representing a relatively small and well-identified group, the development of responses aligned with the right of being included and of participating in the community (UN, 2007) has been an unaccomplished goal. As stressed by Maes et al. (2007) this group often experiences restrictions on the number and variety of developmental and leisure activities – resulting in repetitive and annoying routines; the time for leisure is predominantly spent inside institutions; the social network is commonly confined to professionals and family members; and their preferences and capacities are not sufficiently considered in the activities planning.

Based on the gap between the values/rights and the practical domain, the functioning model of support services – mainly represented by Day Services - has currently been under discussion in terms of significance and contribution for users' quality of life. As internationally documented adults with profound and multiple disabilities tend to spend around 7 to 10 hours in Day Services (Inspectorate of Health Care, 2005). Designed for persons which functioning circumstances prevent the involvement in a job – as

traditionally conceived – the Day Services, in Portugal, are defined by the intention of "*promoting quality of life through the engagement in social valued activities, whenever possible in the community, foreseen the development of skills as active and creative beings*" (Social Security Institute, 2007, p.2). Despite this definition, studies have been indicating that self-care, sensorial and group or passive activities are the activities predominantly experienced on these support services (e.g., Putten & Vlaskamp, 2011; Vlaskamp, Hiemstra, Wiersma & Zijlstra, 2007). The replacement of traditional approaches – merely dedicated to the occupation of time – by others centred on mediating the access and involvement in the community is a critical advance to achieve in terms of support's organization. Modernization of these services entails, then, the need of developing activities for individuals' empowerment, for social network enlargement and for the reduction of physical, social and intellectual barriers in the community (e.g., New Directions 2012-2016; Time to Move on from Congregated Settings: A Strategy for Community Inclusion, 2011).

Considering the need of developing strategies of support social participation of persons with profound and multiple disabilities in the community, this study intends to provide a description of the activities promoted by Portuguese Day Services, specifically in terms of their context of occurrence and of their significance.

2. Method

This study embodied a survey pertaining to a wide project that intends to map the nature and diversity of domains of Activity and Participation promoted by the Portuguese Day Services; and to understand which factors define the most satisfactory experiences.

2.1. Participants

A survey was administered to occupational therapists responsible for planning and implementing activities held in 43 centres situated in the North of Portugal. An incidental sampling was used for participants' recruitment, starting by an invitation letter sent to occupational therapists working in different Day Services in the North of Portugal. The responding therapists had a mean age of 30.79 (SD=6.91), with 7 years as mean time of experience working in Day Services. The majority were females (n=40; 93.02%).

Therapists were working in Day Services that supported an average of 41.26 users (SD= 29.93). It is important to note, however, that a large diversity on the number of persons supported by the services was found, varying from 10 to 162 users. In total the services that participated in the study were serving 1 774 individuals. The majority was supporting individuals between 25-34 (n=67.4% of the centres) and between 35-49 years old (65.1%). Few services indicated also as target population individuals between 18-24 (18.6%) and between 50-59 (9.3%). Most of the centres were implementing supports to groups mainly composed by individual's with intellectual disabilities. Other diagnoses were also represented such as cerebral palsy, down syndrome and autism.

2.2. Data collection

Data was collected using a questionnaire that listed different categories of activities (within learning, communication, mobility, self-care, domestic, work, and recreation and leisure domains), framed by the International Classification of Functioning, Disability and Health (ICF, WHO, 2001), that were identified in a previous study as characterizing the actions promoted by the Day Services (Nunes & Silveira-Maia, 2015). For each category, respondents were asked about the context of occurrence (1- inside the centre; 2 - in the community; 3 – inside the centre and in the community) and about their significance for the users (with a 4-point scale varying from "low" to "a lot").

2.3. Procedure

Data was collected during 2018. The questionnaire was made available online through the software Lime Survey. Questionnaires were accompanied by an introductory letter and a consent form. Confidentiality and anonymity were maintained throughout the study development. A descriptive analysis was performed using the SPSS Statistics 23 software package.

3. Results

Most activities were performed inside the centers, being reported as main context of occurrence by most of the centers (table 1).

From a total list of 19 activities, five were assigned as being mainly performed in the community. Around a half of the centers developed in the community activities of *moving around* and *physical related-activities*. The majority (more than 79% of the centers) assigns/assigned? also to the community activities as *shopping*, *tours and visits* and *laze*.

Table 1. Predominant context of occurrence of the different categories of activities (number of centers; percentage) and median of significance (from "0 none" to "4 a lot").

Categories	Main Context of Occurrence n (%)	Significance Md
Learning and applying knowledge (e.g., clubs of math)	Inside the center (n= 34; 79.1%)	4
Communicating (e.g, groups of conversation)	Inside the center (n= 40; 93%)	4
Using technologies	Inside the center (n= 32; 74.4%)	4
Moving around (e.g., orientation and mobility training)	**In the Community (n= 22; 51.2%)**	4
Manualities	Inside the center (n= 39; 90.7%)	4
Self-Care (autonomy training)	Inside the center (n= 23; 53.5%)	4
Eating and drinking (hour for tea/ lunch…)	Inside the center (n= 34; 79.1%)	4
Shopping	**In the Community (n= 34; 79.1%)**	4
Preparing meals (kitchen training)	Inside the center (n= 34; 79.1%)	4
Domestic Activities (cleaning training)	Inside the center (n= 33; 76.7%)	4
Preparing to work (e.g., carpentry workshops…)	Inside the center (n= 23; 53.5%)	4
Working activities inside the institution	Inside the center (n= 23; 53.5%)	4
Working activities for the community (e.g., laundry...)	Inside the center (n= 22; 51.2%)	4
Artistic and Creative Activities (e.g., painting…)	Inside the center (n= 31; 72.1%)	4
Physical Activities (e.g., sports…)	**Inside the Center and In the Community (n=20; 46.5%)**	4
Tours and visits	**In the Community (n=37; 86%)**	4
Audiovisuals (watching tv, listening music)	Inside the center (n= 38; 88.4%)	**3.5**
Laze (e.g., going to coffees; restaurants, parties)	**In the Community (n=35; 81.4%)**	4
Games and Play (e.g., board games)	Inside the center (n= 40; 93%)	**3**

Significance were judged in a median of 4 – meaning "a lot" -, with exception to audiovisuals and games and play activities that were judged as having a reasonable significance.

4. Discussion and conclusions

The restructuration of Day Services towards a strategy based on accessing mainstream community amenities and facilities is an international trend (e.g., Simpson, 2007). From the perspective of the occupational therapists, this study provided information on the activities promoted by the Portuguese Day Services in terms of context of occurrence and of their significance. Data seems to confirm that the great diversity of the activities developed by Day Services are performed in institutional context. Exception was observed in areas as *moving around*, *physical activities*, *tour and visits* and *laze,* activities which were predominantly assigned as being developed in the community. It is worth to note that data also revealed that the work-related activities (including work activities for the community) remains encapsulated in the institutional context; contrasting with a modernization movement that conceives the employment as the maximum symbolic signal of participation in the community (Scottish Executive, 2003). Considerations should also be done on regard to the activities' evaluation in terms of significance. The present study indicate that all activities were considered of great significance by the therapists. Nevertheless, we must be aware that significance evaluation should be primarily based on the satisfaction of the users (e.g., Simpson, 2007) – perspective not directly covered in this paper. Indeed, study findings seem to reinforce the need to increase the use of community resources and activities, which demands to rethink the way supports are organized and provided.

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THE ROLE OF KNOWLEDGE MANAGEMENT TECHNOLOGIES AT A POLISH UNIVERSITY – A CASE STUDY

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Abstract

The purpose of this paper was to present an analysis on challenges and barriers connected with the use of technical, or Information Technology (IT) tools of knowledge localization, creation, use, transfer, and codification at a Polish university. A synthetic review of the literature on knowledge management (KM) IT tools is presented. Results of surveys and in-depth interviews on the use of IT KM tools conducted among academic teachers, university IT specialists and university administrative staff from the Polish-Japanese Academy of Information Technology in Warsaw are presented. Discussion and implications are carried out. The main conclusion of the study is that although teachers and researchers are aware of the usefulness of various IT KM tools and are willing to use them in their daily work, there is still room for improvement. Its seems that the main challenge for academic authorities is to conduct a thorough analysis of the real needs of academics concerning KM IT tools and to provide them with both the tools and the knowledge how to use them. A further, more comprehensive research into the matter will be worth conducting.

Keywords: Knowledge, knowledge management, it tools, higher education.

1. Introduction

Modern developed economies tend to be Knowledge Based Economies. Therefore, there has been a dynamic development of studies focused on knowledge management. And institutions that have always been meant to create and share knowledge are universities, or institutions of higher education. It is worth mentioning here that the views on the goals and ways of creation and dissemination of knowledge in higher education institutions have significantly changed throughout the centuries. For example, the aim of the medieval university was to protect knowledge from the past and to cultivate knowledge and traditions in accordance with the interpretation of the Church doctrines rather than to create new knowledge or technologies. In the nineteenth-century, by contrast, the so-called Humboldtian university focused on developing research in the field of *pure science*, i.e. basic research. In the same period in the United States, most universities adopted the direction proposed by Yale College, according to which higher education institutions should teach only logical thinking. A group of universities, however, headed by the prestigious Harvard University did not agree with these assumptions as they recognized the research of practical and utilitarian nature as a priority for scientific activity (Matusiak, 2010, pp. 159 - 169). Nowadays it seems that universities differ in the proportions of studies devoted to basic research, utilitarian research and teaching, but none of them would decide not to create and share any new and at the same time usable knowledge at all.

The aim of the article was to continue studies on the characteristics and effectiveness of various IT (Information Technology) tools of knowledge management in higher education institutions in Poland started by the author in 2018 (Cieciora, 2018) and to define challenges and barriers connected with the use of technical, or IT tools of knowledge localization, creation, use, transfer and codification in the academic environment

First, a synthetic review of the literature on knowledge management (KM) IT tools is presented. Next, results of surveys and in-depth interviews on the use of IT KM tools conducted among academic workers and administrative staff in an academy in Warsaw are presented and discussed. Finally, conclusions of the analysis are presented.

2. Knowledge management IT tools in modern organizations – a literature review

As for the above-mentioned technical knowledge management tools, it should be emphasized that their dynamic development is closely connected with using more and more advanced information technologies. In organizations it becomes common to use facilities such as content management systems (CMS), i.e. software that allows easy creation and development of websites and www servers also by users with no technical knowledge, or Data Mining and Knowledge Discovery tools (translated, e.g., as exploration or extraction of data), in which statistical techniques or machine learning are used to help extract and analyze data from large databases and data warehouses. Other dynamically developing tools include blogs, communication tools such as e-mails, text messages, electronic newsletters, tele- and video conferencing group calendars, systems for working together remotely over one text (an example can be Google Docs), wikis, intranets, extranets, corporate file repositories, knowledge bases or e-learning trainings, as well as decision support systems or artificial intelligence tools (Dalkir, 2005, pp. 217 - 236). In the literature on the subject, one can find quite a lot of studies on the usefulness of IT KM tools in various types of modern organizations as well as challenges connected with their implementation. Sikorski *et al.* (2015), e.g. analyzed the use of intranet portals. The main conclusion was that advanced intranet portals can serve in many companies as Electronic Workplace (Digital Workplace) and facilitate to a great extent knowledge sharing. (Sikorski *et al*, 2015, pp. 26-27). Sobińska (2016) analyzed risks (e.g. lack of exclusive control of the tool) and opportunities (e.g. constant access to cutting-edge solutions) connected with using *cloud computing* for organizational knowledge management. Soniewicki (2017) studied the intensity of usage of information technologies supporting knowledge management processes in construction companies in Poland. He found out that there was a correlation between the intensity of the usage of the IT KM tools and the company's competitiveness level. And the bigger the company, the more intensive the IT tools usage. Shahmoradi, Safadari and Jimma (2017) presented a literature review on the implementation and use of IT KM tools in healthcare. It seems that nowadays the most popular of these tools include data management and learning tools, knowledge repositories, databases, electronic bulletin boards and e-mail services. There is also growing interest in Web 2.0 tools (such as blogs, wikis and the social media) as well as clinical decision support system, electronic health record system, community of practices and advanced care management.

3. Results of surveys conducted among academic teachers and researchers of Polish-Japanese Academy of Information Technology (PJAIT)

3.1. Description of the statistical methodology

This data was collected through questionnaires on a group of 36 researchers at the Polish-Japanese Academy of Information Technology, 9 from each of the Academy's departments. The analyses include a statistical test (T-test model, with a p-value of 0.05) used for making comparisons between the groups, as well as calculating the degree of correlation between different aspects of technology use. In order to conduct more fine-grained analyses, three compound indexes were created, which represent the use of various technologies, the intensity of this use, and perception of the technology's usefulness. These indexes are described below.

3.1.1. Use of technology index. This index represents the broadness of use. The higher the score of the index, the more technologies the researcher uses. The index is created based on the following formula: $Index_{Use} = \frac{\sum_i U_i}{N_i}$, where: $\sum_i U_i$ – sum of the answers given to question related to the use of technology (4 – use very often, 1 – do not use at all), N_i - the number of questions related to the use of various technologies.

3.1.2. Intensity of use index. This index represents the depth of use. Participants were asked what types of task they use the specified technology for. They could choose from five different tasks. The Intensity of use index represents the percentage of tasks that the participant uses the specific technology for. The higher this score, the more versatile the use of a technology. The index is based on a formula similar to the one used in the Use of technology index: $Index_{intensity,Technology} = \frac{\sum_i U_{Technology,i}}{N_i}$, where: $\sum_i U_i$ – sum of the answers given to questions related to the intensity of the use of a technology (1 – use technology for a task, 0 – do not use for a task), N_i - the number of questions related to the use of various technologies

3.1.3. Perception of usefulness index. This index, unlike the previous two deals with the way a given technology is perceived. The higher the score, the stronger the participants perception of the general usefulness of all the technology she was asked about. The index is based on the following formula: $Index_{Perc} = \frac{\sum_i P_i}{N_i}$, where: $\sum_i P_i$ – sum of the answers given to question related to the perception of the usefulness of technology in ones work (7 –extremely useful, 1 – do not use at all), N_i - the number of questions related to the use of various technologies.

3.2. Results of the statistical analysis

3.2.1. Use of technologies in the whole sample. As far as the use of different tools is concerned in the whole sample, the Use of technology index is slightly skewed towards the maximal values. This indicates that only a minority of the researchers is below the average when it comes to the use of varying tools for aiding their work. As one can see from Table 1. the most widely used tools include basic reporting tools, as well as email and web search engines. Other tools used for many tasks include document management systems such as Google Docs, or e-learning systems. These results can be attributed to the fact that such tools are quite general in their scope, so they can be used in many fields, and for many varying tasks related to knowledge management. As one can see from Table 2, researchers at the Academy have at least a moderately positive view of the usefulness of the tools they use, or wish to use. And as shown in Table 2, the most general tools were generally viewed as the most useful. This is in contrast to more specialized tools, which received lower scores.

Table 1. Intensity of use among different tools.

Tool/Technology	Total
Basic tools	0.53
E-mail	0.45
Google. search engines	0.41
Google docs	0.35
ERP systems	0.28
E-learning systems	0.28
Social media	0.23
Wiki based services	0.23
Group management software	0.22
Blogs	0.21
Workflow systems	0.19
Document Management	0.17
Corporate portals	0.15
Data Warehouse	0.14
Recommender systems	0.08

Table 2. Perception of different technologies.

Tool/Technology	Average perception
Basic tools	6,75
E-mail	6,69
Google. search engines	6,64
ERP systems	5,94
Google docs	4,94
Group management software	4,94
Workflow systems	4,83
Social media	4,78
Wiki based services	4,75
E-learning systems	4,69
Blogs	4,19
Document Management	3,94
Recommender systems	3,78
Corporate portals	3,53
Data Warehouse	3,19

3.2.2. The use of technologies by department and education. In general a significant difference was observed when comparing the average values of the Use of technology index among the four departments of the Academy. The use of technologies was the highest among the researchers in the Department of Computer Science. This indicates that they are the most motivated to use many computer aided technologies to aid in their work. This may be related to the nature of work done in this department. One needs to point out, however, that the mean values for this index are mediocre. It may indicate that only specific tools are used most of the time. Conversely, the lowest values of the Use of technology index was observed in the Department of New Media Arts.

Additional differences were observed when the Intensity of use index was taken into consideration. As shown in Table 3, once again researchers in the Department of Computer Studies were shown to be more inclined to utilize computer aided technologies in their work. As the table shows, they are also more likely to use the tools in many types of tasks. Conversely, researchers from the at the Department of Culture of Japan were shown to be least versatile.

Table 3. Intensity of use index for mentioned tools (Number in bold indicate results significantly lower/higher than the total average at p-value = 0.05).

	Total	Computer Science	Information Management	Culture of Japan	New Media Arts
Basic tools	0.53	0.6	0.58	0.51	0.44
E-mail	0.45	0.56	0.4	0.4	0.44
Google. search engines	0.41	0.36	0.36	0.51	0.42
Google docs	0.35	0.36	0.38	0.18	0.49
Document Management	0.17	0.38	0.07	0.02	0.2
Workflow systems	0.19	0.31	0.2	0.09	0.16
Group management software	0.22	0.42	0.2	0.02	0.24
ERP systems	0.28	0.44	0.24	0.16	0.27
Corporate portals	0.15	0.18	0.11	0.02	0.29
E-learning systems	0.28	0.58	0.13	0.16	0.27
Data Warehouse	0.14	0.31	0	0.16	0.09
Social media	0.23	0.2	0.29	0.16	0.29
Blogs	0.21	0.2	0.13	0.13	0.38
Wiki based services	0.23	0.27	0.07	0.2	0.38
Recommender systems	0.08	0.07	0.2	0	0.07

The Education section was divided in two ways: on the type of education in relation to the field of study (Computer Science, Economics, Culture Studies) and on the level of education (with three levels: Undergraduates, Graduates and Professors). In general, little significant differences were observed. However, the collected data seems to further confirm previous observations. Among education groups least likely to utilize computer aided tools in their work were people with degrees in economics and professors.

3.3. Comments on the use of other IT KM tools

As far as other IT KM tools used by employees are concerned, it seems that they are mostly used by teachers from the Department of Computer Science. They include, among others applications designed by a teacher himself that are meant to speed up or facilitate work, e.g. a mobile application that can verify the identity and academic achievements of a student entering the examination room in order to quickly eliminate people not admitted to the exam and people who intend to take an exam for somebody else. And as for the suggestions regarding the creation of new KM IT tools, most of them were also reported by teachers from the Department of Computer Science. Most of them suggested constant improvement of already existing tools, mainly modules of the integrated school system called Gakko, e.g. adding an interface that would show aggregate reports needed to complete the employee's card. They also pointed to the need to create new tools, e.g. a forum with answers to students' questions about homework and projects or an application matching job offers for students and graduates.

3.4. Results of in-depth interviews with administrative workers

The results of the survey study were presented to administrative employees of the Academy who were responsible for the organizational management of the work of teaching-and-research staff – vice-deans from all the departments and IT specialists - supervisors of Gakko. They were asked to comment on the data received. None of them was surprised by the results of the survey. The supervisors of Gakko agreed with the suggestions for improvement of the system and admitted that workers form other departments than Computer Science could have problems with the system's interface and access to some

modules. Vice-deans from all the departments apart from Computer Science admitted that their workers would benefit from trainings devoted to the use of IT KM tools as quite often they were just not aware of the existence and ways to use IT tools that were accessible in the Academy. The vice-deans also found some inventions of the staff to be of great interest (e.g. the mobile application that can verify the student's identity and status) and declared undertaking efforts to implement them throughout the Academy.

4. Discussion and conclusions

Upon the quantitative review of the available data, we were able to reach to some general conclusions. Firstly, researchers in the Academy are mostly focused on using general and basic tools for aiding their work. This may be partially explained by the very nature of these tools. By being general and simple, they can be appealing to researchers, regardless of their education and field of study. Furthermore, potential for implementing more specialized tools exists among the researchers, since the same levels of perceived usefulness of such tools was observed. Although this perception is mostly narrowed to some basic tools used at the moment, the fact that similar patterns are observed across many departments, and by people with differing backgrounds, lends credence to the notion that more specialized tools can be introduced, for example through dedicated training sessions. This is further corroborated by the observed correlation between the actual use of the tools and their perceived usefulness. The results of the quantitative study were confirmed during in-depth interviews with vice-deans of the Academy departments and the supervisors of Gakko, who also saw the need to both upgrade Gakko, introduce new solutions and organize trainings for workers, especially from other departments than Computer Science. The findings also go with accordance with the literature review, which shows the growing relevance of IT KM tools in modern organizations.

The paper was meant as a pilot study. The main value of the study is the collection of opinions and suggestions from a sample of respondents from different departments of a university concerning the actual use and perceived usefulness of IT KM tools in the academic environment. This can be used as a basis for further research on the choice of IT KM tools and ways of implementing them at universities in Poland. Its limitations include the lack of research on a larger research sample that would include the majority of Polish universities and verification of employee opinions on the effectiveness of applied IT KM tools with objective methods measuring the effectiveness of their use. Also, opinions of students and university authorities should be collected and analyzed. A more thorough literature review covering solutions related to the use of IT KM tools at leading foreign universities should also be considered as an important direction for further research.

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ROLE OF SOCIAL DIALOGUE WITHIN PARTNERSHIP APPROACH TO EUROPEAN COHESION POLICY AND CROATIA EXPERIENCES

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Abstract

The aim of the research is to analyse the role of social dialogue within the partnership approach in European cohesion policy. Since the Republic of Croatia has become a member of the European Union in 2013, the objective is also to analyse the Croatian experience in this area. The fundamental objective of the European cohesion policy is to equalize regional inequalities across the entire territory of the European Union. In order to achieve this goal, among other things, it was necessary to establish a partnership, and social dialogue has a significant role within this partnership. There is a close link between partnership and multi-level governance (European, national, regional and local). These are the key principles underpinning the European Cohesion Policy. Partnership and social dialogue are particularly pronounced when concluding a partnership agreement, which is a novelty in the programming period of cohesion policy from 2014 to 2020. In doing so, each Member State, in accordance with its institutional and legal framework, has the obligation to organize a partnership with the competent regional and local authorities. Each EU Member State is required to prepare Partnership Agreements (Vertical Partnerships) in cooperation with partners as defined in the legally binding EU Regulation (EU) No. 1303/2013 and in dialogue with the European Commission. The Partnership Agreement establishes the mechanisms of a Member State for the effective and efficient use of the European Structural and Investment Funds. Partnership, in particular, includes social partners who, through negotiations and consultations in shaping the European Cohesion Policy, define social dialogue. The said Regulation stipulates that the partnership agreement must be in accordance with the principles of subsidiarity and proportionality, thus favouring the involvement of social partners at local level.
Given the fact that the Agreement on Partnership between the Republic of Croatia and the European Commission on the use of EU Structural and Investment Funds for Growth and Jobs in the period 2014-2020 has been adopted at the EU level, Croatia's experience in these activities is also analysed.

Keywords: Member States, European Union, Cohesion Policy, social dialogue, multilevel management.

1. Introduction

There is a growing need for involvement of various partners, especially social partners, through social dialogue in the implementation of public policies. Among these policies, the European Cohesion Policy, which is also called regional i.e. solidarity policies, has a significant role. In the EU legal system, it appears under the term "Economic, Social and Territorial Cohesion". From the term itself, it is possible to see that this policy, along with economic and territorial, also includes the social component.

Reducing regional inequality represents the main objective of cohesion policy, primarily through European Structural and Investment Funds (ESI Funds). Even in the 1958 Treaty establishing the European Economic Community (EEC), Rome, 25 March 1957, entry into force on 1 January 1958, the founders of the European Community expressed "the desire to reduce the differences that exist between individual regions" and to reduce the backwardness of the regions in disadvantaged position. By this act and establishing two Structural Funds (European Social Fund and European Agricultural Guidance and Guarantee Fund), the foundations of cohesion policy have been established. It later developed into one of the most prominent European financial policies in the financial sense, which in this period (2014-2020) has funds amounting to 1/3 of the European budget.

The existence of regional inequalities came to the fore after the accession of the poorer countries to the EU and that has resulted in consequences that were of social nature. Their underdeveloped regions exhibit poverty; social exclusion, high unemployment rate, as well as population leaving the underdeveloped areas. These consequences are also felt in the territory of the Republic of Croatia. Therefore, the application of social dialogue through a partnership approach in the European cohesion policy is logical.

2. Social dialogue at the European Level

At the European level, social dialogue is an integral part of the EU acquis communautaire. This, in the first place, confirms the Treaty on the Functioning of the European Union as the underlying treaty on which the Union is founded. This Treaty stipulates that the Union recognizes and promotes the role of social partners at their level, taking into account the diversity of national systems. In doing so, the Union facilitates dialogue among social partners, respecting their autonomy (Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union, Official Journal of the European Union, C 202, Volume 59 Information and Notices 7 June 2016, article 152).

Among the more important documents at the European level, the EU Strategy entitled "Europe 2020: A Strategy for Smart, Sustainable and Inclusive Growth" is also mentioned, which in the pursuit of its goals advocates social dialogue through the strengthening of the capacities of social partners. This implies full use of the potential for problem-solving social dialogue at all levels (from the EU, national / regional, sectorial, within enterprises). In this context, the Strategy publishes a strong incentive for a strategic framework for co-operation in education and training involving all stakeholders. This should result in the application of the principle of lifelong learning (in cooperation with Member States, social partners, experts), among other and flexible learning methods between different education sectors and the training sector and their levels. Therefore, the Strategy requires that social partners should be consulted in order to develop their own initiative in this field (Communication from the Commission "Europe 2020: A Strategy for Smart, Sustainable and Inclusive Growth, European Commission, COM (2010) 2020 final, Brussels, 3 March 2010, p.22). This can be achieved, in line with the European Skills, Competences, Qualifications and Occupations Framework (ESCO), through the acquisition of competences throughout the general, vocational, higher education and adult education.

2.1. Mandatory inclusion of the social partners in the implementation of cohesion policy

Delegated Regulation of the European Commission (EU) no. 240/2014, under partnership implies a close co-operation between public bodies, economic and social partners and bodies representing civil society at all levels throughout the program cycle of cohesion policy, consisting of preparation, implementation, monitoring and evaluation (Commission Delegated Regulation (EU) No 240/2014 of 7 January 2014 on the European Code of Conduct on Partnership in the framework of the European Structural and Investment Funds, Official Journal of the European Union, 14 March 2014, p.1-7). Social partners imply all participants taking part in social dialogue in various forms of negotiation.

The obligation to include social partners in the implementation of cohesion policy is prescribed by the Regulation (EU) No.1303/2013 (Regulation (EU) No 1303/2013 of the European Parliament and of the Council of 17 December 2013 establishing the European Regional Development Fund, the European Social Fund and the European Agricultural Fund for Rural Development European Maritime and Fisheries Fund and the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund and repealing Council Regulation (EC) No 1083/2006, Official Journal of the European Union, L 347/3 320, 20 December 2013). It represents the umbrella policy in the area of cohesion policy and is legally binding for all Member States. The said Regulation lays down the mandatory establishment of multi-level partnerships and management in the area of cohesion policy. According to it, all EU Member States are obliged to conclude a partnership agreement with the European Commission, including programs, and, in accordance with its institutional and legal framework, to organize partnerships with public bodies and other partners as well as social partners.

In Resolution of the European Parliament it is emphasized that in practice uneven progress of Member States occurs in terms of greater mobilization and involvement of social partners in social dialogue on the European structural and investment funds (European Parliament resolution of 13 June 2017 on increasing the engagement of partners and visibility in the Performance of European Structural and Investment Funds (2016/2304 (INI)), Official Journal of the European Union, C 331/2 of 18 September 2018).

3. Experiences of the Republic of Croatia

Historically, during the accession negotiations and the accession process of the Republic of Croatia, the role of social partners in the decision-making process has increased.

The Republic of Croatia, as the latest Member State that has joined the EU (since 2013), is obliged to implement European policies, including cohesion policy. Based on that, the Republic of Croatia was required by the European Commission to conclude a partnership agreement, which was accomplished on 30 October 2014 (European Commission adopts 'Partnership Agreement' with Croatia

on using EU Structural and Investment Funds for growth and jobs in 2014-2020, Brussels, 30 October 2014). Accordingly, the duty of each EU Member State is to submit reports on the progress of the implementation of the EU Partnership Agreement. In the Report by the Republic of Croatia on this issue, Chapter 8 is named "Partner Role in the Implementation of Partnership Agreements". It states that social partners, through social dialogue, are particularly involved in: a) the National Coordination Committee for European Structural and Investment Funds and Instruments of the EU in the Republic of Croatia, b) in the elaboration of the Partnership Agreement of the Republic of Croatia and (operational) programs, Monitoring Committees for each Operational Program and in the work of Evaluation Teams (Progress Report on the Implementation of the Partnership Agreement with the European Union, URL: https://strukturnifondovi.hr/eu-fondovi/esi-fondovi-2014-2020/izvjesca-i-evaluacije/ 01.02.2019).

3.1. Institutional framework for social partnership and social dialogue

Social dialogue can be based on direct relationships between social partners themselves ("bipartite") or on relations between government bodies and social partners ("tripartite"). The Labour Act in its Article 285 provides basic assumptions for the establishment of the Economic and Social Council for the purpose of establishing and achieving harmonized activities with a view to the protection and promotion of economic and social rights, i.e. the interests of workers and employers, the pursuit of harmonized economic, social and development policies, the application of collective agreements and their alignment with the measures of economic, social and development policy (Labour Act, Official Journal no. 94/14, 127/17). The fundamental task of the Economic and Social Council is to promote the idea of a three-way co-operation between the Government, trade unions and employers' associations on the consideration and resolution of economic and social issues and problems. It is clear from the previous legal provision that an institutional framework for the promotion of social dialogue has been established in Croatia. It consists of the Tripartite Economic and Social Council and its working bodies. Based on this, the partnership is conducted by the Ministry of Labour and Pension System, the Federation of Independent Trade Unions of Croatia and the Croatian Employers' Association. At the same time, this body is an advisory body of the Government. In this way, a tripartite dialogue was established at the national level, and it was further lowered to a lower level, by establishing tripartite bodies in units of local or regional self-government.

Regional Development Act of the Republic of Croatia introduced the principle of partnership, which states that the policy of regional development is based on partnership and cooperation between the public, private and civil sector, which implies cooperation between different partners, including social partners (Regional Development Act of the Republic of Croatia, Official Gazette, no.174/14, Article 5). Pursuant to the aforementioned Act, the Regulation on Founding, Composition, Scope and Modes of the Partnership Councils was adopted (Official Journal, no. 103/15.)

3.2. Low level of social dialogue

In general, one can hear the opinion that social dialogue in the Republic of Croatia is still at a low level. The previous statement is also confirmed by the Partnership Agreement between the Republic of Croatia and the EU where it is stated that the cooperation and co-ordination of the public and civilian sector through social dialogue was insufficient for the successful growth, adoption and implementation of integrated local development plans and policies. The inadequate maturity of the local development initiative did not allow local stakeholders sufficient exploitation of local development potential and participation in developing the development paths for their areas. This results in poor involvement of social partners in the development and implementation of both national and European public policies on the Croatian territory (the European Commission adopts 'Partnership Agreement' with the EU's Structural and Investment Funds for growth and jobs in 2014-2020, Brussels, 30 October 2014).

In the context of the implementation of cohesion policy, there are several reasons for a low level of social dialogue. In the Republic of Croatia, the territorial dimension of poverty is particularly pronounced. In this regard, there is evidence that the areas most affected by poverty are areas that were largely affected by war destruction during the Croatian War of Independence and certain border areas and areas of Slavonia. Poverty is particularly high in rural areas, which are faced with huge problems of aging of the population, depopulation, poorer access to services and communal, social and transport infrastructure, making them the most socially vulnerable areas in Croatia (An Analytical Basis for the Progress Report on the Implementation of the Partners hip Agreement between the Republic of Croatia and the European Commission, Institute for Development and International Relations - IRMO, Zagreb, August 2017, p. 65). The fact is that poverty and a high unemployment rate in some regional areas can lead to the weakening of social dialogue and to the dissolution in the opinion of various social partners. Furthermore, there is a lack of capacity at the level of civil society organizations, primarily due to the lack of human and financial resources. In addition, there is insufficient culture of social dialogue in Croatia, as

well as unsatisfactory level of coordination and partnership among all key stakeholders, resulting in insufficiently developed mobilization potential for citizens and volunteers in the policy development process.

The Partnership Agreement between the Republic of Croatia and the EU offers a solution to strengthen social dialogue and policy formulation and implementation. In this regard, the Agreement states that it is necessary to improve the capacities of civil society organizations and to help them actively engage in policy-making processes and their implementation at all levels of government (local, regional and national). Involvement of stakeholders in these processes encourages increased transparency and trust in public administration and justice and their inclusion, openness and efficiency. For this reason, further efforts should be made to improve coordination between them. In order to increase the contribution of civil society organizations to the development and implementation of public policies at local, regional and national levels, additional investments are needed to strengthen their capacities and create an environment for more open and efficient management models (European Commission adopts 'Partnership Agreement' with Croatia on using EU Structural and Investment Funds for growth and jobs in 2014-2020, Brussels, 30 October 2014).

Unlike Croatia, international analyses show that countries that have developed a quality social dialogue (for example Germany and Slovenia) are countries that have achieved much greater results in the field of development. Therefore, Croatia, as an EU Member State, must invest efforts to strengthen social dialogue, with further development of civil society through a wide range of co-operation modalities, which will be particularly supported through the European Social Fund. This fund can contribute to improving social dialogue, with the help of which it will be ensured that civil society has the capacity to gain influence to participate in the implementation of European policies, particularly cohesion policy.

4. Conclusion

In general, it can be concluded that social dialogue is not only relevant in relationships between employers and employees (at enterprise, institutional and industrial level) but is also an important issue in implementing public policies as well. This applies in particular to cohesion policy based on multilevel governance (at European, national and local level). By including social partners in European cohesion policy, they have been given a wide area to participate in shaping this policy. The process of EU enlargement has also promoted social dialogue as a model for participative decision-making.

For the active involvement of social partners in social dialogue, it is necessary to establish a legislative framework that guarantees them an effective functioning. Social dialogue as an integral part of the EU acquis communautaire has a significant place in the European legal system.

Social dialogue, in the implementation phase of cohesion policy, goes down from European to lower levels, primarily at the level of Member States. Similarly, social dialogue is also included in the Croatian legal system. Significant application of social dialogue is at the local level, since the establishment of permanent social dialogue at this level in shaping cohesion policy converges this policy to the public.

In the area of cohesion policy, social partners, through social dialogue, are particularly involved by the National Coordination Committee for European Structural and Investment Funds and the Development of the Partnership and Operational Program through the Operational Programs Monitoring Committee to the Evaluation Steering Group. Nevertheless, in the Republic of Croatia, social dialogue did not develop to an adequate extent. This is particularly characteristic of new Member States, but also of countries with a more pronounced territorial dimension of poverty. For the purpose of strengthening social dialogue, Croatia needs to improve the capacities of civil society organizations, through cooperation that will be particularly supported by the European Social Fund.

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SCHOOL CULTURE, AS AN ORGANISATIONAL CULTURE: THE VALUE ASPECT

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Abstract

Organisational culture is a complex, multi - dimensional phenomenon, which recently is widely analysed and discussed by many researchers. This paper aims at analysis of only one aspect of organisational culture of a contemporary school, the values. Today politicians vision Lithuanian school as a learning organisation. It is obvious that it is in the school, where value formation and education of future members of society begin, where actually the axis of the future society is formed. In this research the value system of the school, as learning organisation, is understood as a pluralistic whole, which on the one hand, allows the development and co-existence of contradicting and competing values. On the other hand, the value aspect is an important variable that influences the behaviour and performance of people in the organisation. Common values shared by members of the same organisational culture lead to successful and effectively working school development. The purpose of a multiple case study was to explore social factors of school organisational culture and a value system of investigated school organisational culture, measuring teacher and student attitudes towards it. The main methodological approach: organisation culture is a pluralistic entirety that allows for existence of even contradictory or competing with each other values. This is an open whole, which encourages growth, education and improvement. The methods of the research: Theoretical: analysis and interpretation of scientific sources. Attempts are made to reveal the concept of organisation culture, to characterise school culture, to overview features of school as an organisation; Empirical: questionnaire survey of teachers and learners.

Keywords: School culture, fundamental values, shared values.

1. Introduction

The beginning of the 21st century has marked the formation of the society, where the continuously changing knowledge has become the most important wealth of its organisations, without which the performance and operation of these organisations cannot be effective (Poškienė, 1998). The organisations striving to unite the professionals for common activities have to give the greatest attention to the social aspects of organisation culture, particularly to the values, the most apparent but not always visible manifestations of organisational culture, and to the common value orientation of both, the individuals and groups, members of the same organisational culture (Poškienė, 1998; Jucevičienė, Poškienė, Kudirkaitė et al., 2000, Robbins, 2006).

For many decades the organisational culture of schools has become the main focus and object of educational research. For contemporary schools as learning organisations play a vital role in education of the future members of society and development of values which in their turn would promote the active development of the learning or knowledge society. According to Simonaitienė (2007), the very idea of the school as a learning organisation is manifest in its main function and the goal.

Every organisation, including school, has a culture. But sometimes it is fragmented, balkanized and difficult to perceive. It may be not clear to outsiders and insiders alike. In order for the school to become an effectively working organisation, it has to develop an organisational culture, which would create favourable conditions, the environment and a value system necessary for knitting together the school community in which students, teachers and school leaders have their own value systems.

2. Methodology

The analysis of the values of school organisational culture is based on Schein's (1992) and Simonaitienė's (2007) defined concepts and parameters of organisational culture, which in this research is understood as a pluralistic whole, allowing the co-existence of contradicting and competing values in the

organisational culture. Such a school culture is perceived as an open system, promoting the development, learning and improvement of organisation and its people. The process of perception and acknowledgement of school culture values has to be consistent with the values of the members of organisation and to lead to acceptance and sharing of the commonly acceptable values (Kavolis, 1996).

The purpose of a multiple case study was to explore social factors of school organisational culture and a value system of investigated school organisational culture, measuring teacher and student attitudes towards it.

The empirical data of a quantitative study analysed in this paper were collected through the employment of a survey method. There were structured surveys conducted in 4 Lithuanian (2 lower secondary and 2 upper secondary/gymnasia) schools. Random research sampling included 54 teachers and 160 students randomly selected from these schools (N=214). In order to analyse the views of teachers and students on the values manifesting in their school cultures, there were two questionnaires (one for teachers and the other for students) designed.

There was the following *hypothesis* stated: Most members (teachers and students) of the school culture will mark the common humanistic values as the most important in their school organisation cultures.

After the statistical analysis of collected data was performed, the further analysis was conducted by comparing the data of teacher and student groups belonging to different types of secondary schools.

3. Theoretical background

Every organisation is unique in its own way, when trying to achieve its objectives and when trying to resolve the problems it is facing. No matter, if the organisational decisions are made by school leadership alone or by all the members of school community, in all the cases these decisions are influenced by the guiding philosophy and the existing value system of the organisational culture (Vasiliauskas, 2004; Coleman, Earley, 2005). Palidauskaitė (2001) stresses that the culture of a particular organisation may be inferred by different things held in common. The existence of commonly shared attitudes, feelings, beliefs, norms of behaviour, ways of thinking and particularly the values of individuals, consistent with those of the organisation, lead to successful achievement of all the objectives, the improvement of interpersonal cooperation and the advancement of organisation. Though many authors speak of the pluralism of contemporary society, they do agree that organisational culture has a vital role and influences the quality of the professional life at a national level and at the level of organisation (McLaughlin, 1997; Hofstede, 2001).

The concept of values related to organisational culture as well as the concept of organisational culture itself has many definitions and interpretations. None of them are exhaustive and can define all the aspects of this very complicated phenomenon (Jovaiša, 2003; Jucevičienė, Poškienė, Kudirkaitė et al., 2000; Pruskus, 2005). Very often this value concept is identified with a certain ideal which might be followed and reached. According to Jovaiša (2003), value is the experience of an individual, which orients his/her thinking and feelings towards the highest objective goodness. The author stresses the positive nature of the value concept and its relationship to personality development. For many authors (Kuzmickas, 2001; Nind M., Rix J., Sheery K, 2005; Vasiliauskas, 2005) values are the goodness which meet human needs, desires, wishes and beliefs. Vasiliauskas (2005) states that this goodness (e.g. culture, science, technology, arts), is the objective peculiarity of values created by man, which satisfy our needs. This researcher also states that a person chooses to live such a life which s/he values, giving priority to particular objects and ways of life, accepting some of them and rejecting the others. The aim of education is to transform these goodnesses into values and make them the essential motive of the activities and human behaviour (Vasiliauskas, 2005, p. 10)

Similarly, the value concept is defined by Kuzmickas (2001, p.60) who states that *the value is not a real fact, but it is what it has to be*. That is why it is closely related to ideals and principles. Whereas principles are the most general form of human convictions. In this author's view, the belief in man, the respect for the individuality is a universal principle. Values are the essence of rules, which say what you can do, or what you cannot. It is the expression of what is good and what is bad, what is right and what is not Kuzmickas (2001, p.60). It is evident that each individual has his/her subjective understanding of what is good and what is bad, different from others.

Aramavičiūtė (2005) stresses the role of convictions in values. The interest in some aspects of life (e.g. a school subject, friends, books) can overgrow into a firm conviction, desire to act according to one's reference or value point. This way a student learns to act, to behave, to live according to one's values, forming a definite behaviour of the definite organisational culture.

The analysis of different academic sources has shown that different authors differently classify values. From the philosophical perspective there are *fundamental values (love, goodness, beauty, truth)* are most often analysed. They are considered to be compulsory for everybody to develop. Besides, based on these there are *common humanistic, society* and *personal values* (Jucevicienė, 1996; McLaughlin, 1997; Jucevičienė, Poškienė, Kudirkaitė et al., 2000).

Jucevičienė (2000), states, that there exists the relationship between fundamental and personal values which manifests in a human character and its main features (justice, honesty and respectfulness). She calls them as common humanistic values, the importance of which is different to different people.

McLaughlin (1997) stresses the importance of *society* and *personal values*, he states that society values are considered to be fundamental ones, they help people to live in a democratic and justice society and strive for their well-being and prosperity. Quite often these values as fundamental principles (freedom of speech, justice, personal autonomy and individual freedom) are embodied in the national state legal system and laws. *Personal values* reflect the level of choice of values, on which one's life may be built, they may confirm with the values, ideals, convictions of certain groups or organisations (McLaughlin, 1997; Jucevičienė, Poškienė, Kudirkaitė et al., 2000).

The value system is the fundamental of every individual and organisation. The investigation and evaluation of the value system is important for a deeper understanding of the ongoing processes characterizing the behaviour of individuals at different levels: organisation and society. Tolerance, respect for diversity are manifest and highly valued in a liberal and democratic society, in which school is one of the most important state institutions (McLaughlin, 1997).

So the school as educational institution is faced with a very complicated task. It has to develop such a set of values, which will coinside with the society values on the one hand, and will not violate personal values on the other hand (Senge, Cambron-McCabe, Lucas, 2000, Pruskus, 2005). According to Kasiulis and Barvydienė (2003, p.109) in different school organisational cultures there can be a different value system with a different set of values, which can have different degree of importance and manifestation, but all of them definitely have the influence on the culture of schooling.

4. Research findings and discussion

Organisational culture of each organisation has a whole complex of values which make influence on the way the school implements its objectives and resolves the problems faced in everyday life. A system of values that the school has is the foundation of its culture. The conducted empirical research was aimed at clarification which of the school values get the approval of teachers, which of them they think are important for school development.

The analysis of data has shown that respondent teachers think that common humanistic values are the most important in general. Particularly the following *common humanistic values*: justice (100%), respect to people (100%), kindness (91%), honesty (91%) and dutifulness (91%) were considered by teachers to be the most important. Both the support and attention to the other were marked as having less importance (68%).

The analysis of teacher data has also shown that some of the *society values*, namely responsibility (100%) and tolerance (96%) were considered by teachers as the most important, whereas, freedom (81%) and equality (64%) as less important.

In the research teachers of the investigated schools had also to evaluate the *organisational values* of the school as a learning organisation. As the most important there were marked the following values: continuous learning and improvement (91%), fostering of cultural values of the mankind (73%), and critical thinking (68%) and absence of conflicts (68%) were less important.

The students, who participated in the research (N=160) were given to evaluate the same list of values belonging to to the same three groups: common humanistic, society and organisational values.

According to students, who participated in our research, there are the following *common humanistic values* that the majority of respondents considered to be the most important: respect to people (79/%), kindness (77%), justice (76%), dutifulness (74%), honesty (73%).

As to the importance of *the society values*, the majority of respondent students marked the following: freedom (73%), responsibility (68%), tolerance (67%) and equality (67%).

According to student understanding and evaluation of the *organisational values* of the school as a learning organisation are less important. Only 60 per cent of students think that constant learning and improvement as well as fostering of cultural values of the mankind are important.

4.1. The discussion of research results

The comparison of the teacher and student results in separate schools, which have participated in the research, have not shown any statistically significant difference. This may have the following explanations. Firstly, the limitations of the study, the attitudes of only 4 schools were analyzed. Secondly, the similarity of results (of different schools can be explained by the fact that Lithuanian educational

system is a centralized one. That means that all school organisations have to develop the values that are prescribed and recommended for schools to develop in the legal documents of the national level. This inevitably leads to an axiological unification of school organisations and to similarity of the developed organisational cultures.

The comparative data analysis of teacher and student subsamples have not shown any significant difference in attitudes towards values as well. We may presume that the investigated schools have already formed a strong organisational culture. It also shows that the process of value sharing promoting the development of homogeneous school cultures is under way.

5. Conclusions

1. Theoretical analysis of the value aspect of school culture has shown that values play the most important role in school organisational culture. It is based on the system of fundamental values which includes common humanistic values, society values and the organisational values, which are acknowledged by majority of organisation members and make influence on the development of their personal values concurrent with the values of the school organisation.

2. The conducted empirical research has shown that all four investigated Lithuanian schools are developing a homogeneous organisational culture. The attitudes of majority of teachers and students acknowledge the importance of all surveyed values: common humanistic values (justice, respect to people, kindness and responsibility), democratic society values (equality, freedom, tolerance, dutifulness) and the values of school as a learning organisation (continuous learning and improvement, fostering of cultural values of the mankind, critical thinking).

3. The stated *hypothesis* that most members (teachers and students) of the school culture will mark the common humanistic values as the most important in their school organisation cultures was proved. There were no statistically significant differences found.

4. The comparative analysis of teacher and student views provides evidence, that teacher attitudes and student attitudes towards a value system of their school organisational culture do not confront, they have similarities. This creates favourable conditions in investigated schools for the achievement of common organisational objectives, promotes the culture of value sharing and develops the cooperative culture and friendly relationship. The more members of the same organisation are committed to the same values and acknowledge them, the stronger is the organisational culture of their school.

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POSSIBILITIES OF EU FUNDS IN SOCIAL DIALOGUE DEVELOPMENT: CASE STUDY OF CROATIA

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Abstract

Social dialogue is the cornerstone of European social policy and helps create decent working conditions for all workers and workers, improving work legislation and developing social partnership as a tool to achieve all common goals such as job creation, improved living standards and economic growth. Bipartite social dialogue is a dialogue directly between social partners (appropriate level of associations of employers and trade unions) as well as negotiations held within its framework. It needs to be emphasized that in Croatia, as a new democracy with relatively short tradition of social dialogue, social dialogue is not only collective bargaining but it also comprises dialogue and negotiations. Although Croatian legislation guarantees protection of workers' rights, in practice, however, many of them are violated on a daily basis. The research is also focused on the analysis of the EU funds available to finance projects in the area of social dialogue development. The research was conducted in the form of a survey to analyze employee satisfaction with the public sector on their rights and work obligations. The aim of the research is to improve the quality of social dialogue through the development and strengthening of administrative and professional capacities of social partners at international, national, regional, local and sectoral level.

Keywords: EU funds, social dialogue, worker's rights, social partners.

1. Introduction

The idea of social partnership gained its clear, recognizable institutional profile at the end of the 19th century, when in Germany, legislative reforms were defined to provide workers with certain risks, such as age, illness, accidents at work. Partnership is historically the most obviously related to the development of a social-market economy and the principles of subsidiarity. Such an understanding of the social partnership is also built on the foundations of the European Union. At European level social dialogue is an integral part of the acquis communitarian on the basis of Articles 138 and 139 of the Treaty establishing the European Community. In the later period, it is important to note that Jaques Delors, European Commission President, in 1985 defined the role of social partners at European level, which was recognized and successfully strengthened by the Maastricht and Amsterdam Agreements. From the experience of the European Union, it can be concluded that the idea of social partnership has undergone great development, especially in the nineties of the last century, since social partners have since gained wide scope for participation in the consultation process, and social and civil dialogue have become the foundation of good governance in the European Union. The term "partnership" emphasizes one important component of the relationship: understanding and appreciation.

Strong social partners and a good social dialogue can play an important role in the economic and social development process in a country, as evidenced by examples from various countries. A good social dialogue results in fewer strikes, improved protection of employees, greater employee satisfaction, increased employment and higher labor productivity. In many Western democracies, social dialogue has made an important contribution to growth and continued prosperity. However, it is important that employers, unions and government are constantly aware of their mutual dependency on the further development of society. (Nieuwsma & Boorsm, 2017)

There are three principles that social dialogue contributes to the achievement of social and economic development objectives: inclusiveness, democratic ownership and accountability. Social dialogue promotes inclusiveness, with representative and independent workers' and employers' organisations, alongside governments, seeking solutions to issues of common concern. As representative organisations, the social partners bring together the points of view of a multitude of employees and employers. In the case of the trade unions, this is further reinforced by their democratic structures and elected leadership. In developing countries, there are also indications that informal workers and their

organisations are increasingly being represented in social dialogue structures through trade union representation. In academic literature, this is described as providing voice to key stakeholders by offering channels for participation in decision-making processes. Social dialogue has been found to be capable of resolving collective action problems in the area of decent work and beyond. Similarly, social dialogue can set common standards or wage levels in a region or sector, thus to some degree removing these elements from competition and accordingly reducing the likelihood of a downward spiral in labour and environmental conditions. Social dialogue, through its inherent processes of information-sharing, consultation, negotiation and joint decision-making, allows the social partners to share their views on and influence the policies or measures that affect them. These are important ingredients of democracy and can improve the prospect of democratic ownership and the effective implementation of such policies or measures by the public authorities and the social partners. In addition, social dialogue offers a number of opportunities to strengthen transparency and accountability among the various actors involved. (HIVA Research Institute for Work and Society, 2017)

2. Advantages of EU funds in social dialogue development in Croatia

The social dialogue is not deeply enrooted within the Croatian society, similar to other former socialist countries. The first steps towards creating institutional and political framework for social dialogue in the country was taken in 1994 with the establishment of the national Economic and Social Council and identifying its competences. Over the next several years, the functioning of the social dialogue was rather limited and reduced to a rather formal and declaratory action. After the parliamentary elections in 2000 the new Government had restored tripartite dialogue at the national level and launched new framework for the development of the social dialogue. Croatia has ratified a number of International Labour Organization (lLO) Conventions and the European Social Charter. Institutional basis for the social dialogue in Croatia is comprised of the Economic and Social Council (ESC) and the Government Office for Social Partnership. The Croatian Economic and Social Council (ESC) is a forum in which key social partners (high representatives of the Government, employers' associations and trade unions) discuss and negotiate important decisions on key economic and social issues. The Economic and Social Council has commissions for the following topics: wage policy and the tax system, employment and social policy, collective bargaining, privatization, education and labour market, legislation, regulation implementation and legal protection, international relations and accession, national budget, pension and health care, and alternative resolution of labour disputes. The ESC can suggest discussing any legislative proposal from the Government before it enters into parliamentary procedure. In majority of cases, such suggestions are accepted. Each social partner has the right to a one vote in ECS and its bodies. Members of ESC can also give a separate opinion but this opinion is not visible when a particular legislative proposal enters into a parliamentary procedure. Similar to other CEE countries, tripartite social dialogue at national level in Croatia is quite developed, unlike bipartite dialogue which is still facing many difficulties. Collective agreements have covered almost all employees in the public sector, as well as in the most of the state-owned companies. Capacities of trade unions are not fully prepared to participate in the sector dialogue and, consequently, sometimes there is a lack of initiative for such dialogue on their part. Furthermore, there is a lack of a tradition of social dialogue in general and unwillingness of private sector to accept trade unions as partners, particularly in collective bargaining. Number of collective agreements in private sector is notably lower than in the public sector. (Samardžija, 2008)

Graphic 1. Benefits from developing social dialogue.
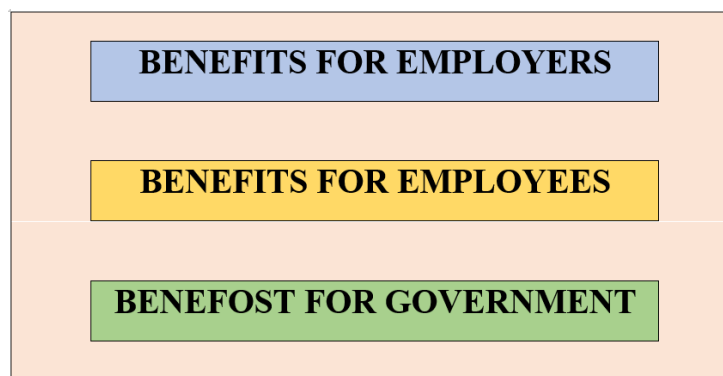

Source: DECP, 2017

It is crucial to develop social dialogue in the European Union as well as in Croatia. There are many benefits for employers, employees and government. Employers have benefit from social dialogue, because countries with a good social dialogue generally have fewer strikes. The business and investment climate are also better than elsewhere. Another benefit for employers is that industrial peace improves their competitive position and productivity. Working together with the unions also results in employers' organisations having more influence in government policy and in politics. If employers and unions agree on a socio-economic topic, then it is hard for politicians to take a very different stance. Similarly, unions are also able to exercise greater influence on government and parliament thanks to social dialogue. Structural consultations with employers generally result in lower unemployment figures and a smaller income disparity in society. For individual employees, social dialogue often results in a broader range in the employment package and improved employment conditions. In fully-fledged democracies, the government together with parliament has the final say. Nevertheless, the government leaves certain aspects of employ meant relationships and employment conditions to the employers and the unions. The benefit for the government is that this results in greater acceptance of the solution that is eventually proposed. This in turn increases the likelihood of the envisaged results actually being achieved. (Nieuwsma & Boorsm, 2017)

In the past several years, social dialogue in Croatia has encountered some difficulties, partly due to accelerated legislative activities for the Croatian accession to the European Union, and partly due to the negative impact of the economic and social crisis that led to measures being taken without properly consulting social partners. Furthermore, although the local (county-level) economic and social councils were established, many of them are not functional. For that reason, improving social dialogue, particularly tripartite dialogue structures and practices were defined as project's main long-term goal. There is possibility to develop social dialogue in Croatia through financing innovative projects in the field of social dialogue by EU funds. Funding through the Social Fund entitled "Boosting Social Dialogue" is a good way to do a step forward. The goal of tender is to improve the quality of social dialogue through the development and strengthening of administrative and professional capacities of social partners at international, national, regional, local and sectoral levels. Potential applicants are social partners: trade unions, higher-level union associations, employers 'associations, higher-level employers' associations, local and regional self-government unit and Development Agencies. The projects are also financed in 100% of the amount by the European Union. Acceptable activities are: project management and administration, strengthening sectoral social dialogue and sectoral social councils, empowering the professional, analytical and advocacy capacities of social partners, analysis, research and monitoring of social dialogue, strengthening the capacities of Croatian social partners through international co-operation, participation in international social partnerships, at EU and global level, and international forms of employee participation, promotion and visibility (European Social Fund, 2017)

3. Research and results

A survey was conducted through a survey questionnaire. The respondents were 125 employees of 47 different employers. The survey explored employee satisfaction at the workplace as well as respecting the rights and obligations of employees.

Graphic 2. The level of discrimination at the workplace.
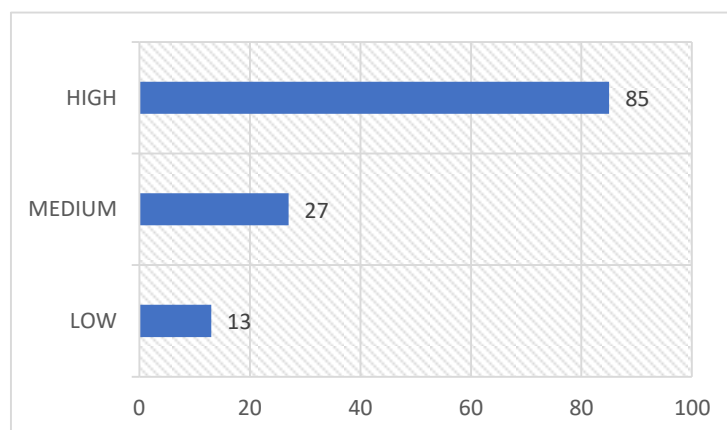
Source: Authors research

As we can see there is a very high level of discrimination of the workers in Croatia, 85 of responders indicated high level and 27 on medium level of discrimination while only 13 responders think opposite.

Graphic 3. The level of mobbing at working place.
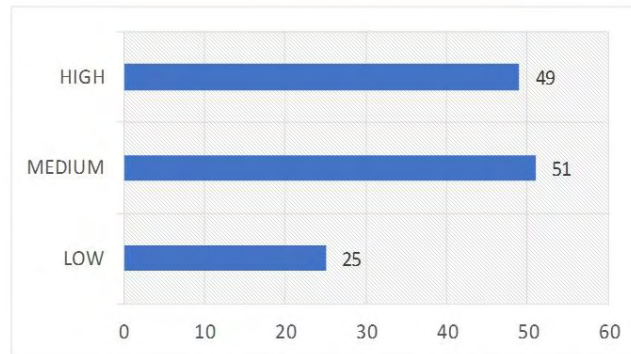
As we can see there is a very high level of discrimination of the mobbing in Croatia, 49 of responders indicated high level and 51 on medium level of mobbing while only 25 responders think opposite.

Graphic 4. Overtime without payment.
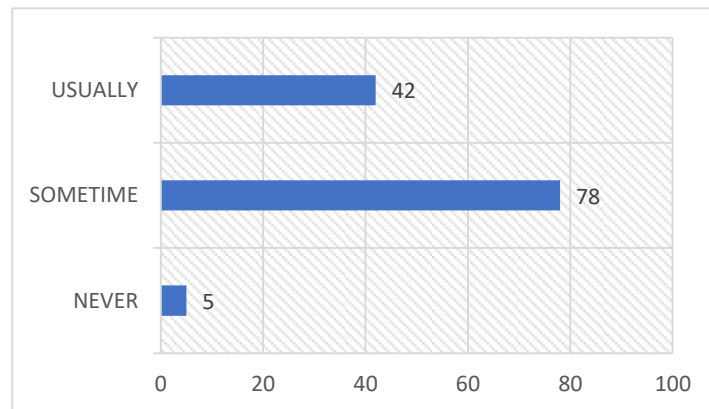
As we can see there is a big problem of overtime working hours. Employees usually (42 responders) and sometimes (78 responders) work overtime but not get payed for that.

Graphic 5. Working environment and conditions.

As we can see there is a very low level of working conditions in Croatian firms (72 responders) while only 23 responders are happy with the working conditions.
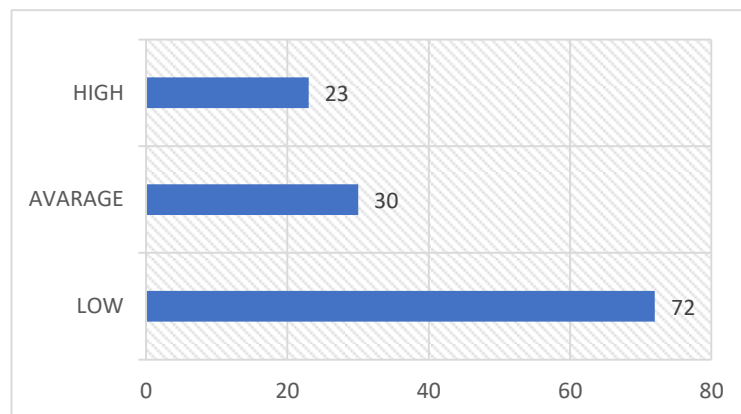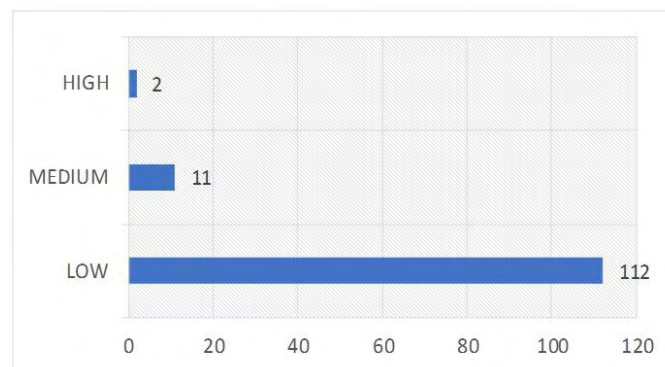
Graphic 6. The level of stimulation for good work.

Source: Authors research

As we can see there is a very low level of stimulation for good work in Croatian firms. From 125 responders almost every single of them (112 responders) didn't get any kind of stimulation for their good work, while only 2 of them have some different experience.

4. Conclusion

Social dialogue is the key to the success of every enterprise, but also the country where the company is located. Communication, positive synergy and common co-operation are necessary to be happy with employees on the one hand and employers on the other. The conducted survey showed great dissatisfaction with employees with discrimination at the workplace, daily mobbing, overtime without pay, working environment and working conditions as well as job de-mining. These are the areas in which the country's considerable efforts must be made to preserve the dignity of the workers. It is important to put emphasis on bipartite and tripartite social dialogue. Bipartite dialogue is dialogue between employers' organisations and workers' organisations and it refers to the discussions, consultations, negotiations and joint actions involving the two sides of industry. Tripartite social dialogue involves the governmental institutions as well as the social partners. The economic crisis represents a serious challenge for dialogue between workers' representatives and employers and government representatives. Government reforms have not always been accompanied by effective social dialogue, which has led to increasingly conflicting relations in the industry. Participation of workers' representatives and employers or social partners in government reforms is important because solutions achieved through social dialogue tend to wider acceptance in society and it is easier to implement decisions made in practice and thus less conflict. Contracts involving social partners ensure long-term sustainability of economic and social reforms. Well-structured social dialogue can effectively contribute to Europe's economic sustainability. Despite the poor results of research and employee dissatisfaction, a better shift is visible. In particular, this shift is visible in terms of financing projects in the area of social dialogue through funds from EU funds. Such projects are the only ones that can encourage all stakeholders of social dialogue to cooperate.

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SCHOOL PRINCIPALS AS ENTREPRENEURIAL LEADERS EMPOWERING PARENTS OF MARGINALIZED POPULATIONS

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Abstract

This study explores principals in one school over eighteen years who empowered the parents of their students, a population of socially and economically marginalized people.

The school serves the children of undocumented work migrants in Israel from third world countries, and asylum seekers and refugees coming from war-stricken countries. These people are perceived by the law as temporary with no possibility of becoming citizens. However, their children are eligible for education as specified in the Law of Compulsory Education. The principals applied their entrepreneurial skills to organized the parents and empower the parents by mobilizing funding, volunteers, and projects.

Principal as entrepreneurs have a vision, engage in innovations, act proactively, that is, they always seize opportunities for innovation, they use networking often to pursue their goals, and take risks by implementing innovations before assuring the funding. These skills are especially important when leading school in a community that is socially and economically marginalized, as marginalized people face practices of residential and work exclusion, discrimination and oppression from the dominant groups in society, and lack of power and voice. The principals in that school took upon themselves to mobilize the parents, and serve as their voice, sometime by resisting State policies.

This qualitative study used a 'data triangulation' which is the use of different sources to reach the same data set. The different sources include document reading, school observation, interviews with school staff and outside agencies, newspapers, the internet, and protocols of meetings of Israeli parliamentary committees.

It was found that the principals organized the parents by implementing numerous initiatives

(A) principals used mediators.

(B) Principals mobilized the community and the increasing civil society such as third sector anti-deportation organizations to give legal advise to parents. Also, they brought volunteer students of medicine to teach hygiene to students and parents of refugees; they also brought volunteers to teach the language to parents.

(C) Principals provided education for parent: organized field trips for the parents in the country, and provided counseling to parents in raising adolescents in a new culture.

(D) Principals initiated personal development such as forming a choir of parents who sing in school and community events,

(E) Advocacy: acting against the government deportation decision and provided services which the parents could not pay, such as educational and psychological diagnoses to students.

Keywords: Entrepreneurial leadership, refugee parents, advocacy, triangulation.

1. Introduction

Principals are required to be autonomous in their decisions and to act as entrepreneurs to implement innovations; yet at the same time they are required to comply with demands from the external environment (Eyal and Inbar, 2007), that consists of parents, regulating agencies, and stakeholders (Goldring, 1995). Principals have to lead the school by bridging the contradictory demands of autonomy and compliance. In their interaction with parents they have a large array of strategies, depending on the characteristics of the parents, such as SES and social and legal status, as well as the principal's perceptions of the boundaries of their school.

This study explores three principals acting as entrepreneurs to empower the parents of one school, serving students of migrant workers and refugees over a period of eighteen years.

2. Entrepreneurial leadership

Entrepreneurial leadership in education is not driven by competition for profit, but rather for its social values. It includes three components: proactiveness – seizing opportunities, introducing new ideas to the school and instilling it with a spirit of innovation; innovation –implementation of the new ideas in programs and projects; and risk-taking – implementing the programs and projects before securing funding and approval of stakeholders, parents or regulating agencies (Eyal and Inbar; 2003). When acting as entrepreneurs, principals have to comply and cooperate with environmental elements such as regulating agencies – Ministry of Education, local authority, stakeholders and parents - with which the school is in direct, daily-basis interaction and influence each other (Goldring, 1995).

3. School-parents relations

Parents-school relations were typified by Epstein (2010) as: 1. Help families establish home environments to support children as students. 2. Design school-to-home and home-to-school communications. 3. Recruit and organize
parent help and support. 4. Provide information to family about how to help students with curriculum-related activities. 5. Include parents in school decisions. 6. Collaborating with the community.
The above types can be classified by degrees of involvement (Goldring and Shapira 1993). Parental involvement refers to participation or reactions of parents when they have no control over the educational processes in schools (in Eyal 2008). Parental empowerment refers to parental control in schools, manifested by the principal letting parents take part in decision-making.

3.1. Refugee and immigrant parents' involvement
Refugee parents are less active in their collaboration with the school than the majority of parents in the host country.
There are several barriers to refugee parents' formal involvement in school: (1) lack of language proficiency (Bergset 2017; Rah et al 2008); (2) time constraints due to family socio-economic status; (3) traditional family structures (Rah et al 2008); (4) cultural differences - for instance, home-school collaboration is not the norm in the refugees' countries of origin (McBrien, 2005 in Bergset 2017), and parents express dissatisfaction with the lack of discipline (Tadmor- Shimoni, 2008; Bergset 2017) in the host country; (5) deferential attitudes towards school authority - perceiving that voicing an opinion about school matters is a lack of respect for the teachers (Bouakaz, 2009 in Bergset 2017); and (6) lack of information regarding the new neighborhood (Eden and Kalekin-Fishman, 2002).

3.2. School strategies to involve parents
Parents are unable to provide academic, emotional, cultural capital and financial support to their children, because they have encountered trauma themselves (Rah et al 2009). Schools use several strategies to enhance parents' involvement: (1) creating a parent liaison position. Who would serve as 'mediator' between school and refugee students and their families; (2) cooperating with community service organisations such as local non-profit organizations; (3) providing parent-education programmes such as learning the host language, teaching parents how to help their children with academic assignments (Rah et al 2009), providing information on Internet safety; (4) advocacy - school leaders help parents access services due to them outside school. For instance, helping parents get medical care, providing employment for parents, and having staff work with parents to revise and update their resumes (Davy 2016).

4. The Israeli case

The relations between school and parents have changed since the establishment of the State in 1948. The Israeli educational system was centralized since its establishment and parents were not allowed to be involved until the 80's (Eyal 2008), due to the mass immigration of Jews into the country and the need to build a national identity. Since then the system has been decentralized, as a result of cutbacks in the budget and recognition of cultural diversity (Eyal 2008), and later on privatization. All this promoted parental initiatives and schools of choice (Shapira and Haymann, 1991 in Eyal 2008). Parents became involved in several areas and levels.
The school studied serves the children of undocumented work migrants in Israel - people who claim to be asylum-seekers and refugees but have not been granted that special status. Their children are more exposed than veteran students to events such as parents being arrested by the police or immigration police, father living abroad, and physical violence in the family (Meir et al., 2016). These people are

perceived by the law as temporary residents, with no possibility of becoming citizens. However, their children are eligible for education, as specified in the Law of Compulsory Education.

The principals applied their entrepreneurial skills to organize and empower the parents by mobilizing funding, recruiting volunteers and initiating projects, and caring for their needs beyond school boundaries.

5. Methodology

This qualitative study used a 'data triangulation', which is the use of multiple sources of data to reach the same data set, to study the phenomenon from different perspectives (Eyal 2008; Eyal 2008; Zambrana et al 2015). The different sources include document reading, school observation, interviews with school staff and outside agencies, newspapers, the internet, and protocols of meetings of Israeli parliamentary committees.

6. Findings

The parents were asked by the school to outline needs and designed a support system to meet them.

(A) Cultural mediator: having a bilingual liaison officer is mandated by the Ministry of Education for all schools with children from foreign countries. In school BR, which serves pupils from 48 countries covering at least 20 languages, this policy was not mandated as the pupils were denied any educational service except for the obligation to attend school. In the first years, one of the qualifications required from teachers was the knowledge of a foreign language which was spoken in school. These teachers participated in all the meetings between parents and school (Eden and Kalekin-Fishman, 2002). Later the more veteran pupils served this function.

(B) Community work: the school works with an anti-deportation non-profit organization. The organization helps parents by advising them how to avoid deportation, and by finding countries that would host the deportees. The organization operates on the school premises.

Volunteering: the principal initiated volunteer work in various areas needed by the asylum-seekers and refugee students and their parents. Volunteer medical students were brought from a neighboring university to teach hygiene and health problems in Israel to students and refugee parents. Volunteers were also brought to teach the new language to the parents; they arranged psychological diagnoses for pupils who underwent traumas, which the parents could not afford to pay; they provided after-school day-care that operated for a while even during holidays, so that the parents could work all day; and informed parents of potential dangers, such as a case of a pedophile in the neighbourhood. A principal also helped a parent with documents of application for family reunification ((Eden and Kalekin-Fishman, 2002; Bergset, 2017).

(C) Education of parents - learning about the host country. When an influx of parents arrived, the school provided them with counseling on parents-adolescents relations, since these are different in Israel from those in their home countries. Also, in order to familiarize the parents with the new country, guided field trips were organized for them through non-profit organizations and museums. In addition, actions were taken to empower parents, such as learning a profession. Parents received professional training, through the school's cooperation with the private sector.

(D) Parents' personal development: the school has a choir of parents who perform in school and community events.

(E) Advocacy - this strategy has a unique pattern in Israel, due to the unique situation in which the students and their parents constantly face deportation. (1) One principal made an agreement with the local police precinct to stop arresting parents who bring their children to school. (2) In August 2010 the State issued a statement which granted legal status (but not citizenship) to children of migrant workers born in Israel who attended school at that time, but not to children of asylum seekers and refugees who were born abroad and were not in school yet, or had graduated at that time (Avnayim, 2011). The principal gathered the parents in a special meeting, saying the school would issue a document acknowledging that their children attend school to prevent deportation, and called the government deportation decision an immoral decision (Fishbain, 2018).

7. Conclusions

This case shows that principals used their entrepreneurial skills beyond their original definition, and used their autonomy and discretion to encourage parents who came with no resources to be active participants in school. The principals did not wait for "big-level societal change to address the inequities that marginalized students are experiencing" (Davy 2016: 174). By extending the boundaries of school they took it upon themselves to help the parents, thus replacing the regulatory agencies; and attempted to incorporate the parents into society.

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THE IMPACT OF AGENCY IN THE ORGANIZATIONAL-MANAGERIAL AND EDUCATIONAL-DIDACTIC PROCESSES OF SCHOLASTIC INSTITUTIONS

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Abstract

The paper offers a reflection arising from the observations related to the first results of a survey that is being conducted in the first operational part of the PhD project, entitled *Inclusive Policies: the school as a participated community and professional development mediated by the agency*. Through this survey, which is still ongoing, we analyze the perception and attitude of the school manager and the teachers towards documents and tools used in the self-evaluation and self-improvement processes that all scholastic institution are called upon to perform. This survey references to the methods of action of the actors involved in these processes with the purpose to understand: what kind of relationship exists between the *inclusive policies* and the governance of these processes and what is the impact of teachers' ability to deal with this relationship. It also allows us to understand *if* and *how* the remarkable legislative innovations are really integrated, in the operative plan, within the specifics of the single scholastic institutions. In fact, recent laws have introduced the use of tools, within the procedures that underpin the school organization, increasingly articulated and complex that invite to rethink the mode of action of the entire school community. In particular, attention is paid to the relationship between the methods of action adopted and the self-evaluation and self-improvement processes that require co-responsibility and co-participation of all actors in the school context. This perspective shows that development of teacher agency skills is mandatory and oriented towards integration, dynamism and flexibility. Moreover, we note how favoring such mechanisms brings a potential contribute to increase agency itself not only of a single teacher but of the whole school community and to encourage a "culture" of professional, inclusive learning development.

Keywords: Inclusive policies, middle management, community of practice, agency, professional development.

1. Introduction

The European school policies set priority objectives to be achieved, showing a series of recommendations to the member countries of the European Union in order to standardize the orientation of school policies of each individual country. In Italy, the legislative innovations introduced, starting from the Regulations on Scholastic Autonomy, DPR 275/1999, up to Law 107/2015 and the subsequent Delegated Decrees, induced the educational institutions to rethink the school governance and to reorient the organizational-managerial and educational-didactic processes at the system organization level. In particular, through the Presidential Decree 80/2013, a series of automated procedures have been introduced relating to the self-assessment and self-improvement process of schools that require the actors of the school context (managers and teachers) to develop inclusive and co-participated agency skills in the perspective of a co-action oriented to professional learning.

1.1. The agency as a trade union between inclusive policies and the governance of scholastic institutions

In light of the innovations introduced, however, there have been many reactions by managers and teachers within the scholastic institutions, because said new procedures invite to "question" the modalities of their actions, each one in their own role, in the different implications, like planning, methodological strategies and didactic activity. In this context, the manager, first of all, assisted by the middle management must favor the conditions for developing inclusive agency modality at the level of the organizational-managerial and educational-didactic processes.

In fact, generally when one argues with regard to *inclusive policies*, reference is made, at least immediately, to the concept of inclusion associated with people, cultures and practices, while little is reflected in the dimension of the relationship between normative documents and policies that lie within the organization of the school system.

When we talk about politics, we can give the impression of talking at an abstract level, but instead they acquire proper depth if we associate them with people, their actions and context.

Discussing policies with regard to scholastic institutions means talking about all those actions, specific to the actors of the scholastic context (manager and teachers), attributable to the organizational-managerial and educational-didactic processes that characterize the quality of teaching-learning processes and consequently the educational success of the students. The adjective "inclusive" is attributed to the meaning of giving importance to the mode of action of all the professional figures who hold roles or perform functions within the school; this modality must favor the development of agency skills centered on dialogue and comparison, on co-participation and sharing, and finally on the enhancement of human resources, context and environment.

Why could *inclusive policies* be fundamental for the governance of scholastic institutions?

The theme of *inclusive policies* (Bocci, 2016, 2018) within scholastic institutions invite to reflect on the use of effective organizational, planning and educational-didactic practices aimed at enhancing the quality of governance strategies, flexibility and efficiency of school organization. In particular, they can be an important junction for self-evaluation and self-improvement processes that require a considerable commitment by all actors of school context throughout the school year. As stated, within the Italian educational landscape, legislative innovations have been introduced that started systemic procedures through the development of valuable documents such as the Self-Assessment Report -RAV- and the Program Improvement Plan -PdM-. These documents can be considered potentially strategic to the process of evaluation and reorientation of the planning of school organization but follow predefined standards and therefore can be perceived as alien to the context. It is therefore necessary to reflect on *how* to act so that in these documents the identity of the school community is really reflected as an expression of many professional experiences joint in a single core.

The *inclusive policies*, for the above mentioned configuration, would help to make school organization evolve as a learning community, in which goals, objectives and choices are shared, communication and collaboration are encouraged and continuous training is enriched with formal, non-formal and informal moments. In this perspective, scholastic institutions are defined as a community of practice (Wenger, 2006) in which the actors involved feel they are open to experiment, welcome the comparison and are available to mutual commitment through a participatory and inclusive approach that favors the development of agency (Priestly, Biesta & Robinson 2015; Calvert 2016).

This argument leads us to argue that the development of agency skills in an inclusive perspective would represent the trait-d'union between *inclusive policies* and policies that underlie the governance of the self-assessment and self-improvement processes both in organizational-managerial and educational-didactic dimensions.

Based on these premises, the focus of the first part of our research project was to identify how managers and teachers perceive documents and tools used to carry out self-evaluation and self-improvement processes in a view of agents' participation of various actors involved. The aim was to identify all types of agents involved in these refinement processes in order to locate recurring indicators useful to deepen the investigation in a subsequent research phase.

2. Design

The whole research project aims to observe and analyze the system actions implemented by the scholastic institutions to carry out inclusive processes: attention is focused on the middle management, that is to say on the professionals (eg: school manager collaborators, instrumental functions, department coordinators, tutors) involved in self-assessment and self-improvement procedures. Their function could act as an engine for the professional development of teachers, staff and students, encouraging shared and co-participatory forms of agency through which the decision-making and coordination modalities and the systematic nature of the procedures are implemented.

The research project tries to answer to the following questions:
• what are the modalities through which the self-assessment and improvement procedures involved in the inclusive governance processes are implemented?
• are the forms, through which the decision-making and coordination modalities are made explicit, really shared and co-participated?
• are the procedures put in place, systemic? Which tools and devices are used in the procedures explication?

3. Objectives

In the light of what has been said, after the acknowledgement of the fundamental importance of *inclusive policies*, the research project will develop through four objectives.

The first part of the field research aims to analyze how schools implement the self-assessment and self-improvement procedures involved in inclusive governance processes, focusing on the middle management (eg: school manager collaborators, instrumental functions, department coordinators, tutors).

Subsequently, based on the previous part's results, the objectives will be as follows:
• implement, in the schools involved, an action research project on self-assessment and improvement procedures through the Index Inclusion tool;
• implement training-research-action courses with the middle management of the schools involved, aimed at developing agency skills;
• analyze the impact of skills agency implementation on *inclusive policies* within the schools involved.

4. Methods

The first part of the research work presented here has been applied through desk analysis and research aimed at examining the existing Italian and international literature and analyzing any studies already carried out on these topics. The study also made it possible to deepen into European and Italian legislation on school policies, taking into account not only the Italian context but also that of other European education systems. This first approach contributed to determine some reflections on *inclusive policies*, especially in relation to the self-evaluation and self-improvement processes. They could be potentially strategic for the management of these processes considering: the complexity of the micro-steps of these procedures' organization; the format of the tools used; the heterogeneity of professional and cultural profiles that operate in the school; the specific peculiarities of school context. All of this confirms that we need a development of agency skills oriented to interaction, dynamism and flexibility.

The driving hypothesis is that the implementation of agency in the school context can deeply influence the educational processes by affecting cultures, policies and inclusive practices. In particular, it is hypothesized that continuous training of teachers, conducted with a view to favoring the mechanisms of agency, can contribute to the increase of agency itself, to the improvement of inclusive processes and to professional development.

Qualitative exploratory research will use mixed methods (Lucisano & Salerni, 2002; Domenici 2009; Trinchero, 2012). For this phase of the first part of the research, through the studies so far conducted, a preliminary questionnaire has been developed and submitted to educational institutions of all levels. In choosing the schools, particular attention has been paid to certain criteria, for example previous experiences in projects aimed at promoting inclusion and the degree of investment in training.

The questionnaire used in this first phase of the research has been submitted to both managers and teachers, in order to detect, as already mentioned, the perception and attitude towards the self-assessment and self-improvement processes. This survey makes it possible to identify the type of agentive behavior; some more recurring of the latter represent indicators that will be subject for further study, in subsequent investigation phase, through the use of the INDEX for inclusion (Booth & Ainscow, 2002) and the Critical Incident, during the conduction of the focus groups.

5. Conclusions

The report on observations related to the early results of the survey, in the first part of the field research, leads to support that: the self-evaluation and self-improvement processes require continuous and deep investigations since they are grafted onto the synergistic relationship, which involves all actors in the school context, in a co-responsible and co-participated manner, and the school context itself, which is more and more dynamic and in constant change in its specificity.

A further conclusion is that a circular process should be initiated leading to rethink spaces and times devoted to reflection on the modalities of agency and how these are practiced; to face with the feedbacks that these ways and practices highlight in order to re-orientate the agency.

In realizing these dynamics it is important to become aware of "questioning" the organizational capacity to act on an individual and collective level; this step is strongly linked to the motivation to grow as a community through a continuous development of professional learning.

Encouraging these aspects means giving voice, teacher voice, (Gerstein, 2013) to all teachers involved in these processes and dynamics.

In fact, the reciprocal relationship between *inclusive policies*-agency-governance must be nurtured and valued going to affect on the "intrinsic motivations of teachers, offering them the opportunity to build solutions to the real challenges they face in the classroom (instead of sitting in a training session that is often generalized) "(Obrien, 2016).

In this perspective, *inclusive policies*, mediated by inclusive agency skills, can represent the hub through which start reflection paths and become aware of the importance of managing the self-evaluation and self-improvement processes based on the real needs of the school. In this way, manager and teachers, each for their function, would assume a role of active protagonist, capable of facing critical issues, collaborating in solving problems and sharing professional experiences.

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COMPARING AND CONTRASTING SUSTAINABILITY PLANS FOR TAKING THEIR CAMPUSES GREEN: A TALE OF TWO INSTITUTIONS

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Abstract

Institutions of higher education have the potential to function as change agents for sustainability. (Stephens, Hernandez, Roman, Graham & Scholz, 2013) According to 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.

From improving recycling efforts to increasing energy efficiency and reducing waste, Hunter College is resolutely committed to sustainable actions and practices on its path towards sustainability. Through the leadership, guidance, and support of the Sustainable CUNY (City University of New York) program, Hunter College has set progressive targets, made notable gains, and pursued innovative solutions all towards the culmination of providing a healthier, cleaner, and more sustainable environment for the Hunter community. Hunter College doubled down on its commitments as the first institution within the CUNY network to promote and cultivate a position solely dedicated to advancing the College's sustainability cause. Renewed emphasis on engagement and equal representation has led the College toward creation of a new 10-Year Sustainability Action Plan led by a committee of members from the student body, faculty, and administration.

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 part of the CAU experience.

This presentation will compare and contrast the program planning for sustainability at two institutions of higher education, a public urban college in the northeastern United States and a private HBCU (Historically Black College and University) in the southeastern U.S. The presentation will describe the approaches used, progress and anticipated outcomes for each institution. How these institutes take their respective campuses green in terms of their sustainability plans and polices can be instructive for other institutions in their quest for green campuses.

Keywords: Sustainability, green campuses, institutions of higher education, urban, HBCU.

1. Introduction

Institutions of higher education have the potential to function as change agents for sustainability. (Stephens, Hernandez, Roman, Graham & Scholz, 2013) According to 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.

2. The Hunter Story

As a public division of the City University of New York (CUNY) network, Hunter College-CUNY is a premier urban institution of higher education. The College is privileged with its standing as an enthusiastic advocate for sustainability, with a long history of early implementation and achievements in mitigating pollution, improving environmental health, and reducing emissions. Following the introduction of green campus reporting into the Princeton Review survey portfolio, Hunter College has been included in every annual edition of the Princeton Review's Guide to 399 Green Colleges since 2014.

Hunter's program planning for sustainability is guided by the policies and standards set by CUNY, as well as the practices that are directly established and managed by the Hunter administration.

Through the leadership, guidance, and support of the Sustainable CUNY (City University of New York) program, Hunter College has set progressive targets, made notable gains, and pursued innovative solutions all towards the culmination of providing a healthier, cleaner, and more sustainable environment for the Hunter community. Hunter College doubled down on its commitments as the first institution within the CUNY network to promote and cultivate a position solely dedicated to advancing the College's sustainability cause. Renewed emphasis on engagement and equal representation has led the College toward creation of a new 10-Year Sustainability Action Plan led by a council of members from the student body, faculty, and administration.

The objective of Hunter College's most recent edition of its Sustainability 10-Year Action Plan was to align the campus with the priorities of the College's Strategic Plan, as well as reaffirm the commitments and expressed values made in the College's 2008 sustainability mission statement. In 2008, Hunter created its first ever 10-Year Sustainability Action Plan, and set bold and aggressive targets to reflect the college's purpose-driven commitment and role in putting thoughts into action, engaging across the interdisciplinary spectrum, and remaining an enduring resource of innovation and collaboration.

Hunter's 2018 Sustainability Action Plan revisited the campus' 2008 sustainability goals and objectives and built on off the successes and challenges encountered to redefine strategy, reassign priorities, and rebrand the rhetoric to set new sustainability targets for the next ten years that promote Hunter College as a green institution and forum for interdisciplinary education and student success.

The 2018 Action Plan creates a pathway to chart the College's progress over the next ten years within seven designated sustainability pillars: energy, waste & recycling, water, transportation, procurement, education & outreach, and sustainable nutrition.

2.1. Energy

Hunter College's energy performance is driven in alignment with two NYC energy-saving directives that call upon the College to respectively lower its GHG emissions and energy use intensity (EUI) by a target year. Sustainable CUNY is an instrumental force in facilitating the implementation of strategies and practices that deliver on these directives and streamline both energy efficiency and optimal performance. Together with Hunter Facilities and Capital Planning Departments, all opportunities to regularly carry out mechanical equipment upgrades, replacements, and retrofits that lower energy consumption in building operations are leveraged. Over the past ten years, the College has saved over $20M in energy costs, and in a continued practice, the College prioritizes using every dollar saved to go directly back into the operating budget.

Solar panels were installed on the roof of Hunter's 68th Campus North Building to provide students with a living laboratory to learn, study, and observe the impacts and operations of renewables and energy efficiency, and the College also participates in the New York Power Authority's "Peak Load Management" program. Under the terms of this program, the College scales back its electricity usage on up to 15 of the hottest days of summer, helping relieve the heavy demands that are placed on the regional power grid during those times.

2.2. Waste & recycling

The strategic objectives for Hunter College Waste & Recycling are inspired by the endeavor to demonstrate and emphasize the College's alignment with New York City's zero waste commitment goals. In 2015, the Mayor of the City of New York set a citywide target to achieve at least 90% waste diversion from landfill by the year 2030, in a campaign marketed as "20 by 30". Hunter College's sustainability goals are marked by a renewed focus on increasing the waste diversion rate, promoting lower consumption practices, and expanding the campus-wide recycling options. Hunter College's primary waste and recycling hauler is the New York City Department of Sanitation (DSNY), therefore all items accepted for recycling by DSNY are also accepted items for recycling at Hunter College.

The full breadth of Hunter's recycling program is affected by the changes and decisions that take place at the DSNY city agency level. As a direct College-organized practice, the Hunter Department of Environmental Health and Safety (EHS) recycles household batteries, and coordinates the responsible recycling efforts for College-owned electronics, such as laptops, desktops, and printers.

The battery recycling endeavor is a program open to all members of the Hunter campus community and all faculty, staff, and students alike are invited and encouraged to bring in their used batteries.

2.3. Water

Hunter College's Water objectives are undeniably impacted by the College's urbanized landscape. Opportunities to lower the water consumption attributed from building operations, as well as reduce storm water runoff are recognized as priorities for the College. As a commuter campus situated in the heart of New York City, Hunter College is without the significant presence of grounds and landscaping maintenance often seen at higher education institutions. The depth of Hunter's water conservation and efficiency efforts lies in the installation and operation of high-efficiency plumbing fixtures (such as sinks and toilets) and mechanical/HVAC equipment. Once an obsolete plumbing fixture has reached the end of its capital use cycle, Hunter College Facilities prioritizes replacement with high-efficiency plumbing fixtures. In 2010, with the advocacy of its student body, Hunter College also began (and continues to this day) installing water bottle-filling stations throughout the campus.

2.4. Transportation

The objectives for Hunter College Transportation are influenced by Hunter College's existing integration with New York City's mass subway transit system! As a testament to Hunter's continued advocacy and active support of mass transit, all of Hunter College's campus properties are purposely sited to nearby accessible modes of public transportation. To continue minimizing the extent of Hunter's transit-related "footprint", bicycle racks are available at each campus, and no parking spaces are made available to students, faculty, and staff. In 2018, Hunter partnered with Citibike to erect a bike-share hub at its 68th Street Campus for use by the Hunter community and greater public. Citibike is a local bicycle-sharing program network operated by New York City.

2.5. Procurement

Hunter College sustainable procurement opportunities are manifests through Hunter's relationship with CUNY, as well as compliance with a State-driven Executive Order. As a public division of CUNY, many campus commodity assets (such as technology, appliances, building materials, etc.) are procured from pre-designated vendors and contracts on the CUNY inventory. Under a New York State Executive Order, Hunter is also encouraged to prioritize the purchase of products that meet environmentally preferable qualifications and performance. The planning objectives for this sustainability pillar are driven by a resolute commitment to deliver actionable progress towards purchasing green products, incorporating the use of more sustainable materials, and implementing a paperless procurement process.

2.6. Education & outreach

The planning objectives for Hunter College Sustainable Education and Outreach are made with the overall strategy to engage with student government more, and to work toward creation of a shared suite of resources that will deliver on facilitating engagement and bringing keen awareness throughout the campus community on the importance of sustainability.

2.7. Sustainable Nutrition

The 68th Street Hunter West Cafeteria and vending machines represent the primary areas of opportunity for sustainable nutrition options at Hunter College. CUNY provides language and guidelines for food service operations is the most apt party able to take the mantle on incorporating more sustainable guidelines into food service requirements. The objectives for Hunter College Sustainable Nutrition are shaped by a renewed emphasis on the provision of organic foods, locally-sourced ingredients, and return to eco-friendly packaging. To address the elements of accessibility and affordability for sustainable nutrition, Hunter College directly established the Purple Apron service to feature as a welcome addition for the College. The Purple Apron is a free resource for undergraduate and graduate students to twice weekly receive a free bag of groceries stocked with balanced options of dairy, fruit, vegetables, grains, and protein.

3. The Clark Atlanta University story

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) sustainability and helps to foster emerging geoscience networks. CAU is on the cutting edge advancing diversity, equity and inclusion.

In 2010 Clark Atlanta University 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 part of the CAU experience.

As described in its 2018 Annual Sustainability Report the CAU Campus Sustainability Plan is a dynamic document intended to provide a roadmap for advancing sustainability over the next five years (2018 – 23). The Plan identifies 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. The plan is considered a living document that will guide sustainability efforts of the university from 2018-2023.

Success means that older materials, facilities and habits are replaced with more sustainable options. As this transition takes place there are positive impacts on health, well-being and the natural environment. Most often the changes are subtle. The appearance of bicycles and bike racks on campus is now well integrated in the CAU fabric as are electric powered golf carts. Ultimately, small changes like the bikes, carts and bottle-less water stations change habits. Behavioral change is one of our most important sustainability goals.

3.1. Sustainability principles that guide the CAU Plan have been adopted in five categories

3.1.1. Leadership. Integrating environmental concerns into decision making at CAU involves providing students, faculty, and employees with opportunities to become environmentally aware; promoting environmental leadership as a continuous and participatory process; using university leadership and expertise to assist local environmental efforts. CAU housed the Building Green Initiative, AUC Vine City & English Avenue (AVE) EcoDistrict, co-leads the HBCU Geoscience Working Group with FAMU, and launched the HBCU Green Fund, all innovative green initiatives and *ideas that matter*.

3.1.2. Engagement. CAU has implemented procedures to minimize its impact on the environment by developing a sustainability plan that outlines efforts to limit its negative impact on the environment. Part of this engagement includes revising policies and procedures to promote sustainability, and strategies to reuse and recycle.

3.1.3. Education. This principle focuses on changes in behavior and the raising of awareness of sustainability on campus and in the community. CAU has maintained a leadership role in the national HBCU Geosciences Working Group and the NSF funded InTeGraTe (Interdisciplinary Teaching about Earth for a Sustainable Future) project. Several CAU faculty members participated in InTeGrate Traveling Workshops focused on topics of concern to HBCUs including Strengthening Geoscience Competency for HBCU Pre-Service Teachers, Putting Sustainability into Action and Pan-African Approaches in Teaching Geosciences. The Sustainability & Social Justice Workshop held in the spring at CAU had the goal of advancing curriculum development around themes and pedagogy for sustainability & social justice for CAU and regional faculty.

3.1.4. Research. A principle at CAU is to incorporate sustainability into research efforts at the university and use research to advance sustainability programs. The aim is that research at the university should be conducted in an environmentally responsible way. Research funds should be utilized to help the university obtain sustainability. Faculty expertise should be used to help promote sustainability efforts.

3.1.5. Campus. The goal is to involve the university community and the community surrounding the institution in the sustainability process. This includes developing projects such as a community garden and other microenterprises that help the local community, and celebrating CAU's successes within the community. CAU is an active participant in the new Greater-Atlanta Regional Center of Expertise (RCE) a network of multidisciplinary stakeholders, including higher education institutions, businesses, non-governmental organizations, community associations, and local, regional, state and federal government agencies coming together to address environmental challenges, climate change, resilience and sustainable development goals.

4. Conclusion

How these institutes, Hunter College and the HBCU, Clark Atlanta University (CAU) took their respective campuses green in terms of their sustainability plans and polices can be instructive for other institutions of higher education in their quest for green campuses.

Hunter College's mission includes striving to integrate the principles of sustainability in all business decisions including the following: Consulting with all campus stakeholders to identify sustainability goals and promote their achievement; Measuring and reporting on campus sustainability initiatives; Evaluating and redesigning all our operations to reduce their environmental impact; Developing educational and research agendas to meet the long-term goals of sustainability; Promoting awareness about the consumption of natural resources by individuals and groups; Encouraging environmentally sound practices among students, faculty and staff; and Seeking strategic collaborations with other organizations to advance the college's sustainability goals.

CAU is a member of AASHE (The Association for the Advancement of Sustainability in Higher Education) and has been able to purposefully leverage the breadth of resource and engagement opportunities that this association has provided. AASHE is dedicated to inspiring higher education to lead the sustainability transformation. However, issues of resources for smaller institutions impede implementation of its sustainability goals and initiates. CAU's success with this endeavor identifies a potential opportunity for which Hunter College could also take advantage.

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EDUCATING FUTURE MANAGERS IN SOCIAL COMPETENCIES, IN SPAIN: HOW FAR HAVE WE GOT, 20 YEARS AFTER THE BOLOGNA DECLARATION?

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Abstract

The original objective of this study was to discover potential improvement areas for teaching social competencies to university undergraduate students. These competencies, often called "soft skills", have become the most demanded capabilities from graduates by employers worldwide. The wider scope of the project became evident when the initial research problem turned out to be the very definition of "competency" itself.

Different sources offered different approaches to its conceptual definition, its classification into different types and to its operationalization. The authors therefore started with the European Tuning Project, a cornerstone of the Bologna agreement, as their base. Up to 5 different classifications were found in the literature, all of them less than 10 years old, and all of them were analyzed, compared, compiled, fused and finally refined into a set of 9 core Interpersonal (Social) Competencies that were established as a "competency framework".

A second research problem was how to evaluate performance: What can be considered an "acceptable" level of achievement? Among the existing options, the *Comparator Organizations* system was chosen, where the benchmark would be the globally recognized United States Educational system.

Parting from these premises, the authors conducted an empirical study of a valid sample of 225 students in Spain (original sample size above 400) who were studying in either the Spanish or the United States educational systems. Statistically significant differences were found among their behaviors and self-perceptions around certain interpersonal competencies. The survey sought to measure both the students' self-perception (13 questions) and their "real behavior", measured as a declared intention in different hypothetical, "easily-relatable-as-realistic' situations (21 more questions). The reason for choosing this combined methodology, which to the Authors' knowledge had never been used before, lies in the very concept of competency itself, understood to be: a "dynamic combination of knowledge, understanding, skills and abilities". This means that, beyond theoretical knowledge and understanding, competencies are dynamic: they must be put into practice, thereby moving beyond the purely cognitive (at the level of descriptive, self-perception statements, intending to measure qualities respondents believe themselves to have) and into the behavioral arena (at the level of behaviors and/or intents, thereby seeking to measure indicators showing that respondents actually put these behaviors into practice).

The differences found between American-system and European-system students led to a series of interesting conclusions about the status quo of teaching and training social competencies to Business students in Europe, and more specifically in Spain.

Keywords: Management learning, competences, interpersonal, leadership, teamwork.

1. Background

June 18th, 2019 is the 20th anniversary of the *Bologna Declaration*, by which 29 European Ministers of Education proposed a European Higher Education Area (currently composed of 49 Countries) in which students and graduates could move freely between countries, thanks to "a system of easily readable and comparable degrees" that should lead to "a system essentially based on two successive cycles, undergraduate and graduate". Systematization and comparability should, thus, be the two main aims of the resulting *Bologna Process*.

20 years and 10 governmental meetings later, , Spain, like other European countries, has adopted the European Credit Transfer and Accumulation System (ECTS), striving to evolve from strict convergence in time spent on qualifications, to a competency-based system.

Within the competencies ("dynamic combination of knowledge, understanding, skills and abilities") included in the system there are 3 main types widely recognized in the Literature, starting with the Tuning Project (González & Wagenaar; 2003), a cornerstone of the Bologna system implementation across European Education Institutions: Instrumental, Interpersonal and Systemic competences

Not to be overlooked, one of the main premises of the European Higher Education Area is that a college degree must guarantee a student's competency in academic, professional and social contexts (Riesco, 2008), leading to an increased employability of graduates. In this same direction, the *Observatorio Empleo UAM*, 2016 points out Spanish students' perceptions of the most demanded competencies in their current jobs, and their own perceived level of achievement after college. Interpersonal competencies are, by far, the most demanded of the three, while there is still much room for improvement in the teaching of them (scored 3.6/5). The UNESCO report (2006) recognizes that as of 2015 these competencies will be the most demanded by employers, worldwide.

In order to measure the progress made in Spain in terms of education of future managers, as in any performance assessment, one can rely on one of the three following criteria (Johnson, Whittington et al., 2017):

- Compare achievement against the specified goals (*Organizational Targets*)
- Compare achievement levels over time (*Trends over time*)
- Compare achievement against a benchmark, typically a competitor (*Comparator Organizations*)

As Education is a global industry with a wide array of rankings and comparator lists from many different organizations, the third criterion appears to be the most suitable to our case. Gathered evidence shows that, while technical skills (Instrumental competencies) of Spanish graduates in areas such as Chemistry, Physics or Architecture find wide international recognition, quite the opposite seems to happen with degrees in Social Sciences (where Interpersonal competencies happen to gain significant weight). At the same time, Social Sciences degrees account for the largest proportion of Spanish graduates (23% of them, according to www.crue.org; 2015) that could be a significant contributing factor to the fact that the Spanish universities usually obtain poor positions in World Education rankings.

Lastly, the prestigious Shanghai Ranking (2016) illustrates that this is not solely a Spanish problem, but rather a European one (as compared with the American Higher Education system).

It is finally worth mentioning that many specific documents ("Reference Points") have been published within the Tuning Project covering the abovementioned Technical and Scientific areas, while little information can be found and consensus is harder to reach among experts in the Social Sciences areas. Instrumental competencies are widely recognized and agreed upon, in the former; Interpersonal competencies, which are admittedly the most important in the Social Sciences find less consensus already from their initial definition and classification, in the latter.

2. Research objectives

As a general objective, our original 3-year long project sought to *"leverage the learning process of undergraduate students, through the identification, measurement and training in personal and interpersonal competencies, to improve their ultimate professional performance'*.

Stemming from this, our goals for the first year, which are the ones presented and discussed in this paper, were listed as:

1. Identify the key competencies for students' professional development.
2. Identify the key performance indicators ("items") of these competencies.
3. Design a framework for measuring the level of achievement in each item.
4. Measure the level of achievement for each student in each competency.

It is worth mentioning at this point that while the first three objectives were expected to consist of a mere literature review, each of these four goals ended up being a challenge in itself, due to the abovementioned lack of consensus among different authors and works analyzed.

The design of the measuring framework and indicators, which seemed simple at first, resulted in a complex task which was solved using qualitative exploratory research, interviewing expert teachers, professors and trainers (Delphi).

3. Methodology

In order to Identify the key competencies for students' professional development, it was necessary to first define the term competency within the educational system, the backbone of the European Tuning Project. González & Wagenaar (2003) defined competency as *a dynamic combination of knowledge,*

understanding, capabilities and abilities that the student acquires throughout the learning process. This is not to be confused with learning outcomes, which are the results of the learning process, or *formulations of what the students must know, understand or be able to demonstrate at the end of the learning process*. It becomes apparent that competencies should be measured through observable behaviors that indicate the level attained at any one time time, and preferably not through self-assessment, as has been done in most research to date.

Secondly, competencies must be classified and grouped into sound categories. A consensus can be found in the literature around *Generic Competencies*, those that are not specific to any one area, and that can be classified into Instrumental, Interpersonal and Systemic competencies. Most consensus reaches this point, but goes no further: hardly a 75% coincidence can be found between classification lists, like the LatAm Tuning project, or the Sonora University Competency list for the Chemistry degree, among others. The authors need to create a list of Interpersonal Competencies, based on the abovementioned diverse sources. The final list of 9 Interpersonal competencies includes:

1. Critical thinking and Self-Criticism
2. Teamwork
3. Interpersonal Abilities
4. Ability to work in Multidisciplinary Teams
5. Ability to communicate with experts from diverse areas
6. Appreciation of Diversity and Multiculturalism
7. Ability to work in International contexts and Global awareness
8. Ability to acquire Ethical Commitments
9. Leadership

In the second place, aiming to "identify the key performance indicators ("items") to these competencies", the Authors elaborated a list of observable behaviors related to the definition of each of the listed 9 competencies. As an example, two different approaches to "Teamwork" were described using up to 11 observable variables ("Items").

Designing a framework for measuring the level of achievement in each item was the third step. At this point, while reviewing the existing literature at hand, the Authors decided to create a questionnaire divided into 2 main blocks, separating *Self-perception*, frequently used as the only measuring tool; and Behavior, an innovation based on the previous work (developing observable behaviors as "Items" of each competency), and which is expected to represent a significant contribution of this work.

Lastly, Measuring the level of achievement for each student in each competency was done through a 40-questions survey. A Likert scale was used in most cases, with an open percentage to indicate the level of agreement with a set of 34 statements (21 Behavioral intents and 13 descriptions of Self-Perceptions).

The fieldwork took place between May 2018, mainly but not exclusively among students from the Autonomous University of Madrid and Saint Louis University, and resulted in 427 interviews, out of which 275 were finally fully validated. Qualtrics was the selected tool for the Survey. The results were developed using SPSS for analysis and Excel for tables and presentations.

4. Results

The first task was to conduct an exploratory Factor Analysis for 2 sets of data, where these were:
- Behavioral Variables, where 13 of the original 21 items merged into 3 constructs/factors, accounting for 52.2% of the variance. We named these factors:
    o Behaviors tending to facilitate Teamwork and Appreciation of Diversity
    o Personally Mature behaviors, exhibiting such values as Empathy or Assertiveness
    o Behavioral Leadership
- Self-perception Variables, where 12 of the 13 original items merged into 3 surprisingly coincidental constructs/factors, accounting for 60.8% of the Variance. Factors where, thus the same ones:
    o Self-perceptions related to values like Teamwork and Appreciation of Diversity
    o Perceived Leadership
    o Self-perception of Maturity values, such as Empathy or Assertiveness

The names attributed to each factor/construct was based on the items it comprised, and as a result of this procedure, only 9 of the original 34 items were discarded.

We then proceeded to analyze the Variance (ANOVA) among different sets of data, using the specifically collected segmentation variables (Age, Gender, Educational System, etc.). As was stated from the beginning, in the project objectives, the main goal was to uncover and analyze the differences existing between European and American Educational Systems students in terms of Interpersonal competencies. Since employability rankings attributed better results to the latter, the idea was to find out if students from both systems effectively differed in their behaviors and self-perceptions, regarding these competencies.

The main results of ANOVA uncovered statistically significant differences between the several groups and for different Factors, among which we focused on differences between European-system and American-system students, regarding three factors:

- Behaviors that facilitate Teamwork and demonstrate Diversity tolerance and appreciation
- Behaviors that demonstrate Leadership competencies
- Self-Perceived Leadership

These two groups turned out to be the most different of all, in statistical terms: *out of all the personal characteristics of a student (*segmentation variables*) such as gender, age, institution they attended, etc., the single one that best predicts a difference in the students' Interpersonal Competencies is the Educational System (European or American) they attended to*.

Self-perceived Leadership seems to be the most complex of all the constructs, showing the larger number of differences between Groups, while *Behavioral Leadership* only shows differences per the Age and the Educational System. The construct *Appreciation of Diversity and Teamwork* shows differences between the Educational System groups and also between the Institution-based (Public or Private) segmented groups. Lastly, the Behavioral construct *Personal Maturity* only shows differences per age groups which, as stated above, should be naturally expected.

To end this discussion, we shall agree that while the Analysis of Variance (ANOVA) indicates the abovementioned differences between segments, it does not at all prioritize the variables that suffer the highest variations, nor does it show "the sense" of these differences (what could be interpreted as "*who is more X than whom*"). In order to obtain this kind of information the sample was segmented in Excel, using the variables indicated by ANOVA, and both subsamples where analyzed separately, on a question-by-question basis. Without disregarding the results of ANOVA, we can pepper their interpretation using this user-friendly system, leading us to conclude that European-system and American-system students differ in their development of Interpersonal Competencies.

5. Conclusions

Focusing on the differences between European and American educational systems and stemming from the analysis it becomes apparent that the most differential items are concentrated in *Behaviors tending to facilitate Teamwork and Appreciation of Diversity*. At the same time, based on the sign of the statements, and the sense of the difference (positive or negative), we can state that, in general terms, European-system students appear to be more tolerant of Diversity and stronger Team players. It is very important, at this point, to keep in mind that we are not talking about the student's nationality (cultural background should be discarded as a potential bias). In both educational system samples European and American students were equally present and mixed.

Continuing with the analysis, items which clustered around the construct *Behavioral Leadership* show smaller differences, yet statistically significant, according to ANOVA. According to the sense of these statements and the given answers, the Item *Communication* seems to be equally strong in both segments, while *Planning*, and even more *Influence* indicate that American-system students hold a stronger position.

Lastly, Items concentrating around *Self-perceived Leadership*, which exhibits highly significant differences between segments, according to ANOVA: It is not to be overlooked that this factor showed the highest number of significant differences between segments (age, gender, institution, etc.). Admittedly, Leadership is not an easy concept, and the following statement, attributed to Warren Bennis, states it clearly: "*To a certain extent, Leadership is like beauty: it is hard to define, but you recognize it the moment you see it*". While it is frequently presented as an important personal characteristic, a skill, and ability... this importance may also open a door to biased self-perceptions. We can conclude that, when it comes to *Self-perceived Leadership*, European-system students are less *Resilient*, and even less capable of *Solving Interpersonal Conflicts*, but above all they perceive themselves as less inclined or prepared for *Leadership*. Back to Bennis, since the 1960's he advocated for *a democratic and humanistic leadership as the best way to deal with a complex, ever-changing environment*, and this appreciations are extremely suitable for our final conclusion: While European-system students are less qualified to behave as Leaders, and they are certain in their self-perception in this regard, our system seems to better prepare them for the future challenges at the workplace, by making them significantly more tolerant to Diversity and individual differences, and stronger Team players. This opens a door to hope for our younger generations, in terms of their potential professional success in the Global Workplace.

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A (DE) HUMANISING PEDAGOGY: LET THE TEACHERS SPEAK

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Abstract

Given the nature of South Africa's linguistically and culturally diverse classrooms, it is inevitable that teaching and learning from a social justice perspective be prioritised to address injustices and inequities. Paulo Freire (1970), who laments the state of dehumanization in education argues "the only effective instrument in the process of re-humanization is humanizing pedagogy." In this case study I draw on conversations with teachers in which I explore their understandings of a humanising pedagogy to answer questions 'What does a humanizing pedagogy encompass? What does it require of us in the context of teaching and learning environments?' I conclude that a humanizing pedagogy is crucial for both teacher and student success and critical for the academic and social resilience of students. The work emanates from a project between universities in South Africa and Brazil.

Keywords: Social justice, humanizing pedagogy, education.

1. Introduction

Given the nature of South Africa's linguistically and culturally diverse classrooms, it is inevitable that teaching and learning from a social justice perspective be prioritised to address injustices and inequities. While narrowly perceived to be 'just good teaching', deconstructions of justice become crucial. Essentially, social justice refers to fair and just relations between individuals and society; it involves breaking barriers for social mobility; breaking the cycles of oppression; and examining systems of power and privilege. Defined by Bell (1997: 3-4) as "full and equal participation of all groups in a society that is mutually shaped to meet their need. the process of social justice should be democratic and participatory, inclusive and affirming of human agency and human capacities for working collaboratively to create change." Inclusivity, participation, and equity are foregrounded as core concepts. Nieto (2006: 2) adds that social justice "challenges, confronts, and disrupts misconceptions, untruths, and stereotypes". To address injustice, we have to challenge and disrupt. Yet despite attempts to transition to a more inclusive, socially just order, legacies of disempowerment and dehumanisation continue to persist in society worldwide (Delport, 2016). And as Zinn and Rogers (2012: 76) say, "the educational arena remains a battlefront, in which the struggle to build voice, agency and community continues." One way of addressing these concerns is through a humanizing pedagogy.

In this paper, I examine the role of a humanising pedagogy and implications the concept has for education. I adopt a qualitative case study to examine teachers' shared understandings of a humanising pedagogy in their teaching-learning contexts.

2. Theoretical framing: Humanising pedagogy

Humanising pedagogy grew out of Freire's (1970) critical pedagogy, and may be considered a method of instruction that "ceases to be an instrument by which teachers can manipulate students, but rather expresses the consciousness of students themselves" (Freire 1970: 51). Freire argued that humanizing teachers engage in a quest for mutual humanization, where students are co-investigators in dialogue with teachers. A dialogic approach develops critical consciousness, and teachers who engage in humanizing pedagogy engage in praxis, reflection, and action upon the world to transform it. Freire laments the state of dehumanization in education and asserts that "the only effective instrument in the process of re-humanization is humanizing pedagogy." For Bartolomé (1996) a humanizing pedagogy promotes respect, trusting relationships between teachers and students, academic rigor and learning contexts where power is shared by teachers and students. Macedo and Bartolomé (2000) add that the pedagogy values students' background knowledge, language, culture, life experiences.

Bartolomé (1994) argues for a humanizing pedagogy that respects and uses reality, history and perspectives of students as an integral part of educational practice. He argues that teachers who work with subordinated students in particular have a responsibility to assist them in appropriating knowledge bases and discourse styles seen as desirable in society. This process must be additive. A humanizing pedagogy is crucial for both teacher and student success and critical for the academic and social resiliency of students, given that educational policy is dominated by standardized and technical approaches to schooling that dehumanize students, especially those of colour (Salazar 2013). Freire's conceptualization of "humanization," "pedagogy," and "humanizing pedagogy" is therefore seen as a counter-practice to dehumanization in education.

In Huerta's (2011: 49) work with Latino children, she explains that teachers who employ humanizing pedagogy in the classroom understand that learning is an act of linking new information to prior knowledge in and out of school, and that learning occurs in a social cultural context. We must understand that language is a tool for learning and through a culturally bound, socially mediated process of language development, children construct mental frameworks (schema) for perceiving the world around them. Teachers who engage in humanizing pedagogy engage in classroom practices that respect cultural differences and reflect care for students. They critically question their deficit views of subordinated students and recognize students as knowers and participants in their learning. They take action to create pedagogical structures that help to balance asymetrical power relations in society.

3. The study

This work emanates from collaboration between universities in Brazil and South Africa. The focus of the project is teacher engagement with education for social change, social justice, cohesion and peace in the two countries. This work serves to report on one aspect in the South African leg of the project. Graduate students involved in the project participated in an introductory seminar where key concepts were deconstructed. The participants were eight students, who are also English teachers. Six are female, and two male, and all except for two are South African. The aim of the work was to examine their thoughts on what a humanizing pedagogy might entail. The work emanates from group discussions with the teachers. All participants also wrote narratives of (de)humanizing teaching-learning experiences that they may have encountered. This paper reports on the group discussions.

3.1. Discussion

I highlight extracts from the discussions, then proceed to discuss them in relation to teachers' understandings of what a humanising pedagogy embraces:

Jana: "It is about being human, what does it mean to be human….it is about free will… It is about justice. We are equal in all that we do, colour should not separate us, blood brings us together, humanises us. A humanising teacher treats everyone alike. We have the same blood. That's why Schweize Reneke is important, we cannot separate children, they must be taught together"

Avi: "We all have a story, some stories are better than others. We have a history. We do not come from nowhere. Teachers must know who their students are. A humanising pedagogy acknowledges everyone's story. This is important in the South African context, given our history and our diversity. Be the revolution, get to the heart of the learner"

Marina: "Everyone speaks a different language. In our case (SA) we have 11 languages. I speak English, but as a teacher I have students who speak at least five different languages. A HP acknowledges the child's language, mother tongue. Yet English is the medium of instruction. I can speak about three languages, so I cannot speak to the learners in their languages, I use English which is our policy at school, at most schools. A humanising pedagogy will respect all languages. Yet how do we focus on this?"

Tsepo: "For me it is about culture. What is a person's culture? It is not race or religion, it is about values and beliefs. In my culture I am allowed multiple wives, but it is a patriarchal culture, this I will not support. Yet as a teacher I will respect all my learners' culture. It is their beliefs and how they were brought up. In school today cultural day is about dressing up in your traditional clothing...this is only a small aspect of culture, it is not what makes you, you...inside"

Vina: "A humanising pedagogy is like social justice, it would include bringing up discussions of a critical nature. We need to talk about SAs history, apartheid. And privilege. We have black and white kids in class. Yet white kids say they are not responsible for apartheid, their ancestors were. Yet they are privileged because of apartheid. We need to have these conversations at all levels."

India: "I spoke Afrikaans as a child, I still do. Many coloureds (mixed race) do. Yet now Afrikaans is stigmatised. It is called the boer language, and we must not speak it. I feel guilty now, yet I believe a humanising pedagogy recognises my Afrikaans heritage as it does other languages. I was not responsible for apartheid, I am a child of it. I am black, I speak Afrikaans. If this is not acknowledged it is dehumanising".

South Africa is a country riddled with past and present inequities. As a fairly new 25 year old democracy, South Africa's past is tragically reflected in over 45 years of apartheid during which time black people did not have rights over where they lived, whom they married, or where and how they were educated. We lived under complete white domination. Decisions were made for us on the basis of skin colour and the texture of our hair. Since democracy, given the nature of the country's linguistically and culturally diverse classrooms, it is inevitable that teaching and learning from a social justice perspective be prioritised to address injustices and inequities. Three major themes emerged from the teacher group discussions, regarding their views on what a humanising pedagogy entails: justice, background stories and the value of language.

All the teachers referred to a sense of justice as being core to a humanising pedagogy. For Jana, skin colour is superficial, she considers blood a uniting force for human beings. For her a humanising pedagogy means that all learners must be treated the same. Jana makes an interesting reference to Schweize Reneke. Schweize Reneke is a little town in the North West of South Africa. The incident referred to occurred in January this year, when a Grade 1 teacher separated children into two language groups: one that spoke English and one that did not. These groups happened to consist of separate race groups as well, one black and one white. Her understanding was that the children would feel more comfortable among those who spoke their language. The incident went viral very quickly with much of the country referring to it as a racist act to divide children along linguistic grounds. The teacher later apologised, as her intentions were not racist. Vina too evokes social justice by calling for what he calls "discussions of a critical nature". Zembylas and others refers to these conversations as discomforting or troubling conversations. Vina's view that white children absolve themselves from apartheid is also troubling. He feels that a humanising pedagogy would involve us engaging in discomforting dialogues, where we get opportunities to acknowledge our privilege and entitlement, rather than engaging with 'apartheid denial'.

Avi understands a humanising pedagogy as acknowledging learners' backgrounds. Given the nature of diversity of learners' backgrounds, it is crucial that we listen to learners' stories or narratives. Storytelling lies at the heart of our experiences, they engage us at a spiritual level, and are the voice of change. Avi reminds us of this: that stories give voice to children. He also evokes us to "be the revolution". This is reminiscent of Freire's (1970) revolutionary teachers. Freire uses the term in opposition to "reactionary" teachers. For Freire (1970) revolutionary teachers establish a permanent relationship with students from subordinated cultures and languages. Revolutionary teachers practice a humanizing pedagogy where the method of instruction is not an instrument by which teachers can manipulate students, because it expresses students' consciousness (pg 51). Bartolomé (1994) too argues that a humanizing pedagogy values students' background knowledge, culture and life experiences, and creates learning contexts where power is shared by students and teachers (pg 248).

Schools need to do more than just teach students English. They must also strengthen cultural awareness and identity. Marina's focus on language and Tsepo's focus on culture foreground this. Marina's questioning of how to address language discrepancies in the classroom is a concern in South Africa. Given the linguistic and cultural diversity of South Africa, it is near impossible for teachers to be able to speak all the childrens' languages. However, it is important to acknowledge them. Too often, have children who speak languages other than English been considered marginal or deficit. Language must be highlighted as a vital element to humanisation. Childs (2016) explores the (potential) dehumanising nature of language use in many South African classrooms by highlighting the regular disconnect between the dominant language of the classroom and the home language of the learner. In contexts where English is hegemonic as the language of teaching and learning, Exploring the possibilities of translanguaging can bring about humanising experiences for learners as well as teachers. Childs (2016) says that translanguaging practices are inherently humanising, affording teachers and learners opportunities to participate as social, thinking, transforming individuals. Marina and India evoke these points. India's point however, refers to Afrikaans, originally emanating from Dutch colonisers, and spoken by Afrikaners and SA's coloured, or mixed race people (apartheid nomenclature used for clarity). Her view is that as a black person she should not feel guilty about speaking the language of the apartheid rulers, she has a right to the language.

Historical realities of dehumanizing in South African education have been well documented by researchers such as Alexander (2002), Chisholm (2004), Jansen (2009), and Soudien (2012). Zinn and Rogers (2012) add that the legacy of dehumanization has been wittingly and unwittingly absorbed into educational arenas that depict hierarchies of power, compliance, fear, suppression and loss of voice. Restoring voice and agency is a key characteristic of what it means to be human. Given our oral tradition, in the south, voice and storytelling are pertinent, storytelling, must be seen as a social and cultural activity. Loss of voice is one aspect of dehumanization; restoring voices equates with agency, which has implications for social justice and human pedagogies.

4. Conclusion

For us to commit to increasing equity and excellence in education of culturally and linguistically diverse students, we must teach against the grain of dehumanizing practices (Salazar 2008). Relegating learners to the fringes of society through dehumanising policies and practices that reproduce social and academic inequities. For Huerta (2011) research in teacher education has placed emphasis on teacher knowledge and instruction, not enough on attitudes and perspectives that can contribute significantly to pedagogy. Teachers who embrace a humanizing pedagogy recognize the socio-historical and political context of their own lives and students' lives, including the influence of societal power, racial, ethnic identities and cultural values (Bartolomé; Freire 1970; Salazar and Fránquiz 2008). These teachers believe that marginalized students (due to race, economic class, culture) experience difference in how they learn, not in their ability to learn. Thus we need to listen to the voices of the classroom. We must let the teachers speak.

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STUDENTS' PERCEPTION ON HIGHER EDUCATION CRM POLICY

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Abstract

As a set of practices, customer relationship management (CRM) provides an integrated view of customers which have to ensure that each customer receives the highest level of service, and consequently enhance profitability of business. According to previous studies, different models have been developed in a wide range of settings. In order to achieve better results, many higher education institutions (HEIs) have recognized the importance of adopting CRM strategy. By implementing CRM initiatives, managers in HEIs, intend to increase performance, improve teaching process, and the relationship with their stakeholders. However, the literature on higher education (HE) marketing lacks theoretical models that are adapted to particular context of HE and the nature of their services. Thus, the adoption of CRM by HEIs request the use of appropriate instruments to acquire greater knowledge of the needs of students, in order to implement training courses and to provide services, which are tailored to their characteristics. The purpose of the article is to determine needs for customization of CRM approach in order to increase satisfaction of different students groups. The main goal of this paper is to examine CRM in a HE setting and difference in the level of satisfaction on existing CRM policy of HEIs. In order to achieve defined goal, the survey has been conducted among students in the Republic of Serbia, and 444 valid questionnaires were collected. Research findings reveal students' perceptions on CRM policy, implemented in HEIs. In addition, parametric t test has been used in order to determine the difference in students' perception between male and female students, as well as between students at bachelor and master level of studies. Viewing students as customers, the obtained results should provide guidelines for achieving competitive advantage and improving a faculty's and university's ability to attract, retain and serve its customers. This paper, also, should be used by policy makers, as a recommendation in the HE sector to embrace investment in CRM and to highlight the relevance of implementing CRM strategy in HE setting.

Keywords: Customer relationship management, higher education, students.

1. Introduction

The growing importance of the third mission of university, which emphasizes its social dimension (Laredo, 2007), has significantly contributed to the attention of intangible asset of HEIs. Among the most valuable HEI's resources are a wide range of economic, political and institutional relationships, built and maintained between HEIs and their stakeholders (Ramírez-Corcoles et al., 2012, Veltri & Silvestri, 2015, Pedro, Leitão & Alves, 2019). By observing students as customers, as the most important stakeholders (Nair et al., 2007; Seeman & O'Hara, 2006), the question arises which is the most effective approach applicable in the context of HEIs. Different marking tools have found their application in this context, and CRM can be presented as one of the possible means for developing relationships with students before, during and after teaching process (Badwan et al., 2017).

CRM has been widely applied in a corporate sector (Grönroos, 1996) and is one of the important approaches to sustaning an organization on a modern business environment, with the focus on identifying and delivering customized services to each customer (Ogunnaike, Tairat & Emmanuel, 2014). In the context of higher education, CRM is also used (Tapp et al., 2004; Fletcher, Wheeler & Wright, 1995; Peppers & Rogers, 1997; Chen & Ching, 2005) and is often the answer to challenges of HEIs faced with (Seeman & O'Hara, 2006).

In view of the increasingly frequent application of the marketing concepts under the framework of HEI, in this paper students' perception on CRM in a HE setting is examined. Research conducted among 444 students aims to provide answers to the following research questions: 1) what is the perception of students about CRM policy in HEIs? 2) Is there a difference in perception between male

and female students? 3) Is there a difference in perception between students at undergraduate studies and students in master studies? The purpose of the work is to establish, based on the identified differences in the perception of the existing CRM approach by different groups of students, guidelines for further customization of the CRM policy in order to increase student satisfaction during the course of study.

This paper starts with a definition of CRM, its implications for faculties and universities, and exploring students as customers. It then presents the research methodology and research results, which may be useful to gain a better understanding of the students' needs for CRM development. The last part refers to the contribution of conducted research and directons of future research.

2. Literature review

2.1. Customer relationship management

In literature numerous definitions of CRM concept are identified, with the implementation of this concept contributing not only to the performance of the organization, but also provides multiple benefits for customers. The basic assumption on which CRM is based is to provide one-to-one relationship with the customer (Seeman & O'Hara, 2006) in order to understand the needs of customers and create a positive experience in relation to the given product / service, which is also of particular importance for keeping users, organizational growth and profitability (Badwan, Al Shobaki, Naser & Amuna, 2017). Wali and Nkpurukwe (2008) define CRM as a customer acquisition process, customer retention, an increase in the number of users, thus ensuring the path towards achieving and sustaining competitive advantage. CRM is not just a marking tool, it is also an integral part of the business strategy. Therefore, CRM can be described as "a part of a customer-focused business strategy that aims to increase customer satisfaction and loyalty by offering customized service to each customer" (Seeman & O'Hara, 2006; Wali, & Wright, 2016).

CRM is a concept oriented towards creating an emotional relationship with customers, understanding their needs, distinguishing customers through market segmentation and loyalty analysis (Peppard, 2000). Berkowitz (2006) defines CRM as an effort, which organizations are investing to ensure an economic and long-term relationship with the consumer for well-being, not just organizations, but also customers. According to Karakostas et al. (2005), CRM is "a set of practices that provide a consolidated, integrated view of customers across all business areas to ensure that each customer receives the highest level of service". Therefore, one of the main goals of CRM is building trust between customers and organization with task that customers repeat purchase in the shortest future period (Ogunnaike et al., 2014).

Swift (2001) presents CRM as an organizational approach, with the crucial importance of communication, in order to enhance the satisfaction and loyalty of existing customers, but also attract more new customers. Therefore, employees must possess the necessary CRM skills in order to efficiently and effectively provide services in accordance with customer complaints and appeals (Gupta et al., 2013). And in this field, the contribution of marking tools is evident.

2.2. CRM in higher education

Higher education institutions (HEIs) are student-oriented organizations that pursue a wide range of student activities, such as admission, financial assistance, counseling, employment, and more (Nair, Chan, & Fang, 2007). As such, HEIs are faced with the challenge of maintaining and increasing the number of newly enrolled students during one academic year. Although the number of high school students decreased during the 1980s and 1990s, the number of enrolled students grows year after year (McDonough, 1994; OECD, 2008). The trend of a significant increase in the number of students from the 1960s to the 1990s was popularly described as "massification", which consequently led to the popularization of higher education in the modern developed world (Dolenec, 2006). However, even after attracting students and making a decision on enrollment, the challenge is to keep students focused on various student counseling programs and support activities for students in the job-seeking process (Seeman & O'Hara, 2006).

On the presented challenges in the field of HE stands a use of CRM. This concept is widely implemented in the corporate sector (Grönroos, 1996; Nair et al., 2007). However, the numerous HEIs have already recognized that they should be flexible in meeting the different needs and preferences of students. Bearing in mind that most universities and faculties are qualified as medium-sized organizations, the importance of direct marketing and CRM approaches for improving entry rates has been proven (Tapp et al., 2004). Universities and faculties benefit from CRM implementation by: improving student-facing processes (Fletcher, Wheeler & Wright, 1995), personalized communication with students (Peppers & Rogers, 1997), information exchange between members of different departments (Chen & Ching, 2005), and an increase the degree of student satisfaction (Kotler, 1997).

Therefore, as in the corporate sector, managers and HEIs make efforts to adopt CRM initiatives, in order to increase performance, improve existing management practices and improve the relationship between HEIs and current and potential students (Badwan et al., 2017).

HEIs have different interest groups, and they need to act in order to meet their needs. Users, i.e. students (Nair et al., 2007) are classified as the most important stakeholders. A typical student usually visits the faculty several times before starting the teaching process. This includes their departure before faculty selection, a visit to register and another visit to pay fees and the purchase of textbooks. Since the development of the media and electronic registration systems has alleviated some of the problems and provided certain benefits, students continue to face numerous administrative tasks, which need to be completed while attending a particular HEI. When performing these tasks, a lot of time is spent waiting for a certain service, which reflects on satisfaction, but also on the retention rate of students at a particular faculty. One of the approaches that reduces a complexity of achieving these administrative tasks is the CRM approach, because it enables more efficient implementation of certain activities, such as registration at any time, payment of tuition fees, counseling and execution of requests, tailored to each individual customer, i.e, student (Seeman & O'Hara, 2006).

3. Methodology

In addition to indicating the relevance of the CRM concept and the HEIs, the given theoretical framework is a starting point for researching student perceptions of CRM policy. Participation in the research were taken by students of graduate and master studies at HEIs, with a total sample of 444 respondents. Respondents were randomly selected, and data collection was carried out using a questionnaire, which was specially developed for this research. Respondents expressed their views on CRM policy on the 5-point Likert scale on (non)agreement. In order to obtain high internal consistency of the questionnaires for the items a results of previous research is used to measure CRM policy and relational capital (Sin, Tse & Yim, 2005; Bontis, 1998, Wang, Wang & Liang, 2014) which are additionally adapted to HEIs. By analyzing the structure of the sample, it was established: 365 graduate students and 79 master students; 83 male students and 361 female students. The software package SPSS was used for data processing. In order to make appropriate conclusions about student attitudes, descriptive statistics analysis, reliability analysis and parametric t test were conducted.

4. Findings and discussion

Based on the displayed values of arithmetic mean and standard deviation, the conclusion is drawn that the highest degree of student aggregation is identified in terms of the relevance of knowledge acquired at the parent faculty compared to other faculties (Table 1). This statement indicates that the knowledge and quality of the teaching process are still the basic criteria of the faculty image, and it is clear that faculty management needs to pay special attention to processes of accreditation of study programs, but also to the teaching staff, who need be competent and ready for students to offer and transfer relevant knowledge in the given fields.

Table 1. Descriptive statistics and reliability analysis.

Items	Cronbach's alpha =0,805	Mean	Standard deviation
RC1	Students are satisfied with the teaching process.	3,5045	0,96787
RC2	Number of students' complaints is minimal.	3,4302	1,05475
RC3	Faculty management develops cooperation with students and former students.	3,4054	1,07614
RC4	Faculty has information about potential students.	3,2725	1,03005
RC5	Faculty undertakes everything to meet the needs and wishes of students.	3,1554	1,09820
RC6	Acquired knowledge at this faculty has a higher value compared to other faculties.	3,5495	1,07286

In order to determine the differences in the attitudes of male and female students, the second step was implementation of a parametric t test (Table 2). Significant difference was observed in the case of the last two statements (RC5 and RC6). In the case of RC5 statement (i.e., Faculty undertakes everything to meet the needs and wishes of students.) it has been proven that female students show a higher level of consent, as in the case of RC6 (i.e., Acquired knowledge at this faculty has a higher value compared to other faculties.).

Table 2. Results of t test for two independent samples (male and female).

Items	Male M (SD)	Female M (SD)	t value	Sig.
RC1	3,3012 (0,93359)	3,5512 (0,97083)	-2,131	0.793
RC2	3,3494 (1,14160)	3,4488 (1,03454)	-0,773	0.493
RC3	3,1807 (1,02582)	3,4571 (1,08216)	-2,118	0.332
RC4	2,9759 (1,08173)	3,3407 (1,00705)	-2,934	0.523
RC5	2,9639 (1,01748)	3,1994 (1,11260)	-1,767	0.065[*]
RC6	3,2410 (1,23555)	3,6205 (1,02063)	-2,931	0.023[*]

[*] The value is significant at the level 0.1; M- mean; SD – standard deviation

Below are the results of the second t test (Table 3), which proved that there is no statistically significant difference between graduate and master students in the perception of CRM policy at the selected faculty.

Table 3. Results of t test for two independent samples (bachelor and master students).

Items	Bachelor students M (SD)	Master students M (SD)	t value	Sig.
RC1	3,4849 (0,97660)	3,5949 (0,92707)	-0,916	0.605
RC2	3,4384 (1,06630)	3,3924 (1,00534)	0,351	0.462
RC3	3,4164 (1,05182)	3,3544 (1,18795)	0,464	0.107
RC4	3,2932 (1,03726)	3,1772 (0,99691)	0,907	0.306
RC5	3,1589 (1,08787)	3,1392 (1,15175)	0,144	0.682
RC6	3,4986 (1,08340)	3,7848 (0,99577)	-2,158	0.441

[*] The value is significant at the level 0.1; M- mean; SD – standard deviation

5. Conclusion and guidelines for future research

The obtained results show that in most of the observed statements there is no difference in the perception of CRM access between male and female students. A statistically significant difference was found in the domain of perceptions of the effort that the faculty invests in order to achieve a high level of student satisfaction. Female students expressed a higher level of consent, which indicates their higher level of satisfaction with actions that faculty invests to meet the needs and demands of students. These results have two practical implications: firstly, faculty management should identify the causes of lower satisfaction in the male student population in order to increase the overall level of student satisfaction, and secondly, female students are more suitable to participate in promotional activities of the faculty. A statistically significant difference was also identified in the domain of acquired knowledge value. Female students showed a higher level of satisfaction with acquired knowledge, which also has the following practical implications: first, female students are better faculty ambassadors in the public than male students, secondly, exploring the causes of lower male students satisfaction can contribute to the improvement of the curriculum.

In general, the obtained results indicate a need to differentiate CRM approaches in the female and male population of students in order to achieve a higher level of satisfaction of existing students. The difference in attitudes between students of graduate and master studies has not been established which suggests that no differentiation of CRM approach is needed in relation to the level of studies.

Future research will focus on determining the causes of the stated differences in the attitudes of female and male students, as well as identifying contextual variables that can affect changing attitudes.

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POSTERS

LIFESTYLE HABITS IN A UNIVERSITY CONTEXT: STUDENTS' POINT OF VIEW

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Abstract

Despite the many physical and psychological health benefits associated with healthy lifestyle habits, some 50% of Canadians fail to adopt an active lifestyle and healthy eating habits (Statistics Canada, 2014). University students are no exception to this tendency, even though the literature acknowledges the benefits of healthy lifestyles for their academic success (Trockel et al., 2000). This research proposes to survey university students in order to learn their needs and interests towards interventions aimed at improving and/or maintaining their healthy lifestyles, with particular emphasis on regular physical activity and a healthy diet. The qualitative research includes three focus groups within the three study cycles (N=22 students, ~7/group). The interview grid was developed around the variables of the ecological *Conceptual Framework* of the Quebec Ministry of Health and Social Services (QMHSS, 2012). Data were analyzed using NVivo software. Preliminary findings suggest that students are strongly interested in the development of a tailored intervention to promote physical activity and good nutrition throughout the academic year. They highlight the relevance of a balance between offline (e.g., workshops) and online interventions (e.g., computer tailoring). The relevance of online functionalities, however, would be a determining factor in their willingness to download and use the application. The *Conceptual Framework* of the QMHSS serves as a theoretical support for enriching the discussion. The present research falls within the context of health initiatives in the Quebec education network, and the emerging interventions may be exported to other post-secondary institutions concerned with the health and academic success of their students.

Keywords: Lifestyle habits, healthy, students, university, initiatives.

1. Introduction and context

The World Health Organization (WHO) describes the current situation of obesity and overweight as epidemic (WHO, 2003). Although obesity is a multifactorial health problem, the literature firmly establishes that those most affected by the problem overeat and lead a sedentary lifestyle (WHO, 2014). Despite the many physical and psychological health benefits associated with healthy lifestyle habits, some 50% of Canadians fail to adopt an active lifestyle and healthy eating habits (Statistics Canada, 2014). In addition, the transition to university is recognized as a risk period for young adults regarding body weight management, as a US (Levitsky et al., 2004) and a Canadian study (Pérusse-Lachance et al., 2010) demonstrate. The literature also acknowledges the benefits of healthy lifestyles for academic success (Trockel et al., 2000). What's more, many experts believe that environments influence the increase in obesity more than biological factors (Hill et al., 2003), with some going so far as to describe this as an "obesogenic" environments (Swinburn et al., 1999).

Such was the context for a study conducted in 2016 at a Canadian university, which found that 55% and 81% of students did not meet the guidelines for physical activity and fruit and vegetable consumption, respectively (Busque et al., 2017). These disturbing results motivated a second phase of research at the same university that focused on better understanding students' needs and interests in terms of healthy lifestyles, in this instance, regular physical activity and a healthy diet.

2. Conceptual framework

Environment influences health behaviours. The *Conceptual Framework* of the Quebec Ministry of Health and Social Services (QMHSS, 2012) includes four environments, from the most proximal to the distal, which influence individual health behaviours: (1) individual characteristics, (2) living milieu, (3) systems and (4) global context. The Quebec government's *Framework* served as a theoretical and methodological guide for this study. Although there are several frameworks relevant to our subject (e.g., Cohen et al., 2000), the present *Conceptual Framework* (QMHSS, 2012) proved to be the best guide for examining the interaction of healthy lifestyles with multiple environments in Quebec specific context.

3. Objective

The objective of the present study was to survey university students in order to learn their needs and interests towards interventions aimed at improving and/or maintaining healthy lifestyles, with particular emphasis on regular physical activity and a healthy diet.

4. Method

Our qualitative study used a descriptive and interpretative approach to achieve our research objective (Poupart, 2011). Participants included 22 students who were divided into three study cycles and took part in the focus groups as follows: Group 1, n=6 (F=;5; M=1), Group 2, n=8 (F=7; M=1), and Group 3, n=8 (F=5; M=3). Participants in the study closely respect the ratio of women vs men in our student community. The focus groups lasted approximately 90 minutes each and were guided by 14 questions divided into four major themes/environments echoing the *Conceptual Framework* (QMHSS, 2012). The analysis strategy is inspired by Boutin (2007). The content was audiorecorded, transcribed and analyzed using NVivo 11 software, which facilitated the delineation, coding and grouping of units of meaning, the emergence of sub-categories, and the analysis of the similarities and differences noted in the comments of the various participants.

5. Findings

Findings are presented in keeping with the objective of the study and fall into four main categories. First, results concerning individual characteristics show that most students are interested in practicing physical activity but lack the time and motivation owing to a heavy workload. The same holds true for healthy eating, as students say their workload does not allow them to organize meals in advance.

Second, in terms of living milieu, students find that, on the whole, the cost of physical activity facilities is slightly higher on campus than off. Furthermore, they describe the quality of the food on campus as very poor, expensive and generally unhealthy, especially when compared with food in the neighbouring environment.

Third, when it comes to systems, students highlight the importance of improving the structure of the built environments on campus to facilitate the adoption of active transport to university.

Fourth, findings suggest that students welcome the idea of workshops on health promotion activities to increase their awareness and knowledge of healthy lifestyle habits. They also demonstrate a strong interest in the development of an application tailored to their needs in terms of physical activity and nutrition.

6. Discussion

Findings show that time constraints of a heavy workload, high costs and lack of motivation are the main reasons for students' failure to participate in physical activity and/or adopt healthy eating behaviours. These findings are consistent with those of Azru and colleagues (2006). Students' living milieu must be considered and developed with their needs in mind (QMHSS, 2012) if they are to acquire or maintain a healthy lifestyle. Two ways to achieve this objective are through computer-tailored interventions and active workshops. The innovative intervention could be based on the computer personalization technology, which makes an online an individualized program according to the user's desired lifestyle (Boudreau et al., 2016). In addition, the environments in which the community evolves will be considered, which represents a bold and distinctive element in research on tailor-made and individualized interventions.

7. Conclusion

This study has the potential to guide the university in developing a program to promote overall health and healthy lifestyles, thereby ensuring the permanence of a healthy and active lifestyle for students in the years following their transition to university. We believe that, when used as an educational strategy, our survey can serve as a model for other post-secondary institutions (or in other professional fields, even) insofar as it offers a better understanding of the mechanisms for adopting a healthy lifestyle. Environments should also be taken into account and studied to determine the type of interventions most likely to affect people's health behaviours.

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AN ANALYSIS ON THE INTRAINDIVIDUAL DIFFERENCE IN L1 AND L2 UTTERANCES IN THE SAME CONTEXT

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Abstract

A longstanding problem that English education in Japan has been struggling with is that learners cannot develop communication skills in English. Learners have rarely been trained to express their internal concerns subjectively, that is how they think or feel about external things, in English. This study investigated, using twelve university students, how and what they say in English and in Japanese when confronted with a thought-provoking situation. By comparing the data, our hypothesis that they would describe the situation more objectively in English than in Japanese was confirmed. The results were discussed in the context of the problems of current English programs and some pedagogical suggestions were made.

Keywords: Intraindividual difference, Japanese ESL learners, objective description, subjective expression.

1. Introduction

Japanese people are often said to be timid in English conversation despite the fact they have been extensively taught English in schools. One of the possible reasons for this problem may be the content of English-learning in these classes that tend to focus on how to describe external things or events objectively (e.g., 'A rainbow is caused by the refraction of light inside raindrops.'). They have been rarely trained to express their internal concerns subjectively, that is how they think or feel about external things, in English (e.g., 'How beautiful that rainbow is!'). Consequently, they have developed an objective attitude in using English, trying to describe what they encounter as correctly and fluently as possible, while hesitating to express their feelings and emotions that have no objective truth. In the present study, as the first step to confirm the above conjecture and thereby contribute to the improvement of the English-learning program in Japan, we explored how and what Japanese young people say in English and in Japanese when confronted with a thought-provoking situation. Our hypothesis is that they would describe the situation more objectively in English than in Japanese.

2. Methods

2.1. Participants
Twelve university students (9 males and 3 females, mean age 20.9 years old), all majoring in English education, participated in the experiment.

2.2. Materials
Fourteen pictures, collected from copyright-free materials on the Internet, were used as stimuli (see Figure 1). They were seven pairs of the same subjects, skydiving, cake, lion, party, mountain, couple, and monkey. Two sets of these seven pictures were used in the first and the second halves of the experiment. Pictures were projected on a whiteboard (29 x 39 degree).

2.3. Procedure
Participants watched pictures one by one for one minute each and were instructed to say anything that came to their mind. He or she talked to himself or herself, not having a conversation with the experimenter.

In the first and the second halves, the language to be used was changed from Japanese to English, or vice versa. The order of languages was counterbalanced among participants.

Figure 1. Samples of the pictures used in the experiment (from left, cake, party, and monkey).


2.4. Data Processing

Participants' utterances were recorded and transcribed. Then, they were segmented into meaning units, and each meaning unit was classified as either *objective description* of what is shown on the picture (e.g., 'they drink alcohol') or *subjective expression* of what participant imagined (e.g., '(they are) maybe company colleagues'), what he or she was impressed (e.g., 'what a beautiful cake'), and a feeling of his or her own (e.g., 'I want to go to hot springs').

3. Results

Figure 2 shows the number of meaning units classified as objective description or subjective expression in Japanese and English utterances in each participant. As shown here, the ratio of subjective expression was higher in Japanese than in English for all participants. In ten of twelve participants, such a difference was supported with statistical significance by the chi-square test.

Next, we picked out self-related items from the subjective expression units, such as 'I want to do it once in my life,' 'I've seen it before,' and 'I don't like sweets'. For all data it the total was 145 (*M* 12.1, *SD* 11.5) in Japanese and 72 (*M* 6.0, *SD* 9.9) in English. This difference was revealed to be significant (F=21.15, df=1,11, p=.001, η^2=.658).

Figure 2. Number of meaning units classified as objective description or subjective expression in Japanese and English utterances for each participant (A – L). The area of background indicates its ratio in each language. The result of chi-square test is shown below each panel, significant case indicating different ratio between languages.
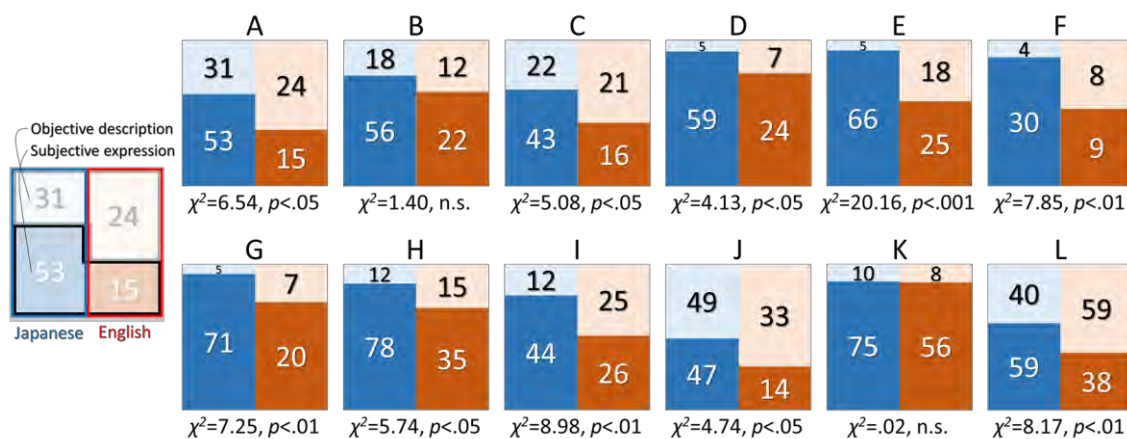
4. Discussion

Many Japanese people are not content with their English proficiency, especially in speaking, despite receiving six years of English education (recently it has become even longer). They learn from 3,000 to 5,000 words and sufficient grammar for describing what they see and how they feel about that. Although lack of opportunity to communicate with others in English either in classrooms or daily life prevent them from acquiring fluency, they must have ability to express things in English if they are given enough time for semantic processing. Those who have not achieved fluency tend not to think in English, but to try to translate what they think in Japanese into English. If this is their process, their utterances in

Japanese and English should be alike. This study, however, revealed the quality of what they utter in English is different from that in Japanese. They tended to make more subjective utterances in Japanese than in English. As shown in Figure 2, half of the participants (A, C, F, I, J, and L) made subjective expressions in about 50% or less of all English utterances, whereas most of them made overwhelmingly more subjective units than objective units in Japanese. In addition, detailed analysis of the data showed that Japanese are less inclined to express self-related things in English than in Japanese. Our hypothesis that Japanese would describe the situation more objectively in English than in Japanese was (unfortunately) supported by the present data. According to a short interview conducted with each participant after the experiment for their feedback, some participants can focus on the main theme of the picture, i.e. *cake, beer party, monkey* etc., and express their feelings about it in the case of Japanese. On the other hand, however, their direction of eyes spread throughout the picture in the case of English, and as a result, their utterances tended to become the objective description of anything seen on the picture. This implies the fact that English has not become a language to express their emotions.

In order to investigate the causes of this result, we have to consider it in the context of English education in Japan. One of the problems to be pointed out is an authenticity of learning materials used in junior high and high schools. Since texts are usually chosen from the viewpoint of educational appropriateness rather than authenticity, even texts used in the conversation parts are far from colloquial common expressions (Kobayashi, 2013), which is indispensable for expressing one's feeling in natural conversations. In the case of vocabulary acquisition, after a new word is introduced with its Japanese translation, acquiring the usage of the word in real life is left up to learners. Although many words are polysemous, the chances of expanding vocabulary knowledge are limited. Learners think they know the word; however, they do not even notice that there are other meanings (Aotani, 2010, 2012), therefore, in production, the ranges they can express are then very narrow. Japanese and English are regarded as distant languages. The more they perceive formative differences, the longer the psychological distance they feel between the two languages seems to become (Kellerman, 1977). In such a situation, they tend to be reluctant to utilize their L1 knowledge and believe straightforward translation from Japanese to English does not work very well in order to produce 'good English'. English education in Japan has been focusing on accuracy rather than fluency. Learners have always been under pressure to produce grammatically correct sentences. Considering this educational background, in this study, we instructed participants not to worry about grammatical accuracy. We did not require sentence-level utterances, allowing word-by-word utterances. Despite this encouragement, their quantity of utterances in English was still far less than that in Japanese. Some participants mentioned in the interview that it was due to their mentality. Matsuoka (2008) investigated college students' communication apprehension, and pointed out personality traits such as perfectionism, competitiveness, 'good-student' mentality and face-protecting orientation may generate communication apprehension. Going back to the individual data of this study, participant K (male, 22 years old) stood out from others. K's English proficiency level is not particularly higher than other participants, but he is a highly motivated learner of English since he is going to work abroad from this coming spring. His case implies having high motivation, which is definitely one of the most desired factors for language learning, can overcome learners' apprehension.

The new National Curriculum Standards in Japan were enforced in 2017, and the beginning age of studying English in public schools was accelerated from 5th graders to 3rd graders. The priority of the revision is to revise the curriculum to be suitable for a rapid progress of globalization and to make English education focus more on enhancing learners' communication skills than ever before. In real-life communication, expressing one's feeling is a fundamental factor for mutual understanding, and how to enhance this ability should be one of the priorities in English education in Japan.

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MATHEMATICAL READINESS ASSESSMENT FOR FIRST-YEAR STUDENTS

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Abstract

Critical thinking, problem-solving skills and general mathematical competency are necessary for many occupations today. While working with first-year students, varying competence and confidence in mathematics is observed. This paper discusses the use of common mathematical diagnostic tests for the evaluation mathematical preparedness of the first-year students. The test was compiled by an international team of mathematicians and organised for the first time in the autumn of 2000 in the cooperating agricultural universities in Latvia, Sweden, Estonia and Lithuania. The test consists of 15 tasks and focuses on fundamental mathematical concepts and helps identify students' mathematical strengths and weaknesses. Various secondary and tertiary education reforms raise new challenges for universities mathematicians. Diagnostic tests provide the possibility to identify tasks that are more problematic for students and also allow to compare the competence of first-year students' mathematics competence between the different universities.
A graphical analysis method and a method of statistical quantitative analysis of the research data were used in the study. The results of the research revealed a connection between the students' mathematical preparedness and ongoing educational reforms. The results of this test also reveal a contradiction between quantity and quality in studies. Measures to improve the learning process of the subject of Mathematics depending on the level of students' ability are offered.

Keywords: Mathematics, diagnostic test, mathematical preparedness, mathematical competence.

1. Introduction

Mathematics is one of the most essential components of general education for students. The evaluation of mathematics as a subject at school is involved in the calculation of the entrance score to all technical and economic specialties at our university. However, the level of knowledge between each student who enters the university is rather different and usually, it differs from the grade received at school (Rimkuviene D., Kaminskiene J., & Laurinavičius E. (2011)). Lower knowledge in mathematics means a slower understanding and learning of mathematics at university. Universities can play a major role to address the concern by providing the necessary academic support services for students who are considered academically underprepared (Atuahene, F., & Russell, T. A. (2016)).

The object of the research is the mathematical test results of the first-year agriculture students in Lithuania and Estonia.

The aim of the research is to analyse and evaluate the changes in mathematical readiness of the first-year agriculture students.

2. Education reforms and mathematical competences

Education reforms happening in Lithuania influence the level of students' mathematical readiness. Learning mathematics in two different difficulty levels – A (expanded course) and B (general course) – creates different backgrounds for mathematical readiness. Having studied B level mathematics without taking the mathematics state exam, young people usually have difficulties in learning mathematics at the university.

On one hand, free market and competition at university studies (new studies with own funds and an unlimited number of new students) gave an opportunity for more young people to study; on the other hand, this allowed the students with low levels of readiness to enter universities, too. Universities left the problem of under-prepared students to the lecturers who are teaching the subject.

3. Participants, data collection and analysis

From 2000 to 2018, the mathematical readiness test was attended by Vytautas Magnus University Agricultural Academy first-year students during their first week at the university (in total, 6347 students). Test results received from students of class 2018 from Estonian University of Life Sciences were used as a comparison (226 students). The test in both countries was the same.

The test contains 15 tasks. Each task has 4 options. After solving the task in the draft, students have to mark only one correct answer. The test lasts 45 minutes. No formulas or calculators are used. The tasks are comprised of short problems and different topics needed later at university. The results of these tests are used to analyse students' mathematical readiness. Each student's scores are noted, the results from different specialties and groups are calculated.

4. Results

By analysing test results from the period of 19 years, we can notice the periods of time when average results grow and decline (Figure 1).

Figure 1. The average score of the common-math test (Agricultural Academy).
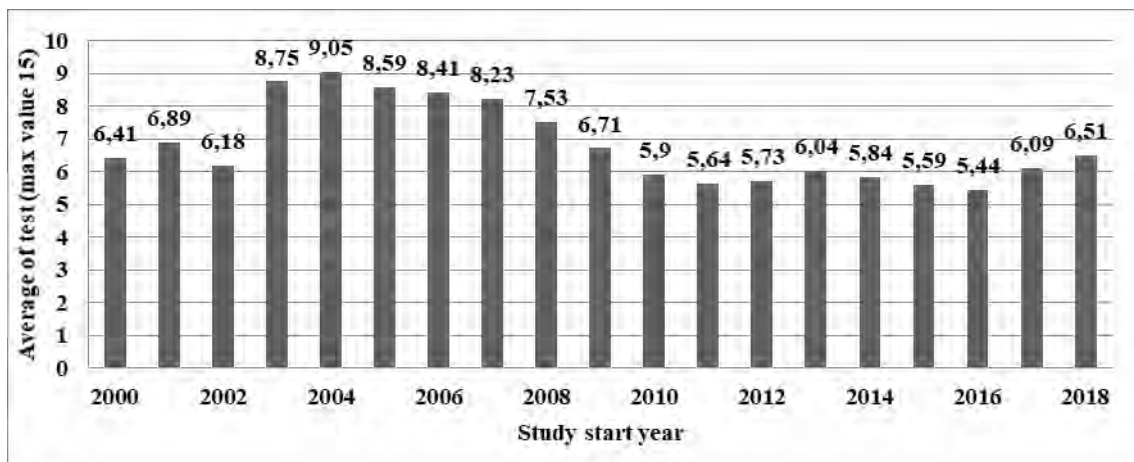
For a long time, mathematical readiness was assessed according to the results of school-leaving exams (10-point scale, taken in schools). Since 1999, a state exam of Mathematics is introduced and chosen (100-point scale, taken in exam centres). The examination reform in Lithuania was successful so the results of the state exam had a more significant value while entering universities; it is shown by our test results, too. Until 2008, universities had a limited amount of new students which was decided by state funding. A contest was held to enter most of the specialties. When the competition between universities was allowed and the number of new students increased, huge differences between mathematical readiness of new students appeared. The average test results started declining and they remained low until 2016.

The mathematicians of the Agricultural Academy apply a number of methods to teach mathematics:
- Under-prepared students are suggested to take mathematics review courses;
- Methodological literature are prepared based on the specialty's programme; these methodological means in detail explain the methods and processes of solving tasks and they help to review the basic mathematics knowledge from school;
- Detailed learning material with self-control tests and video footage are created in Moodle;
- During practical work, a method of mini-tests is used;
- Each week, lecturers devote some extra time (3 academic hours) to student consultations.

Some methods were successful (Moodle, mini-tests) but others not so much (mathematics review courses). Students do not really use personal consultations, often it is used just before tests or exams.

The common diagnostic test allows comparing the level of readiness between the students from different countries. While testing the null hypothesis, we found that there is no significant difference between the means of the Estonian student's test and the Lithuanian student's test (p-value=0.14). However, the results of knowledge acquisition differed. Figure 2 and 3 present the compared results between separate tasks.

Figure 2. Tasks at which the Estonian students performed better.
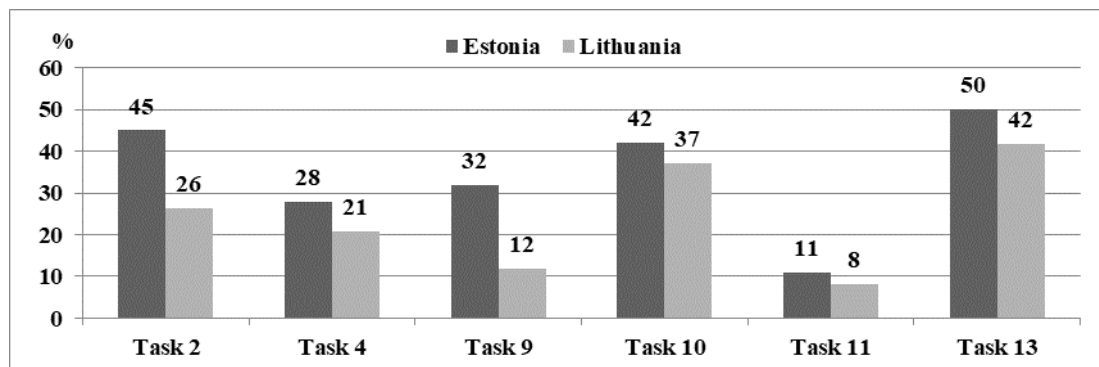
The Estonian students had a better performance at 6 tasks out of 15. The following tasks were done significantly better by Estonian students: trigonometry (Task 9), algebra (Task 2) and the percent word problem (Task 13). Students from both countries didn't know square root properties (Task 11).

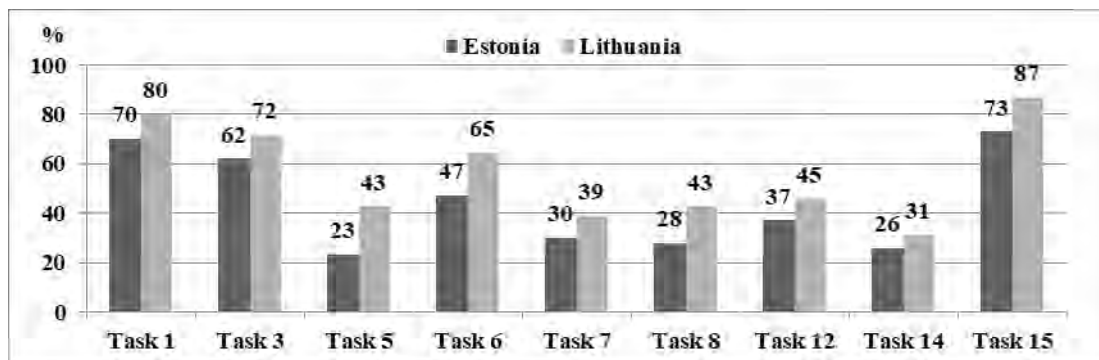*Figure 3. Tasks at which the Lithuanian students performed better.*

Figure 3 shows that the Lithuanian students had a better performance at 9 tasks out of 15. The following tasks were done significantly better: the task with logarithm (Task 5), the task where students had to find reverse function (Task 6) and the task where students had to solve a square equation (Task 8). Students from both countries are equally good at solving the tasks with fractions (Task 1) and the Pythagorean Theorem (Task 15). The solving percent of most tasks is either equally good or equally bad. Some subjects like tasks with square root properties (Task 11) or algebra tasks (Task 14) are understood equally bad by the students from both countries.

5. Conclusions

The test results show that a part of new university students have bad mathematical readiness (more than half of the students couldn't solve most of the tasks). The more students, the bigger is the number of students who are under-prepared. Thus, the quantity means lesser quality and we are faced with certain challenges while teaching mathematics. Since the number of school and gymnasium graduates is decreasing (since 2011), the number of students in universities is decreasing, too. In the recent year, universities are requiring a cumulative score which largely consists of a score from the mathematics state exam; therefore, we are noticing slightly better results which are still not enough. The comparison between the Estonian and Lithuanian test results encourages doing a more detailed comparative analysis of learning programmes in schools.

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THE ORCHESTRATION OF INTEGRATED ACTIVITIES OF SCIENCES AND MATHEMATICS IN THE 5TH SCHOOLING GRADE: THE ROLE OF QUESTIONS

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Abstract

The aim of this poster is to analyze the questions of a training teacher and of those their students in a sciences and mathematics integrated environment. The study wants to understand what type of questions will be crucial to mediate the learning in such context. The examined data belong to a research entitled "The enquiry in sciences class of 5th grade students: an approach integrating mathematics". The methodology used was influenced by: Balance Model (Kiray, 2012) for integrating mathematics and science; the ideas of Myhiil and Dunkin (2005) and Carlsen, Erfjord and Hundeland (2009) about the teachers' questions; and the ideas of Moreira (2012) about student's questions in the classroom.

The results seem to show that the students identify the abiotic factors through analyzing graphs elicited by questions. They also used processes of interpretation and intuition. Although the students had posed few questions, they had opportunity to deal with questions of different types and functions. The types of questions that seem to us to be the most crucial to mediated the learning (Carlsen et al. (2009) are: *asking for argument*, *problem solving invitation* and *concluding*. The science textbook, used in the class, didn´t take in account the mathematic curriculum. In order to promote science and mathematics learning, it seems important the textbook take in account the mathematics and science curricula according to the year of schooling.

Keywords: Orchestration, integration, questions, sciences and mathematics, teaching and learning 5th schooling grade.

1. Introduction

The integration of disciplines in the school curriculum has been discussed and considered necessary for all disciplines. "Mathematics and Science, are much more suitable for integration because of their fields of application and their mutual scientific approach towards problem-solving. Science and mathematics are two closely related systems of knowledge; they are both related to the physical world, and science provides concrete samples, while mathematics provides abstract samples" (Kiray, 2012, p.1182). However, Mathematics and Science integration may not always be possible and therefore a model, called "the balance model" vas developed, in which Science and Mathematic contents are central (Kiray, 2012).

The orchestration is a word used to describe what teachers do when they develop learning activities. To orchestrate activities the teacher has to plan, think forward, act in the moment, follow students' questions and comments, adapt questions for each students (Hundeland, Erfjord, & Carlsen, 2017). "The teacher's role is to orchestrate the supporting features – the visual cues, the prompts, the questions, the instructions, the demonstrations, the collaborations, the tools, the information sources available, and so forth" (Carlsen et al., 2009, p. 2568).

The teacher should act as an instigator and enabler of thinking processes, but rather encourage and promote challenges, giving space for students to think, discuss and present arguments (Calleja, 2016).

The inquiry thus becomes a strong strategy to increase and improve learning, because it promotes social interaction in the classroom (Silva & Lopes, 2015). The inquiry should be based on asking questions, solving problems, formulating, imagining, exploring, investigating, reasoning, encouraging discussions and looking critically (Jaworski, 2015). Asking questions is a social activity that provides the interaction between teacher and students and between students (Hayashi, 2012). The classroom questions have been categorized in different ways: questions formulated by teachers (Myhiil & Dunkin, 2005; Carlsen et al., 2009) and questions posed by students (Moreira, 2012).

Myhiil and Dunkin (2005) analyzed the questions of the teachers in 54 classes with students from 6 to 7 and from 10 to 11 years of age, categorizing them related to their form and function. The form questions were categorized into: *factual*, *speculative*, *process* and *procedural*. The function were categorized in: *class management*, *factual elicitation*, *cued elicitation*, *building on content*, *building on thinking*, *recapping*, *practicing skills*, *checking prior knowledge*, *developing vocabulary*, *checking understanding* and *developing reflection*. Carlsen et al. (2009) conducted a study with children and identified six categories of teachers' questions: *suggesting action*, *open*, *asking for argument*, *problem solving invitation*, *re-phrasing*, *concluding*.

The questions formulated by the students in classroom also were an important role in meaningful learning. Moreira (2012) used a classification system of questions according to three levels of complexity: *Acquisition*, *Specialization* and *Integration*. Moreira (2012) also classifies students' questions on *routine* questions, which relate mainly to aspects of classroom management.

2. Design

As above mentioned, this poster is based on a qualitative, descriptive and interpretive study described in a Final Report "The questioning in Sciences classes in the 5TH Schooling Grade: an approach integrating Mathematics" (Guerra, 2018), carried out under the Master's Degree in Teaching of the 1st Cycle of Basic Education and of Mathematics and Natural Sciences in the 2nd Cycle of Basic Education of the Higher School of Education of Coimbra. This study was developed in the classroom (twenty-one students) and was fundamentally influenced by the ideas of: Paul (1995, cited by Vieira & Tenreiro-Vieira, 2005) about Socratic method; Vieira, Tenreiro-Vieira and Martins (2011) about Science, Technology and Society (STS) perspective; Leite (2001) and Martins et al. (2007) about practical work in Sciences; Rees (2001) about tables and graphs; Curcio (1989, cited by Arteaga & Batanero, 2011) about chart interpretation; Kiray (2012) about Integration of Science and Mathematics in the balance model; Myhiil and Dunkin (2005) about the classification of teachers' questions; Moreira (2012) about the classification of students' questions.

The methodology used in this study was closed with Cheng and Ling (2013) ideas and involving three phases: "planning", "implementation" and "evaluation". In the planning phase the topics of Sciences and Mathematics have been chosen: "The influence of abiotic factors on the behavioral and morphological adaptations of animals" and "the interpretation of graphs" using an inquiry strategy; and to design a teaching sequence of three classes: "When is snail activity most active?"; "What is the influence of environmental factors on the behavior of animals?"; and "What is the influence of water, light and temperature on the behavior of earthworms?". The implementation phase was involving a teaching sequence in Sciences classroom. The evaluation phase of methodology was always present during the study and was supported by the two groups: training group and the reflection group.

3. Objectives

The main objective of this poster is to examine the questions of the teacher and the students in an integrative environment of Sciences and Mathematics in a 5th year Sciences class in order to understand what kind of questions will be crucial to mediate learning in such an environment.

4. Methods

In this poster the analyzed data are transcripts of audio records of in the excerpts from the lessons "In what period are the snails more active?" and "What is the influence of water, light and temperature on the behavior of earthworms?". The date was subjected to content analysis.

The teachers' questions were classified according of Myhiil and Dunkin (2005) and Carlsen et al. (2009) and the students' questions were classified according to the classification of Moreira (2012).

In these two classes, the main resource used was the textbook and PowerPoint about "the influence of abiotic factors on morphological and behavioral adaptations of animals".

5. Discussion

The students rarely posed questions, and only two types of questions: *acquisition* (questions associated with simple ideas and/or processes or concepts, which do not imply evaluation, judgment or conclusions - "*Teacher, this is the school thing, is not it?" but doesn't this thing belong to the school?*) and *integration* (questions that want to reconcile different ways of thinking, to solve conflicts, and to test circumstances of understanding complex ideas -"*Have they gone to the school at midnight to see the snails?*").

According to Myhiil and Dunkin classification´s (2005), the questions posed to the students by training teacher may be: *factual, speculative, process* and *procedural, class management, factual elicitation, cued elicitation, building on content, building on thinking, developing vocabulary* and

checking understanding. Looking at the classification of Carlsen et al. (2009) the training teacher posed the following questions: *open, asking for argument, problem solving invitation, re-phrasing* and *concluding*. To classify the question according to both classifications is a difficult task. For instance, the question *"Why, how can we see that?"* may be a *process* question or an *asking for argument* question. So, we have decided to use in this study the classification of Carlsen et al. (2009) because we consider it to be more systematic and appropriate to the situation. The study seems to point that in a Science and Mathematics integrated environment the teacher should promote the "inquiry" through posing questions as: *asking for argument, problem solving invitation* and *concluding*.

6. Conclusions

The results appoint that the students worked mainly with content of Science ("the influence of the abiotic factors on the behavior of the animals and the biodiversity") and mathematical graph. The students used processes of interpretation, justification, intuition, imagery and inferences.
The study showed one Science and Mathematics integrated environment that used an inquiry strategy. The main resource of this environment was the textbook. However, many of the graphs present in the textbook weren't appropriated to the mathematics curriculum of those students.
The study also evidenced the need of given to the student's opportunities to exercise their own questions in order to promote active learning and metacognition according to the ideas of Wong (2012).

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PHENOMENON OF ARCHITECTURE AND ITS PEDAGOGICAL IMPLICATIONS / RESEARCH PROBE: PATHS

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Abstract

The research study "Paths" was realized as a workshop in October 2018 at the Department of Art education, Pedagogic Faculty, Charles University, Prague, Czech Republic. This study is part of ongoing outcomes of author' doctoral studies. The subject of the study is the mutual interaction and overlap between architecture, art, and art education, and the common "language" shared by these fields. The main research tool is the collection of students' verbal and artistic statements, which help the researcher to understand the influences and relationships that help to shape young people's attitudes towards the phenomenology of architecture. Its objective is to investigate this phenomenon through artistic creation mediated to students and to explore the possibilities of using the findings of the creative processes in educational situations with university students. The applied methodology is related to the research of artist and designer creation: A/r/tography. Contemporary art education is based on visual literacy and critical thinking skills by integrating contemporary art into the core curriculum. It emphasizes inquiry-based education, a critical understanding of contemporary art practices, problem-solving, examining the relationship between art and relevant cultural and social issues. The development of creativity (creative process, creative (artistic) expression) and cultural heritage (art history, architecture, artistic traditions) are on the main trends of topical researches in art education that currently predominate in the world.

Keywords: Architecture, creative reflection, experience interpretation, methods in pedagogy, spatial forms.

1. Basic characteristics and project objectives: Project rationale

Architecture is art of the articulation of spaces. Architectural history has been written implicitly adhering to the rudimentary version of the model of communication. All the attention has been focused on the design of new forms but none of their interpretation. It is high time we realize that there should be a history of meanings along with a history of formation.

The Project is based on the current public discussions about how architecture influences our perception of public space, and the quality of life in our country connected with it (Melková, 2013).

However, the topic of architecture is almost absent at schools and in teacher training programs in the field of arts. In my experience such discussions take place only exceptionally in elementary and junior high schools, and unfortunately also at secondary schools, colleges and universities. The urgent need for change is called for e.g. by Elisabeth Gaus – Hegner, a German educationalist with five years' experience of teaching architecture to children, with focus on art didactics, she underpins the importance of paying attention to this topic already in childhood. According to her findings, it is very important to mediate architecture to children; it means to deliberately open the way for them to experience and get acquainted with space. (Gaus - Hegner, 2009).

2. Research probe "Paths" – Implementation

The Research Probe "Paths" was implemented in October 2018 as a probe of participatory type at the Department of Art education, Pedagogic Faculty, Charles University, Prague, Czech Republic in cooperation with Jan Pfeiffer, a Czech researcher artists and educator. Whole 180 minutes were devoted to it in the framework of painting. The sample chosen for the research were 12 students aged 19 – 24 years.

The Project's points of departure became part of a deeper investigation on how attitudes, values, opinions and their possible changes are structured. It took place at joint sessions of the teaching artist with the students over the topic of apprehending and experiencing architecture and space. The students were invited to cooperation and co-creation.

The research probe analysis took place in several steps and had the form of responding to research questions, which were asked one by one during the course of the research.

The lecture was documented by video camera and by written reflection by students, artists and an independent observer.

3. Research theoretical postulates

The resulting documentation became part of a folder containing reflective evaluation and artistic solution variants. Combinations of specific forms of qualitative and art-based research were exploited in the project (Fulková, 2008).

In theoretical postulates we focus mainly on the semiotic concept of art education. In art education, semiotics is a powerful concept, which can be used to revise traditional educational processes; it has strong impact on the topics, focus of the study, and the research method itself. (Fulková, Tipton, 2008).

Structuralism seems to have obvious application to the world of architecture through the disciplines of semiotics. Semiotics offers a mechanism by which the built environment can be read or decoded. It deals not only with the most obvious signs of our environment, but also how we think and act with signs, how signs penetrate into our penetrate into our innermost essence and determinate our existence.

In our case we applied methodology related to the research of artist and designer creation (art-led and practice–based research, artography) A/r/tography is a research methodology, a creative practice, and a performative pedagogy that lives in the rhizomatic practices of the liminal in-between (Irwin, 2004).

Especially the reflective-practice concept of Donald A. Schön was used for our probe. This approach, which arose from Schön's observations of students of architecture, is a reflection on learning as a tool of gaining knowledge everywhere, where the linear learning model fails, and expert knowledge is torn from practice; he also vindicates the implicit tacit knowledge of the practitioners. (Schön, 1983).

4. Research problem – Research questions

The research probe analysis took place in several steps and had the form of responding to research questions, which were asked one by one during the course of the research.

1. What are the existing attitudes of Czech students to architecture and other forms of spatial art?

2. Can these attitudes be changed during the joint meetings of the teaching artist and students over the phenomenon / topic of architecture?

3. What are the phenomena students focus on when perceiving their inner and outer lived space? What and how they speak about it? Which are the phenomena they mention most frequently?

5. Summary of findings from the realized survey

I investigated this phenomenon based on A/r/tografy methodology and we came to the following findings. The findings confirm the ideas of the educator and researcher Jan Slavík, who identified several points of similarity and congruence between art and education: a delimitation of space and time, composition, and the beauty of the work. (Slavík, 1996).

This fact refers to the overall understanding of the realized A/r/t/ographic educational model, in which the artist/teacher/researcher works in a kind of "third world" where his various identities become intertwined and begin to influence one another.

Having verified these research findings, we can draw the following conclusions:

The subjects, which were approached from the viewpoint of several different "situations," are assessed identically, with just minor deviations. The study's participants perceive and experience this space or architecture very intensively on the basis of their own positive or negative experiences. We may take it as proven that perception influences how we interpret the world, but also that the opposite is true: our interpretation of the world plays a role in how we perceive a particular place. The criteria for evaluating architecture are thus associated with this experienced phenomenon.

6. Conclusion

Based on our research probe findings we arrived at the following conclusion:

This topic is highly relevant and inspiring both for an art teacher and artist, making it almost a must for him to deal with it as part of his professional practice, thus handing his or her experience further again.

Contemporary art education in the narrow sense means the place of contemporary art and architecture in art education and its teaching strategies. The contemporary cultural context and the spread of visual culture provide preconditions for changes in art education. To understand the meaning of contemporary art education is important to examine the meaning of contemporary education. Educational reforms are associated with new learning environments, changing students attitudes towards learning and teaching, the changing roles of an educator in the process of education. (Sederlhorn, 2012).

We arrived at a conclusion that investigating phenomenology of architecture in connection with the semiotic concept of art education is indispensable both for the teaching artist and the student. We deem it is a perpetual task of architecture to create an existential metaphor that gives our being in the world concrete shapes and structure. Architecture reflects upon, materializes and immortalizes ideas and images of an ideal life. Space and our perception of it make us capable of structuring and also understanding the shapeless flow of reality and last but not least to realize what we are. (Norberg- Schulz, 1980).

There will be a follow-up to the "Paths "research probe, in the form of other research probes' analyses, namely "Memory of the Place" and "My Home". The research findings are meant for art teachers and students at teacher training institutions. We see the contribution of our research for the art education theory in verifying the functionality of the new methodology in a concrete educational environment and with concrete findings that can be used in teaching practice.

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HUMAN BEING DEVELOPMENT: RESEARCH PROTOCOL FOR A HOLISTIC AND COMPLEX REVIEW ON THE SOCIAL DIMENSION

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Abstract

The purpose of this article is to lay the foundation for the building blocks of the social development of human beings in a contemporary democratic society; more broadly, it focuses on the research protocol with used to conduct a holistic and complex review on the social dimension of the human being. From a cross-reading of the thoughts of ancient and contemporary authors, a number of structural, conceptual and dynamic elements related to this subject emerged. This article, based on Bronfenbrenner's ecological approach, establishes a first foundation of knowledge synthesis on the social dimension of human beings. *Initial Warnings*. Current knowledge of the requirements of good development and good functioning of human beings allows for the definition of new guidelines to redirect our education systems towards the implementation of education and training programs that allow every human to better know oneself and to realize optimally their potential. We want to put into perspective the knowledge generated by several authors to synthesize their approaches and draw the guidelines for this new orientation that is necessary and more respectful of human development. This article is a proposal for the basis of work on which the experts of different fields mentioned in the text will be able to continue the reflection and co-build this holistic framework with us. More than ever, we believe in the importance of this exercise to redefine humanism and education that truly places human beings in what they are, and is most fundamental and in the optimal conditions for them to succeed.

Keywords: Human being, development, social dimension, Bronfenbrenner, ecological model.

1. Human beings in relation – contemporary democratic society

This work focuses on the social dimension of human beings, placing them at the centre of a reference system: the ontosystem. Parmentier gives this definition of the person: "to be thinking, reasonable, capable of reflection and to consider oneself as a thinking being in different times and places" (2002). Therefore, the present research takes for reference any being who is part of the process of thinking about the world in which he lives, as well as his history and his future, and to think in this world.

This human being is able to endorse a number of statutes, including that of worker or citizen, which O'shea (2003) defines as "a person who has skills related to understanding and knowledge related to a given society and culture, but also skills that relate to living well with the family and in the local environment." The external characteristic peculiar to our reference must be related to a modern democratic environment since such a regime helps to construct the "social being" (Huchon, 2002). In this context of democratic application, the person possessing the internal characteristics related to the affective, cognitive and behavioural structures necessary for the proper functioning of each of the systems that result from it could be able to develop its social dimension in the best possible way.

The purpose of this article is to lay the foundation for the building blocks of the social development of human beings in a contemporary democratic society; more broadly, it focuses on the research protocol with used to conduct a holistic and complex review on the social dimension of the human being.

2. Methods

The realization of this work was orchestrated around a grouping of points of view and related knowledge on the social dimension of human beings, stemming from currents of thought and different times. Therefore, all the notions used are the result of reflections or work already existing, and the present study of qualitative type was the subject of a content analysis, which "consists of dismantling the structure and the elements of this content to highlight its different characteristics and to make their meaning clear" (Laville & Dionne, 1996). In other words, we have analyzed authors' concerns more closely around lexical fields in order to extract a selection of content of interest around the social development of human beings.

While the emergence of different social contexts was the result of cross-readings by ancient authors belonging to a Western literary tradition and more contemporary researchers, their arrangement

was made, among other things, around the conceptions of Bronfenbrenner's ecological approach (1979); an approach widely used in developmental psychology syntheses (Bee & Boyd, 2003; Berger, 2000; Papalia & Olds, 1989).

2.1. First step: review of key authors of the Western tradition

We decided to begin our research with a historical-cultural study of man rather than an inventory of current writings on the subject of his social development. This allowed, first, to keep an open mind, a "naive" look, little influenced by contemporary conceptions, and necessary for the inductive and progressive development of this type of work. Then, sweeping through such a great period of Western history appeared as a pledge of confidence in the emergence and recurrence of different elements of a possible summary table. Therefore, the field of this research is based, firstly, on a census of writings concerning key thinkers of the great periods of human history and Western societies. We initially sequenced our documentary pool according to the following periods: the Greek period (between the 3rd century BC and the 1st century), the Roman period (between the 1st and 5th century), the Middle Ages (between the 5th and 15th century), the Renaissance (15th to 18th century), the century of Reason (18th century) and the modern era (19th and early 20th century). For each epoch, we drew up a spontaneous list of thinkers. It was expanded following the meeting of researchers from different fields (e.g., History, Philosophy, Sociology) to which we explained our approach.

2.2. Second step: systematic review of contemporary authors

We have selected a number of relevant books. We have tagged our research around several lexical fields and keywords (social development of the person, human development, citizen, citizenship, socialization, personal fulfillment, happiness, living together, live happily, interpersonal relationships, social space) that have been associated with each author. The databases of the catalog of the library (Ariane), but also Francis, Eric, Sociology Abstract, among others, were questioned to sweep the period from antiquity to the present day. Subsequently, the selection was followed by a summary reading (summary, introduction, conclusion, table of contents) in order to first identify the notions and lexical fields that appeared relevant to an integrative model used as a basis for social development of human beings. This targeted reading strategy allowed faster access to relevant information. Therefore, it is easy to understand that all the works consulted for this research have not been read in their entirety. However, they all contributed to the development of the integrative model through the concepts they addressed, the precision they offered about the author consulted or even the context of the time when the writings appeared. This inductive approach has allowed us to shape our thinking and develop our model as we read and collect data from the Grounded theory perspective (Glaser & Strauss, 1967).

2.3. Third step: organization and data collection

The collection of data was organized around the division of contents. A selection of relevant elements was made within the collected documentation. Thus, everything relating to the various lexical fields mentioned above was taken into consideration in order to constitute a database of important data with respect to the social development of the human being, especially to perceive the emergence of the themes in the thought of the authors, their recurrence in their writings, but also between the different authors of the same time.

2.4. Fourth step: categorization data analysis

All this information, once harvested, has been categorized. These emerging categories have been defined according to the open model; that is, they "are not fixed initially, but take shape during the analysis itself" (Laville & Dionne, 1996). In this conception of the approach, the categories emerged at the end of a "regrouping" of periods. Three sets have been created: (a) the Greek, Roman and Middle Ages, (b) the Renaissance and Reason centuries and (c) the modern period. In order to make the synthesis of ideas functional, double-entry tables (Authors/Categories) have been drawn up for the different groups presented previously. Thanks to this progression, it was possible to "obtain a first set of rudimentary categories. This set is the starting point of an approach which, in successive stages, will lead to the final categories" (Laville & Dionne, 1996).

3. Anchoring the ecological approach of Bronfenbrenner

The constitutive elements of our research emergent categories of our readings crystallized from contemporary authors and took shape within a dynamic structure: Bronfenbrenner's ecological approach (1979). Very often used in the developmental theories of the human being, this conceptual framework makes it possible to arrange the elements related to the development of the person, as much as to reveal the links and the reciprocal influences.

The ecological environment to which Bronfenbrenner refers is detailed in four systems: *microsystem*, *mesosystem*, *exosystem* and *macrosystem*. These systems make it possible to consider a way of structuring the various social contexts in which the developing person lives the *ontosystem* both in their

content and in the links that unite them. 1) *Microsystem*: "The microsystem is a dynamic of activities, roles and interpersonal relationships experienced by the developing person in a setting with particular physical and material characteristics" (Bronfenbrenner, 1979). In short, it is the direct interactions of individuals in their daily lives, whether between friends, husbands, colleagues, etc. 2) *Mesosystem*: The "set of [links] and processes that take place between two or more microsystems" (Bronfenbrenner, 1977) is the mesosystem. For example, the child attending school allows two microsystems the family and the school to create a direct link. 3) *Exosystem*: the "place or context in which the individual is not directly involved, but which nevertheless influences his life" (Bronfenbrenner, 1977). As an illustration, the learning that a child achieves in the school stems, among other things, from the programs set up by a ministry of education (exosystem), and these governmental directives will influence the development of the school child through the teacher. 4) *Macrosystem*: is the set of "contexts of development [...] composed of traditions, values, beliefs of society" (Berger, 2000). It is the last system that participates in human development and encompasses all the other systems previously listed. Also, 5) Bronfenbrenner talks about an additional system in his model, the *chronosystem*, linked to the passage of time.

All these systems, linked to the environment or the individual, are the object of reciprocal interactions that influence the development of the person: "Development is the result of continual and reciprocal interactions between the individual organism and its environment" (Bronfenbrenner, 1979). These interactions are called "bottom up," called "centrifugal dynamics" in this research, with regard to the influence of individuals on their more or less immediate social contexts and "top down," or "centripetal dynamics," regarding the inverse influences.

4. Next steps

The construction of this model responded to the desire to collect and synthesize the largest number of constitutive elements about the social dimension of human beings, a construction site still too fragmented. If several studies are interested in the process of socialization of individuals to make them "functional citizens," little interest in circumscribing all the constitutive elements of the social dimension from a developmental perspective of the person to tend, deliberately towards higher levels of humanity.

This ambitious research project has become more than necessary as several authors have shown (Fortin, 2007; Legendre, 2002; Marcotte, 2015; Morin, 2000, 2011). Not only must the characteristics of the human being be studied and articulated together, but more than that, they must target the improvement of human development to truly take a step closer to a more humanizing education that goes beyond the instruction. A future step would be to make this tool applicable to the reading of the current reality and this, in several contemporary social contexts. Humbly, we are now inviting other specialists in the social dimension of human beings and related themes or issues to pursue, revisit and enrich this work so that it can achieve the ambition it sets for itself. The path is still long, but if the human efforts meet around a clear target and are well oriented, the march will be faster.

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TEACHING PROCESS GUIDELINE OF INDUSTRY-ORIENTED OFF-CAMPUS INTERNSHIP CURRICULUM FOR TECHNOLOGICAL UNIVERSITY

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Abstract

The off-campus internship curriculum plan should meet the educational goals and the educational philosophy to demonstrate the learning outcomes of the theoretical and practical skills module courses. The purpose of this study is to develop a teaching process guideline of industry-oriented off-campus internship curriculum for technological university. In order to meet this purpose, three parts are proposed. The first part is before internship. The teaching content includes understanding the industry profile, organization and department functions of the internship company, work norms and professional ethics, standard operating procedures, and student internship content. The second part is in the internship. The teaching content includes effective communication, teamwork, technical problem solving strategies, data collection. The last part is after internship. The teaching content includes internship report on the experience of industry-university cooperation. In each stage, this study proposes the teacher should teach the content, the counselor of the industry mentor, and the student needs to complete the content during internship period.

Keywords: Teaching process, industry-oriented, off-campus internship curriculum, technical university.

1. Introduction

For responding the new generations coming, the Taiwan Ministry of Education emphasizes the plan for the reintegration of colleges and universities resources and provides a variety of operating models for the development of higher education. Therefore, achieving off-campus internships between industry and university is an important part of university students' cultivation (Chen & Liu, 2018). However, Chen (2018) surveyed off-campus internship courses of 24 department of marketing and logistics management in technological universities in Taiwan found that only 4 schools (14.3%) said that they had teaching material for off-campus internship courses. The teaching material for off-campus internship courses for technological universities are needed in Taiwan. Chen (2006) said that teaching for the universities in Taiwan had some problems, which were more theoretical knowledge rather than practical skills and the students learn portion rather than integration of the domain field (Hsiao, et al., 2012). Teichler (2000) also indicated that curricula, teaching and learning in the universities should be more applied in practice oriented. Keat et al. (2011) said that the universities must be able to develop and/or design the curriculum to fulfill the demands for the industry. Unfortunately, the curriculum design including instructing method and teaching martial in Taiwan didn't meet with social change and development (Hsiao & Chen, 2001; Hsiao et al., 2012). So, the off-campus internship curriculum plan should meet the educational goals and the educational philosophy to demonstrate the learning outcomes of the theoretical and practical skills module courses.

2. Objectives

When students during off-campus internship period, what content need to teach? How to teach students? This is the motivation of this study. The purpose of this study is to develop a teaching process guideline of industry-oriented off-campus internship curriculum for technological university.

3. Methods

There are two stage of the implementation of this study. First, under group discussed among authors, the draft industry-oriented off-campus internship curriculum goals and teaching process guideline for technological university was developed. Secondly, this study conducted expert meeting to discuss the draft teaching process guideline. There are 5 experts invited to join the meeting. Finally, the industry-oriented off-campus internship curriculum goals and the teaching process guideline was discovered.

4. Results

The goals of industry-oriented off-campus internship curriculum are to strengthen professional knowledge of student integrity, to improve student workplace experience, to cultivate student employment competences.

The teaching process guideline of industry-oriented off-campus internship curriculum for technological university includes three parts: before internship, in the internship and after internship.

The first is before internship. In this stage, the teaching content includes understanding the industry profile, organization and department functions of the internship company, work norms and professional ethics, standard operating procedures, and student internship content.

The second is in the internship. The teaching content includes effective communication, teamwork, technical problem solving strategies, data collection.

The last is after internship. The teaching content includes internship report on the experience of industry-university cooperation.

In each parts, this study proposes the teacher should teach the content, the counselor of the industry mentor, and the student needs to complete the content during internship period.

5. Conclusions and Recommendations

5.1. Conclusions

Under group discussed among authors and expert meeting, the of industry-oriented off-campus internship curriculum goals are found, that is to strengthen professional knowledge of student integrity, to improve student workplace experience, to cultivate student employment competences. The teaching process guideline of industry-oriented off-campus internship curriculum for technological university was discovered. There are three parts for the guideline. That is before internship, in the internship and after internship.

In the before internship parts, the teaching content includes understanding the industry profile, organization and department functions of the internship company, work norms and professional ethics, standard operating procedures, and student internship content. In the internship parts, the teaching content includes effective communication, teamwork, technical problem solving strategies, data collection. In the after internship parts, the teaching content includes internship report on the experience of industry-university cooperation.

5.2. Recommendations

Several recommendations are made as follow:

- It is recommended that the planning of teaching content should be further strengthened.
- In order to strengthen the industry orientation, it is recommended to join the business mentors counseling matters.
- In order for students to have compliance content, it is recommended to list the things that students should complete.
- In order to strengthen the theoretical basis of t teaching process guideline, it is recommended to link the problem-base learning theory.
- In order to understand the student's learning situation, it is recommended that the teaching evaluation method should be added in the future.

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INTERACTIONS AND TEXT PRODUCTION: BENEFITS FOR BOYS AND GIRLS

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Abstract

Learning to write is challenging for elementary school pupils, particularly boys, who show poorer writing performance than girls (Herbert & Stipek, 2005, MELS, 2012). Offering pupils motivating and meaningful writing activities thus represents a significant challenge for teachers (Colognesi & Lucchini, 2018). Since boys generally enjoy interacting with their peers, why not take advantage of this interest and allow them to write in pairs? When this opportunity is given to them, what kinds of spoken exchanges occur between them? Do these exchanges differ from those of girls? And are the texts produced in pairs of better quality? To date, few studies have compared boys' interactions with those of girls or the impact of these interactions on the quality of the texts produced. The aim of this study was thus to 1) describe the content of the interactions of girls and boys in Grade 6 (11-12 years old) when producing texts in dyads and 2) compare the quality of the texts produced by these pupils according to the writing context (individually and in dyads). Thirty-three (33) dyads participated in this study (N = 66, 35 girls and 31 boys). The pupils planned, wrote and edited/corrected a story individually and then in dyads. Their writing performance (syntax, punctuation, vocabulary, narrative structure, lexical and grammatical spelling) and interactions (number, content) were evaluated and compared. The results are presented and discussed in light of the benefits of collaborative writing activities for boys and girls.

Keywords: Interactions, writing performance, gender, elementary school, collaborative writing activities.

1. Introduction

Learning to write is challenging for elementary school pupils, particularly boys, who show poorer writing performance than girls (Herbert & Stipek, 2005; MELS, 2012). The rate of failure on the Quebec Ministry of Education writing exam at the end of elementary school (11-12 years old) has been found to be 28.2% among boys compared to 12.9% among girls. This situation is a cause for concern and points to the relevance of examining writing instruction practices (Graham & Perin, 2007; Homsy & Savard, 2018). Since boys generally enjoy interacting with their peers (Järvelä et al., 2010; Johnson & Johnson, 2002), why not take advantage of this interest and allow them to write in pairs? When this opportunity is given to them, what do the exchanges between them focus on? And are the texts produced in pairs of better quality?

Collaborative writing activities give rise to spoken exchanges regarding the text being produced. Collaborative writing is defined as a socio-cognitive process whereby several writers negotiate, coordinate their actions and share responsibility for the writing of a text (Lowry et al., 2004; Rubiae et al., 2016). Studies examining this practice have shown that it leads to some improvement in the quality of the texts produced (Ferguson-Patrick, 2007; Graham et al., 2012; Lavoie et al., 2011), appears to be beneficial to weaker pupils (Yarrow & Topping, 2001) and to be appreciated by boys, and that boys interact to the same extent as girls (Lavoie et al., 2008). Studies have investigated the nature of the interactions that take place between pupils during collaborative writing activities (e.g. asking for help, explaining, giving examples, negotiating), but not the content of these interactions (Fitzpatrick & Hardman, 2000; Jones, 2003; Rojas-Drummond et al., 2006). Moreover, studies examining this issue have focused on beginner writers (Ferguson-Patrick, 2007; Jones, 2003; Lavoie et al, 2008; Marin, 2010). Interactions among boys and girls in a collaborative writing context at the end of elementary school merit examination, in particular, to provide insight on the content of such interactions and their impact on the texts produced. This study thus aimed to examine the relevance of collaborative writing activities.

2. Method

2.1. Participants

Thirty-three (33) dyads of pupils in Grade 6 (11-12 years old) participated in this study (N= 66, 31 boys and 35 girls). Once the necessary authorizations had been received, the pupils took the

Repérage Orthographique Collectif (ROC) test, involving a spelling discrimination task and a dictation (Allal et al., 2006). Based on the results on this test, heterogeneous dyads of pupils were created using the pairing procedure proposed by Fuchs et al. (1997).

2.2. Procedure

The pupils planned, wrote and edited/corrected a story, first individually and then in dyads. In writing these texts, they referred to pictures containing some elements of the story (e.g. main character, secondary characters, place, triggering event). There was only a two-week interval between these two writing activities to ensure that the pupils' writing skills had not had time to improve. During the writing activity in dyads, the pupils were filmed to capture their interactions. They were given only one sheet of paper to write on to encourage discussion and prevent them from each working on the story separately. The pupils were also each given a different coloured pencil, making it possible to determine who had written which part of the story. They were given 60 minutes to write the story.

2.3. Data analysis

The pupils' interactions were analyzed based on the video recordings, using Van der Maren's (2014) method of systematic data analysis. A coding grid was used to record the number of interactions and their content. This made it possible to identify whether the pupils were discussing the conventions of the written language (e.g. spelling, punctuation, text structure) or narrative structure (e.g. We could say…, The story could end like this…) (Lavoie et al., 2007; Lefebvre & Daudelin, 2001). As for the texts themselves, a grid including the following elements was used: narrative structure, vocabulary, punctuation, syntax, and lexical and grammatical spelling (Gagnon & Lemonnier, 2010). To ensure objectivity in the analysis, all the texts were corrected by two evaluators. Means and standard deviations were calculated for the interactions and writing performance criteria.

3. Results

The interactions recorded among the boys were similar to those among the girls (see Table 1). The highest means were for narrative structure and lexical and grammatical spelling. Moreover, like the girls, the boys talked very little about syntax and punctuation. The differences between the means for the boys and girls were small (between 0.15 and 2.19), except for the "narrative structure" criterion, for which the boys presented 12.20 fewer interactions than the girls.

Table 1. Mean number of interactions between the boys and girls for each of the criteria.

	Narrative structure	Vocabulary	Punctuation	Syntax	Lexical spelling	Gramm. spelling	Overall
B. (n=31)	102.77	8.47	5.47	0.56	16.67	13.42	147.36
G. (n=35)	114.97	10.37	7.66	0.71	17.66	15.4	166.86

The results concerning the texts themselves (see Table 2) revealed that, individually, compared to the girls, the boys made a greater number of errors in syntax, punctuation and spelling, used a less rich vocabulary and structured their narrative less well. Moreover, it was observed that when the boys wrote in dyads, their performance improved with respect to all of the evaluation criteria.

Table 2. Mean percentages obtained by the boys and girls for each of the evaluation criteria on their written texts.

	Narrative structure	Vocabulary	Punctuation	Syntax	Lexical spelling	Gramm. spelling	Overall
B. (n=31)	69.52	67.10	76.02	74.56	93.51	90.83	77.29
G. (n=35)	75.57	76.00	88.97	84.21	95.64	93.02	84.14
Dyads	81.22	72.12	94.62	86.92	96.87	94.82	86.83

4. Discussion

First, it was observed that the boys discussed the same aspects of their written texts as the girls and also that they interacted almost as often as the girls, which is consistent with other studies involving younger writers (Lavoie et al., 2008). This finding is nevertheless surprising. Since boys generally produce texts of lesser quality, we might have expected to see much less involvement on their part in the discussions. Moreover, it was revealed that most of the interactions, that is, 114.97 for the girls and 102.77 for the boys, dealt with narrative structure. The girls put forward a few more ideas than the boys. Surprisingly, the pupils were very engaged in discussing the content of their stories, although studies have shown that this aspect of text production is given little attention in class (Lavieu-Gwozdz, 2013). The pupils also focused, to a lesser degree, on spelling (lexical spelling: B = 16.67, G = 17.66; grammatical spelling: B = 13.42, G = 15.49). It appeared to be particularly difficult for them to discuss how to spell words and use correction

tools (e.g. Pupil A: Can you look up how to spell "sea vessel" in the dictionary? Pupil B: I can't find it, but I've spelled it "sea vessal" before and it wasn't marked wrong so that must be how you spell it. Pupil A: Okay.).

With regard to the texts themselves, in line with other studies (Herbert & Stipek, 2005; MELS, 2012), it was observed that these boys, at the end of elementary school, performed less well than the girls, on all the criteria analyzed. Moreover, the overall quality of the texts produced in dyads (86.83%) was better than that of those produced individually. Both the boys (77.29%) and girls (84.14%) thus benefited from writing collaboratively. However, collaborative writing proved to be even more advantageous for the boys, who saw their performance increase more than that of the girls for each of the criteria evaluated. As also found by other researchers (e.g. Ferguson-Patrick, 2007; Graham et al., 2012; Lavoie et al., 2011), this practice led to some improvement in the quality of the texts produced. Moreover, a sizeable difference was observed with regard to narrative structure, for which the boys obtained a mean score of 81.22% when they wrote in dyads (a difference of 11.7% for the boys and 5.65% for the girls). The pupils' spoken interactions also focused more often on this element, suggesting that their discussions had a positive impact, for both the boys and girls.

5. Conclusion

Our study shows that the number of interactions between the boys and the content of these interactions were similar to those for the girls and that the boys performed less well and benefited more from writing in dyads than the girls. These findings suggest that, when it comes to writing, especially for boys, working in pairs in class could help lead to better results. While writing texts in dyads is more time consuming and requires more energy, the discussions that such collaboration gives rise to help boys and girls come up with and organize ideas and identify errors. Using this collaborative mode more often could thus foster the production of better texts and the development of writing skills more generally.

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DO I STILL NEED MY BRAIN?
EVOLUTION OF NAÏVE MIND-BRAIN CONCEPTIONS
FROM CHILDHOOD TO ADULTHOOD

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Abstract

Given that metacognitive knowledge promotes students' academic learning, it seems important to better understand how the mind-brain conceptions change with age. We recruited 34 children aged 5/6 years, 34 children aged 7/8 years, 33 pre-adolescents aged 10/12 years, 30 adolescents aged 14/16 years, and 33 adults aged 21 to 35 years. We used the Mind-Brain Questionnaire (Rossi et al., 2015). Each participant was asked to indicate what a character needs in order to perform different actions by using response cards (brain, mind, hand, heart, eye, mouth). We conducted analyses for four response category 1- Mind and Brain response cards; 2- Brain without Mind response cards; 3- Mind without Brain response cards; 4- Neither Mind nor Brain response cards. The results reveal that participants over 10 years of age had a better understanding of the relationships between the mind and the brain than younger children, particularly when it comes to mental functions (dream and imagine). However, these relationships were not as well defined for basic functions (see and talk) and scholastic functions (read and count). Children aged 5 to 8 did not perceive the implication of the two entities in cognitive functioning and participants from 10 years to adulthood only recognized the role played by the brain. Our results provide further arguments for the development of neuro-educative school programs based on a better self-awareness of learners in order to help develop young people's metacognitive skills and promote a pedagogical approach that facilitates academic learning.

Keywords: Mind-brain conceptions, development, metacognitive skills, neuroeducation.

1. Introduction

The notion of "naïve conceptions" corresponds to the way of seeing the world instinctively or naïvely. This term refers to the idea that a naïve conception results from an intuitive knowledge leading to an understanding of natural phenomena, distinguishing from a scientific conception. In this study, we are interested in naïve conceptions about the mind, the brain and their relationships. In cognitive sciences, the common definition claims that the mind refers to the product of brain processes engaged in treatment of intern and extern information. From this point of view, the mind does not exist without the brain and vice versa. Studying naïve mind-brain conceptions is a way to study metacognitive knowledge which is known to promote learning (Wang et al., 1990). While a better understanding of the mind-brain conceptions development could be relevant for education, studies are still scarce. To our knowledge, Johnson and Wellman (1982) conducted the only study that explored children' naïve mind-brain conceptions through the nature and the functions of the mind and the brain in different human activities. Their first study investigated how children consider only the role of the brain in mental acts, sensations, feelings, and voluntary and involuntary behaviours. Children from 5 to 11 years and adults made judgments whether the brain was necessary to these activities. The results indicated that younger children consider the brain necessary for a limited set of activities such as mental acts and to a lesser extent in school activities. From 8/9 years, children progressively showed a better understanding of the brain's role in various activities. However only adults considered the brain as necessary for all activities including involuntary behaviours. In the study 2, judgments on brain and mind were compared, as well as their material or nonmaterial status. Children between the ages of 6 and 15 years were asked to say where their mind and their brain were, if mind and brain, separately, could be seen or touched, and if one could exist without other. They had also judged if various activities could be performed without the mind or the brain. The authors showed that children aged 6/7 years confused the functions of the mind and the brain, while separating

them in the head. Afterwards, between 8 and 11 years of age, they became able to understand that the mind and the brain are dependent on each other. Finally, the capacity to materialize the mind in the brain and to understand that the mind produced by the brain only appeared at 14/15 years. Study 3 investigated the ideas about the function of the brain and the study 4 explored their ability to localize the brain inside the head, in 3 to 5 year-old children. At all ages, mental acts were associated with the brain more than sensory-motor activities. Only the younger children were not able to consider that the brain is inside the head. There results were replicated in a contemporary sample with the same design protocol focused on the conceptualization of only the brain (Marshall et al., 2012). Notably, authors also proposed two questions concerning the nature of the mind-brain relation, but unfortunately, they did not report the obtained results in their paper. To our knowledge, no study has focused on these relations by giving children the opportunity to associate (or not associate) the mind and the brain to observe whether children can materialize the mind into the brain. The existent developmental literature emphasized the necessity to revise and extent the comprehension of mind-brain conceptions. Indeed, the heterogeneity in used methodologies and the inconsistency in age groups did not allow us to understand clearly the course of these conceptions until adulthood through different cognitive functions. More recently, Rossi et al. (2015) assessed naïve mind-brain conceptions of children aged 8 years who participated or not in a neuroimaging experiment. This study is interesting because they introduced a new methodology which allows to perceive the real naïve conceptions of participants because it did not only focus on the mind and the brain during the questioning. The employed Mind-Brain questionnaire (MBQ) seems to be a more adapted tool to assess naïve mind-brain conceptions by less influencing the children's responses.

2. Method

A total of 34 children aged 5-6 years (m = 69.5 ± 3.8 months; 16 girls), 34 children aged 7-8 years (m = 95.7 ± 6.9 months; 24 girls), 33 pre-adolescents aged 10-12 years (m = 134.5 ± 6 months; 22 girls), 30 adolescents aged 14-16 years (m = 176.1 ± 6.1 months; 17 girls), and 33 adults aged 21 to 35 years (m = 318.1 ± 55.4 months; 15 women) participated in this study. All groups differing in age (all $ps < .001$). Adults were recruited according to certain criteria: holding a maximum five years' degree after the baccalaureate and not working in the medical field. Adults' participants and the parents of children and adolescents gave their written consent in order to participate to the study. All participants were tested in accordance with national and international norms governing research on human participants. All participants were recruited in Normandy (France). They hailed from middle class homes and were native speakers of French. None of them reported cognitive impairments or developmental problems. All participants were interviewed individually by using the MBQ. A character, Julie, with her cats was presented to each participant, illustrating by a drawing. We explained that Julie performed different actions with her cats. Then, we introduced the response cards (brain, mind, hand, heart, eye, mouth) that we made sure they are recognized and understood by the participant. For each presented action, the participant was asked "What does Julie need to do this action (e.g., see her cats)?" and was asked to use response cards to answer question, which were placed in front of the participant and randomized between each actions. It was specified that choosing many responses cards was possible and that there was no right or wrong answer. We repeated the method for six cognitive functions presented in random order between each participant (Basic functions: see and talk; Scholastic functions: read and count; Mental functions: dream and imagine). To the extent that our interest is focused on naïve mind-brain conceptions, our interest response cards are "mind" and "brain" and the other response cards are considered as distractors. Then, for each cognitive function, participant's response can be one of the following response category: 1- Mind and Brain response cards; 2- Brain without Mind response cards; 3- Mind without Brain response cards; 4- Neither Mind nor Brain response cards. We conducted repeated-measures analysis of variance for each response category. We used Age as the between factor and Cognitive functions types as the within factor. When the interaction effect was significant, we carried out a posteriori analysis (Dunn-Bonferroni Test). We also performed planned comparisons with a corrected significance threshold for each elementary comparisons at $p = .005$. We supposed that participants should answer more the mind and the brain simultaneously with age to the extent that the acquisition of knowledge increases during development. However, this effect would be different according to cognitive functions.

3. Results

Few children aged 5/6 years considered the mind and the brain necessary for all cognitive functions types (Figure 1A). From 7/8 years until adulthood, participants associated these responses more with mental functions than with basic functions and scholastic functions. Furthermore, whatever the age, we observed the same percentage of participants who associated mind and brain responses to basic functions than to scholastic functions. From a developmental point of view, we observed that the number

of participants who gave mind and brain responses for mental functions increased with age until 10/12 years to reach 80% of participants at the adulthood. Adults more frequently chose mind and brain responses than 5/6 and 7/8 years children for scholastic functions. The same result was observe between adults and 5-6 years children for basic functions. Then, according to our hypothesis, we observed that participants should answer more the mind and the brain responses simultaneously with age, differently according to cognitive functions. The developmental course seems to include a step at 10 years of age.

Figure 1. Percentages of participants in each response category according to Age and Cognitive functions type. (A) Mind and Brain response category. (B) Mind without Brain response category. (C) Brain without Mind response category. (D) Neither Mind nor Brain response category.
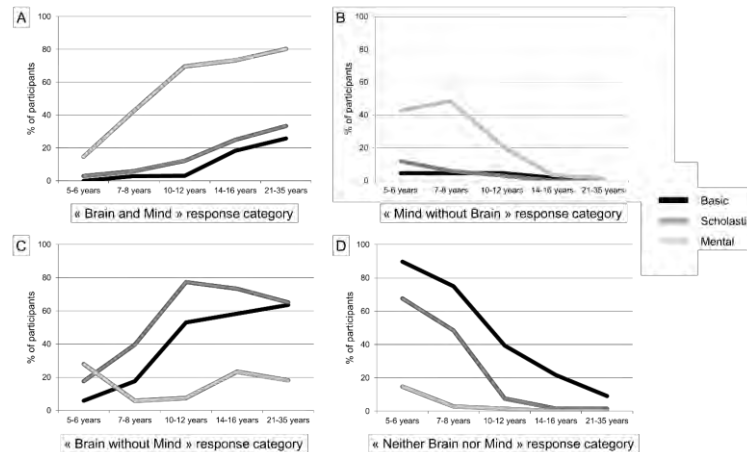
Many children aged 5/6 years and 7/8 years considered only the mind necessary for mental functions contrary to older participants (Figure 1B). No significant developmental difference appeared for basic and scholastic functions for which the mind response was very few given. While we did not observed a significant age effect on the percentage of participants who answered that only the brain was necessary for mental functions, this response was progressively answered for basic functions and scholastic functions (Figure 1C). 5/6 and 7/8 years old children had few considered that the brain was necessary for each function contrary to older participants. Few participants considered that neither the mind nor the brain was necessary for mental functions (Figure 1D). However, this was the case for children before 8 years old for basic functions and scholastic functions contrary to older participants. Finally, we observed a developmental shift in the naïve mind-brain conceptions at 10 years of age (Figure 1).

4. Conclusion

Our research reveals an evolution of the naïve mind-brain conceptions during development. The relationships between the mind and the brain are better understanding with age, but only in context of mental functions, not in a context of basic nor scholastic functions. Furthermore, we show that naïve mind-brain conceptions stop to evolve around 10/12 years. Children as adolescents and adults seem to lack knowledge about themselves and their own functioning while this knowledge promote learning and skills emergence. In the neuroeducation context, our results encourage to develop pedagogical programs based on the self-awareness in school learning to develop metacognitive skills and promote academic learning.

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STEM CAMP: ACTIVE INVOLVEMENT IN RESEARCH AND SCIENCE ENDEAVORS

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Abstract

At almost every step of the STEM education ladder, we see girls walk away. By seventh grade, most girls have lost interest in these fields, and few high school girls plan to pursue STEM in college. Our goal for the camp is to provide encouraging STEM Education experiences to rising eighth grade girls from Wood County and Northwest Ohio by organizing a camp introducing them to emerging areas in STEM and exposing them to the environment of higher education. During this presentation, we will discuss the camp structure, curriculum design, research design and the research findings.
This presentation will present data based on pre- and post-evaluations collected and analyzed based on the learning outcomes for the 2018 Camp. Camp participants responded to daily reflective questions on each class, workshop and field trip and we used this data in planning the curriculum for the next year. Both quantitative and qualitative data were collected. Some of the data suggests that there was a 20% increase in the number of girls indicating an interest in pursuing a career in science after attending the camp. After completing the camp, 100% girls reported their goal was to attend college. Ninety-eight percent of the campers positively rated the opportunities provided by camp to learn about the real world applications of STEM. After successful completion of Tech Trek, we concluded that these girls think about themselves as future scientists, engineers, mathematicians, and computer specialists and the camp experience ignites their interest in STEM.

Keywords: STEM education, mentorships, active learning, partnerships, STEM career ladder.

1. Introduction

At almost every step of the STEM education ladder, we see girls walk away. By seventh grade, most girls have lost interest in these fields, and few high school girls plan to pursue STEM in college. Those who do will likely be a minority in their programs and aren't likely to find much support in their studies. Stereotypes, gender bias, and the climate of academic departments and workplaces continue to block women's participation and progress. Additional research indicates that training programs are, in fact, successful in recruiting and retaining more women and underrepresented students in STEM programs. Both mentorship and active involvement in research and science endeavors have been shown to increase motivation and interest in STEM fields among young women, and particularly young women of color. Tech Trek operates on the belief that learning and achieving come from applying oneself rather than from an inborn predisposition. The camp builds a set of values and skills that equip girls to be persistent learners in any sphere and work hard to reach their goals. For many girls, the camp experience provides the life-altering "spark" that ignites their interest and encourages them on a path toward success. The Bowling Green AAUW Branch and Bowling Green State University wanted to break this cycle and assist girls into pursuing STEM professions.

2. Goals and objectives

The goal for the camp was to provide encouraging STEM Education experience to rising 8th grade girls from Wood County and Northwest Ohio by organizing a one-week camp introducing then to emerging areas in STEM and exposing them to the environment of higher education. After successful completion of Tech Trek, the goals is for girls think about themselves as future scientists, engineers, mathematicians, and computer specialists.

The Tech Trek Learning Outcomes for participants were to:
- Know the diverse career paths within the STEM fields.
- Engage in experiential, hands-on activities that enrich learning on a daily basis.
- Experience workshops and core classes that accommodate multiple learning styles and personality types.
- Strengthen self-efficacy by providing multiple opportunities to engage in healthy competition and recognize successes.
- Experience an environment that provides them with an opportunity to meet and learn from female STEM role models of all ages.

3. Participant selection

The researchers reached out to local schools in the Wood County and Northwest Ohio area for nominations from science and math teachers. This past year there were 260 girls nominated by teachers. Once nominated, the girls are informed of the nomination and must make application to be considered for one of the fifty camp slots. Each girl is interviewed by a team of AAUW members and then 50 are selected based on their application, narrative on why they want to pursue a STEM career and their face to face interview.

4. Curriculum

Curriculum covered includes STEM careers, coding, cell research, robotics, forensics, engineering, robotics, algae bloom in the Great Lakes, chemistry, physics, microbiology, cyber security, MIT App Inventor, and biology. Participants are assigned to one of three core courses based on interest. The core courses are cyber security, microbiology and MIT App Inventor. Cyber security.

Women are in high demand in the cybersecurity profession and represent only 11% of the positions in this field. Introducing middle-school girls to this issue and the careers in cybersecurity is important so we have future professionals in this area. Middle school age girls are important to target because by age 16 they will decide not to pursue technology if they are not exposed to the curriculum or to role models (Center for Cyber Safety and Education, 2017). Cybersecurity is one of the core courses based on curriculum created by AAUW and Symantec (2108). This five-day course introduces the students to programming languages, coding, and women in the cyber security field. Students are in the computer science laboratory 3 hours per day immersed in this robust curriculum.

App Development is the second core course that is offered at the camp. We use the MIT App Inventor curriculum that introducing the girls to mobile App design, coding and creative thinking. Students are in the computer science laboratory 3 hours per day immersed in this robust curriculum using android systems and PC systems. The students begin learning how to design, build and maintain mobile applications. This course helps build the basic skills so that they can go into a career in Mobil App Development.

The third core course is microbiology. Many of the participants are interested in pursuing careers in the medical or environmental fields. The girls are in the biology laboratory with a biology professor 3 hours a day researching basic microbiology lab techniques by isolating and identifying environmental bacteria. It involves isolation of bacteria from different samples such as water, air, and milk. Then, implications of some microbiological techniques such as spreading, streaking are understood to amplify the number of bacteria. Additionally, using staining techniques will be used to distinguish between gram positive and gram negative bacteria.

During the afternoon and evening, the participants attend workshops on chemistry, physics, kinesiology, robotics, engineering, forensics and mathematics. The signature experience is the Shark Dissection workshop which provides students with a culminating experience and teambuilding.

5. Outcomes

Pre and post evaluations were completed by each camper, data is analyzed by a consultant from AAUW and the results are shared with us. Questions include items such as:
- What was your experience at Tech Trek?
- What have you learned?
- How might the Tech Trek Camp be improved?
- What are your perceptions of science, technology, engineering and mathematics?
- How would our rate the quality of the elements of the camp?

These evaluations are used to plan the camp the following year. We have found that:

- There was a 20% increase in the number of girls that indicated that they would be interested in pursuing a career in science after attending the camp.
- After completing the camp 100% girls reported that they intend to attend college.
- 98% girls positively rated the opportunities provided by Tech Trek Camp to learn about the real world applications of STEM.

Camp participants responded to daily reflective questions on each class, workshop and field trip and use this data in planning the curriculum for the next year. A Tech Trek research team designed, implemented and analyzed the evaluation process and results. Both quantitative and qualitative data were collected. Themes emerged such as confidence in pursuing a career in a male-dominated field, finding support with other like-minded girls, positive impact of team-building, understanding the gender bias that they face in STEM fields and confidence to pursue high level courses at school.

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EXPLORING SHARED BOOK READING STYLES OF CHINESE TEACHERS FROM THE PERSPECTIVE OF ACTIVITY THEORY

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Abstract

Research in shared book reading has revealed that teachers vary in their styles of interacting with children around books, which can affect children's language and literacy development in different ways. While previous studies have identified broad patterns of teacher reading styles, few have defined the term or addressed adequately and systematically how characteristics of children and books help shape these patterns. This study applies activity theory model and conceptualizes teacher reading style as a multidimensional construct inherent in the transactional activity of shared book reading, in which the teacher (as the subject), the children (as the community member), and the book (as the tool) bring their own qualities to condition one other and enact the reading interaction. This conceptualization guides the qualitative inquiry revolving around six preschool teachers from Mainland China in a multiple case study. Data collection includes intensive classroom observation, teacher interview and documentation. Audio-recordings of reading sessions and teacher interviews will be transcribed and coded with qualitative analysis software. A cross-case analysis will be conducted to untangle how teacher reading styles are related to contextual specifics across cases and what learning opportunities for children can be offered through different reading styles. With a fine-grained representation and an in-depth analysis of teacher reading styles, the exploratory study seeks to inform preschool teachers of the possibilities of consciously shifting among reading styles in response to circumstantial requirement, and to provide implications for studies that examine differential effects of teacher reading styles on child development.

Keywords: Shared book reading, teacher reading style, activity theory.

1. Introduction

Shared book reading, also known as joint book reading, reading aloud, or interactive reading, generally refers to the process in which adults read a book to children and sometimes engage them in book-related discussion (Schickedanz & McGee, 2010). In classroom context, teachers naturally demonstrate different styles in presenting book information and facilitating discussion, yet our current knowledge about what and how specific aspects of teacher reading style affect certain domains of child development is limited by a relatively small body of research in teacher reading style, compared with that in parent reading style (Cline & Edwards, 2017). Further, this literature is obscured by a lack of conceptualization of teacher reading style, rendering it difficult to tease out what the construct encompasses and how it interacts with contextual variables. This article aims to address this issue by reviewing prior research and suggesting a sociocultural outlook on teacher reading style. It proposes that teacher reading style be conceptualized as a multidimensional concept best examined in relation to the characteristics of the teacher, the book, the children and relevant elements in the activity system.

2. Teacher reading style as a multi-dimensional construct

The extant literature has yet offered an explicit definition of teacher reading style, though it has been used interchangeably with such terms as *storybook reading style* (Martinez & Teale, 1993) and *read aloud style* (Price, Bradley, & Smith, 2012) in studies that seek to delineate patterns of teacher talk in shared book reading. Dickinson, McCabe and Anastasopoulos (2003) stated that teacher reading styles vary in "when and to what extent they engage children in conversations as they read, in the nature of questions they ask, and in the extent to which their reading includes dramatic qualities" (p.97). This implies that a thorough understanding of teacher reading style entails not only consideration of structural features such as the proportion of discussion in the reading event and the distribution of responsibilities in talk, but also the cognitive flow of verbal exchange and the pedagogical strategies employed by teachers.

Indeed, a closer look on prior research reveals that the majority have utilized these aspects in characterizing teacher reading style. Dickinson and Keebler (1989) identified two reading styles according to varying degrees of discussion: an interactive style in which the teacher engage children in considerable discussion while reading the book, and a performance style in which the teacher provide storytelling with few breaks for discussion. Later studies (e.g. Hindman, Connor, Jewkes, & Morrison, 2008; Zucker, Cabell,

Justice, Pentimonti, & Kaderavek, 2013) went beyond structural level and shifted attention to the pragmatic functions performed by teacher utterances and the cognitive demand placed on preschoolers. Whether teacher utterances serve to provide or request information is indicative of how the labor of talk is shared among the teacher and children, while cognitive demand of teacher talk hints at the types of learning opportunities opened to children. Both can yield useful yet distinctive details for capturing the role of teachers and have thus found their ways into the coding systems of many studies, enabling more subtle differences across reading styles to surface. For example, based on the interactive style, Dickinson (2001) further distinguished a co-constructive style from a didactic-interactional style. While both include discussion, the former features high cognitive demand conversation, the latter low cognitive demand talk such as recall of factual information.

Besides structural, pragmatic and cognitive dimensions, researchers have approached the construct by analyzing how teachers mediate the content and the structure of the book in shared reading. This is exemplified by the work of Martinez and Teale (1993) that examined reading styles of six kindergarten teachers from three facets: the focus of teacher talk (e.g. setting and character), the type of information discussed (e.g. background and inference) and the instructional strategies (e.g. eliciting and reviewing). One merit of operating the construct in this way is that it informs readers as to how specific instructional strategies were associated with various aspects of the book, contributing to case-sensitive knowledge of how reading styles functioned in context. By highlighting the role of instructional strategies in framing discourse patterns, the study added another important dimension to the concept. The underlying assumption is that teacher reading style would be more meaningfully understood when taking into account of the book read and the role of teachers as the mediator between the text and children in shared reading.

3. Teacher reading style from a socio-cultural perspective

Another feature of previous studies is that many have proposed labels to characterize reading styles (e.g. Dickinson, 2001; Schick, 2015). While labels can be helpful for differentiation, it risks compromising the complexity of the concept. For one thing, labels are limited in covering the full range of teacher reading style. For another, labels cannot reflect the connection between the construct and contextual factors, such as the book and children. Dickinson et al. (2003) pointed out that book genre, familiarity and complexity can affect what teachers read and how they read it with children. Teachers generally use more inferential questions and engage children in more cognitively challenging discussion when reading informational texts than storybooks (Zucker, Justice, Piasta, & Kaderavek, 2010). They also adjust cognitive demand of conversation as a function of the age, ability and engagement levels of children (Dickinson, 2001).

Subjective factors also play a part in explaining the variation in teacher reading style. Gerde and Powell (2009) observed that teachers with more years of education and training in early childhood delivered more book-focused talk, while Bratsch-Hines, Vernon-Feagans, Varghese, and Garwood (2017) reported an association between teacher knowledge and experience in reading and their use of meaning-based instructional strategies, suggesting that teacher knowledge, experience and level of education are relevant factors in the equation. Price et al. (2012) argued that teacher enjoyment and confidence in shared book reading could bear on their teaching practices. Although empirical research in this line is scarce, there is evidence on how preschool teachers' belief influences teacher-child interaction (e.g. Garrity & Guerra, 2015), implying that teacher perception may be a variable worth exploration.

On top of contextual and subjective influence, sometimes teacher reading style needs to be examined against institutional and cultural background. Lipsky and Adelman (2016) found that compared with private school teachers, Head Start teachers employed vocabulary instruction strategies more often in shared book reading, a phenomenon that can be explained by the guidance of Head Start Performance Standards and the monitoring of Head Start district personnel, both placing an emphasis on supporting children's vocabulary development. This indicate that in some cases, teacher reading style can be the product of a deliberate and gradual adjustment of teaching behaviors based on the norms and policies available in the teaching environment that regulate how shared book reading should be implemented.

4. Teacher reading style from the lens of activity theory

In line with its socio-cultural outlook, this study draws on activity theory as a descriptive framework for depicting various dimensions of teacher reading style, and as an analytical tool for exploring subjective, contextual and institutional factors that shape the construct. Engestrom (1999) identified six elements in the activity model: subject, object, instrument, rule, community and share of labor (see Figure 1). In the activity system of shared book reading, teacher reading style is conceptualized as entailing the usual ways in which the teacher, as the *subject*, uses the *instrument* of books and instructional strategies to engage the *community* member of children in sharing the *labor* of achieving the *object*. Each element may bring in their own qualities to define and condition teacher reading style. For instance, the *subject* (i.e. the teacher) may differ in qualification and perception, while the *community* can include children of different age groups or ability levels. Only with a holistic and systematic analysis of how these elements interact within the system can one arrive at a comprehensive understanding of teacher reading style.

Figure 1. Developing Conceptual Framework from Activity Theory.
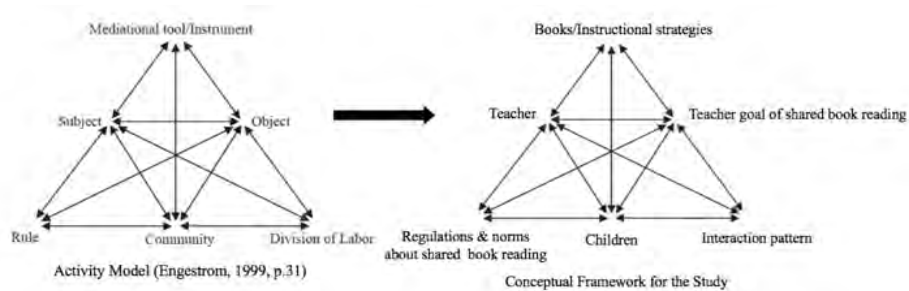
5. Conclusions

This article revisits extant literature on teacher reading style and discusses how structural, pragmatic, cognitive and instructional dimensions of shared book reading help circumscribe the construct. The multidimensional nature of teacher reading style defies any simple labels, but demands a socio-cultural perspective that addresses subjective, contextual and institutional influence in a systematic way. The activity model is proposed as a descriptive and analytical framework to explore how teacher reading style is manifested in and shaped by different elements in the activity system of shared book reading.

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ARTWORK IN ART EDUCATION

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Abstract

The presented research mainly addresses the process of artwork interpretation in art education. Attention is paid to the didactic transformation by which the artwork becomes the subject of education.

This process is explored in the relationship between the students/viewers, the teachers/art educators and the unique artwork itself. The process of artwork interpretation is analysed in a concrete teaching situation in which students are placed at the centre of their learning experiences (the subordination of teaching to learning).

The poster is based on the results of two studies exploring the use of art in art education. In both studies, the crucial question is: What is the space for students' voices, their empirical viewership and their critical thinking in art education?

The research outcomes also reflect the field discourse of art education didactics, especially in relation to functional visual literacy. Visual studies and the theory of art education are the discourses that guide the theoretical framework of the research.

Keywords: Art education, interpretation, discourse-based educational models, critical thinking, functional visual literacy.

1. Introduction

Multiple literacies emphasizing functional visual, cultural and social literacies and critical and reflective thinking are necessary to understand communication exchanges in visual language systems as well as to understand the relationships and existential controversies of the "natural" world today. In light of these tendencies, the concept of culture as an anthropological complex is broadening for gallery and museum education as part of art education in school. (Fulková 2013) Encounters with an artwork bring a series of challenging questions to education. For example, ethical issues or the concept of intertextuality that points to the fact that artwork interpretation is unstable and the meaning of artworks is constantly changing.

In the paper, the involvement of contemporary art in art education is explored on two levels.

The first level comes from a case study based on the reflection of the educational program and its extension to school education at the second level of primary school. The gallery education "Faces – the Phenomenon of the Face in Video Art" at the Rudolfinum Gallery in Prague. (Říhová, Svatošová 2012) This part of the research presents the outputs of the analysis of one of the possible ways to involve art in teaching. The analysed educational program is based on the following principles: A discursive model of educational programs, a three-stage time model of educational programs (dedicated to preparing students before visiting the gallery, a specific educational program in the gallery and continuing education distributing the educational program) and connecting various components of visual art and other art forms. (Hajdušková, Fulková, Sehnalíková 2013)

The second level is based on the empirical study "The Process of Artwork Interpretation" (Říhová, 2018). In this study, the interpretation of an artwork in particular art education was analysed in comparison with the Czech Framework Education Program for Elementary Education and the European Network for Visual Literacy - ENViL and their model for visual literacy. The empirical study aims to compile the results of the research and the theoretical framework, including the curriculum, to identify the interpretation possibilities of students aged 11–13.

2. Theoretical framework

Discourses in contemporary art education based on cultural and visual studies and constructivist pedagogy.

3. Objectives

The aim of the paper is to analyse and describe the specific situation in which the didactic transformation occurs through which the artwork becomes the subject of education.

4. Methods

1. The "Faces" case study is based on the reflection of the educational program "Faces – the Phenomenon of the Face in Video Art" at the Rudolfinum Gallery in Prague during August and September 2012.

For this education, we created three educational support materials – Worksheets, a Reading Book and White Boards. The education directly encouraged follow-up work at school. After the gallery education, follow-up instruction was taught in the educational area of Czech Language and Literature, Art Education and Drama Education. The case study includes learning outcomes from two teachers from two elementary schools in Prague (56 students aged 12-13). Research methods consist, participating observation, reflective balance of teachers, of preparation for teaching, focus group interviews with students, a discourse-based analysis of student testimonies, as well as worksheets and their visual art and essay in art and drama education.

2. The empirical study "The Process of Artwork Interpretation" is based on qualitative action research based on discourse analysis. Methods of research are participatory observation, transcription of audio recording of part of the lessons, discourse analysis of student worksheets, reflective papers from the teachers and reflective paper from the observers.

5. Results

The discourse-based educational model:

This part of the results is a diagram illustrating the process of interpretation in the observed art education. A detailed analysis of the audio records showed that the concrete education is based on discourse-based educational models. The discourse based educational model reveals the journey from the empirical spectator through pre-concepts to critical audiences, the path from perception to the interpretation of the artwork.

Figure 1. This visualisation reveals the relationship between the three terms - students/teacher/artwork in three phases.
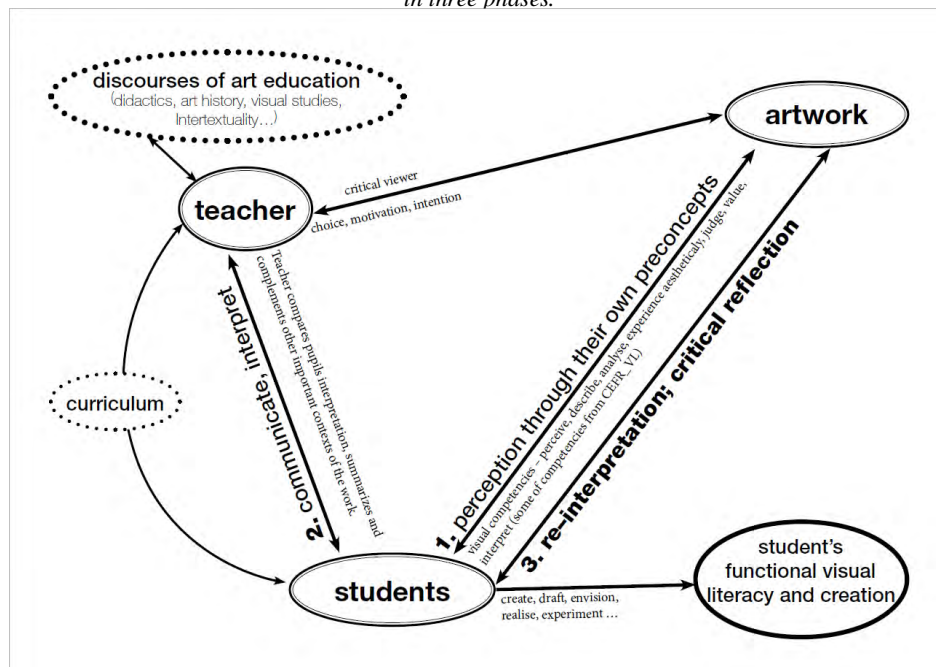
The first phase of the perception of the work is part of teaching when students are empirical spectators. The students' perception is through their own pre-concepts. In this visualisation, I use some visual competencies from the ENViL model – in this phase this is: perceive, describe, analyse, experience aesthetically, judge, value and interpret.

The second phase is about communication between the students and teacher. In this phase, the teacher played the role of initiator and mediator of the students' artwork perception and their own experience in their paths to art. Here visualisation reveals the power of discourse, which is the theoretical

background of the field, including the curriculum. Visualisation reveals principles of artwork interpretation in concrete art education. The peer effect is a benefit of this phase.

The relationship between the teacher and artwork is about the teacher's reasons and their choice, motivation and intention – in this point of view the teacher is a critical viewer.

The most important is the third phase, when students re-interpret and critically reflect on the artwork.

This process has an impact on the student's increasing functional visual literacy and developing their own creativity.

The visualisation results of this learning strategy reveal art education to be a dialogue with a high level of student autonomy (learners as reflective practitioners) and with the concept of discourse as a medium organising audio-visual regimes.

The quality of interpretational process is affected by:
- the level of the student's critical thinking;
- the willingness to change to expand and reinterpret their own attitudes and opinions;
- the teacher's roles, mediating contexts from artwork discourse and art education;
- the teacher works with contexts to expand the understanding of the work and enrich their thinking;
- a language that is understandable to students;
- the processing of the youth's experience into an interpretational scheme runs counter to the deep-rooted notion that art can be understood only by experts and they speak of it as a very complicated method.

6. Conclusions

The research results confirm the current trends in approaches to teaching art history and contemporary art in art education and gallery education based on a high degree of student autonomy, the concept of a reflective practitioner, with the concept of discourse-based critical approaches.

The visual turn comes to the forefront of its critical analytical position – to watch, to think critically, to use its lived experience, and art education could be a relevant space to develop this kind of skills and visual competencies.

The results reveal the benefits of the subordination of teaching to learning.

The study revealed the gap between how the issue of interpreting the work of art in relation to the active involvement of a student's voice is perceived by the general public as opposed to a theoretical discourse. The curriculum presents us with a very challenging task in the form of expected outputs leading to a critical analytical position.

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OBSERVATIONAL LIFE DRAWING AS A HOLISTIC TEACHING TOOL IN THE TIME OF MEMES / PRE-RESEARCH STUDY

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Abstract

This pre-research study deals with the problem of fundamental relational paradigm of life drawing in contradiction to virtual experience and consumer life style. It looks into the question how to teach drawing in the time of social networks and fake news when the reality has become more and more fictional, without losing the transcendental and cognitive potential of drawing. It inquires how the two-dimensional pictorial culture and related visual symbols and memes influence perception and ability to draw and how the problem is felt by pedagogues and students of drawing themselves.

The core of the study is created by the author's past experience when working as an artist, pedagogue and curator; and from that experience also derives the used practical research method - A/r/tography. The topic is viewed from the perspective of holistic pedagogy, image theories and contemporary art studies and it works with the conception of graphic types by Jaromír Uždil and symbolic systems by Betty Edwards. These principles of art expression also relate to a collection of drawings by dozens of respondents, which is an integral part of the study and the author gained it during several years when she was working as a teacher.

The study is a part of a doctoral research, which deals with qualitative contexts of drawings according to reality and their didactic reflections. The research is performed at the Department of Art Education at the Pedagogic Faculty of the Charles University in Prague.

Keywords: Life drawing, art education, teaching tool, art-based research, visual symbols.

1. Introduction

In the contemporary Euro-American culture, which is based on the hegemony of eye and intellect and for which the result of each work is more important than the process itself, the manual observational drawing is not appreciated enough and understood well. Within the prevailing consumer and digital way of life, all our activities are more and more flooded by the fear of impreciseness, unclarity, accidentality and chaos, and creative and soulful activities have become mostly mechanical and mannerist process of imitating and cloning. We are losing the feeling for depth, for "the melody behind the lyrics".

The more we focus on various monitors, screens, tablets and other means of the two-dimensional pictorial culture, the more shallow our everyday lives become. Peripheral vision, which is very important for our perception and mental system mainly for the fact that it integrates us into the space and thus into our life, is replaced by focal vision, which makes us play only a role of a viewer. Manual drawing and sketching of reality bring us to the sensual contact with an object or space. In our imagination we hold an object in our hands and in our mind at the same time (Pallasmaa, 2009). We design the imagined and proposed picture in our consciousness and also in our unconsciousness by our whole body. At the same time, we become the part of the object and the observer. A creative process needs not only our whole sight, but the holistic approach; it means the full body and mind identification and compassion. Thanks to drawing we can copy, analyse or deconstruct, but we also create a relation to the environment, we learn empathy and we learn how to integrate.

In the time when the threat of ecological catastrophe hangs over our civilisation like Damocles' sword, it is important to blow the dust off the drawing according to the reality and to see it not only as an ancient craft, but also as the oldest cognitive tool. And as a possible strategy how to survive, which is supposed to connect us to physical reality and its fundamental existential quality, and which may prevent us from taking off into the realm of virtual or other worlds and from alienation from nature.

2. Basic characteristics, questions and project objectives

Drawing according to reality is often understood as an academic art discipline and a basic skill capital of fine artists. However, the contemporary approach to drawing at schools of arts lacks transparency of methods and meaning. Due to mass expansion of photography and new media, and due to conceptual artistic theories, drawing has lost the position of the crucial discipline and has been relegated to the secondary status (Faure Walker, 2005). On the field of contemporary art, the vicarious image, drawing or painting according to the two-dimensional pictorial template has been dominating over the image according to the 3-D reality for the long time. At least from the half of the last century it has put on different forms, from conservative appropriations to ironic post-modern quotations or collage post-internet works, which exist in various levels and in various media. It is possible to say that creating according to photographs is the today's answer to the question how we see the nature – as a secondary media topic (Patočka, 1992). The nature is a mere image inside of the more powerful primary "nature", inside the virtual contemporary society. Is it still possible to visualize the old topic of nature as a normal image (Ševčíková, Ševčík, 1996)? What can learning how to draw (not only according to models) constitute in our contemporary time?

This preliminary study is inspired by the efforts to clear up the philosophical background of contemporary art drawing and it tries to contribute to the discussion. It deals with the influence of virtual reality and symbolic pictorial matrices to visual literacy of non-professional viewer. It investigates how the two-dimensional pictorial culture and related visual symbols and memes influence the perception and ability to draw. The goal of the study is to find out how the students and pedagogues of art education see and approach the problem of copying, vicarious image and impact of pictorial matrices on the ability to draw and creativity itself.

In the context of the main focus of the author's doctoral studies, the goal of the whole project is to rehabilitate the life drawing as a universal, ecological and holistic teaching tool, and to map the difference of professional and folk discourse of drawing.

3. Methodology and conceptual framework

The study is a part of pedagogical art research and it derives from the introspection of the author's past experience as an artist, pedagogue and curator. The method that has been used is A/r/tography, which, within gathering and analysis of data, as the only method enables an ambivalent approach and communion of roles – an artist / a pedagogue / a researcher (Irwin, R. (2004). An artist / researcher is able to articulate and clarify the understanding of the process from inside – out, that mans in a way that might not be so fundamentally approachable by a contrarily focused theoretician and scientist. In that context we can also see an advantage in the fact that an artist / teacher has deeper experience with a creative process in the course of its long-term development. Considering the new paradigm of art education, which has become influential in the last years and which has oriented students' attention not only inside, but mostly outside (from self-reflection and self-analysis to attention to surroundings, nature, local and global groups, media and also to communication itself, that means to various discourses) (Varto, 2006), the mentioned pluralism of roles is ideal.

The theoretical framework of the study is the intersection of chosen opinions from holistic pedagogy, contemporary art theories, image theories, phenomenology and post-continental philosophy (e.g. concepts of Alain Badiou or Isabelle Stengers). The concepts of visual symbolic systems or graphical types are based on the works by Betty Edwards, Jaromír Uždil and Helena Hazuková.

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A PBL CASE ON GLYCOGEN AS AN EVALUABLE TASK FOR STUDENTS STUDYING METABOLISM

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Abstract

We are currently involved in an Educative Innovation Project (PIE17-145, funded by the University of Malaga) aimed to improve the teaching practice of Metabolism to undergraduate students. We are designing and developing new metabolism cases of problem-based learning (PBL) applied to different groups of Biochemistry and Biology undergraduate students. In the academic course 2017-18, we implemented a first trial for a PBL case on glycogen and its metabolism that was offered as an optional evaluable task for students of two courses devoted to metabolic regulation, both corresponding to the second year of the Degrees in Biology and Biochemistry.
Metabolism, its regulation and its integration is one of the most complex study subjects for Biochemistry students. In fact, its learning is perceived as a demanding and difficult task by undergraduate science students, and only few of them achieve an integrated and deep learning of the subject. In END 2018, we presented a communication describing how PBL can be used as a motivating didactic strategy for the study of fundamental topics in biochemistry. In the present communication to END 2019, we will show the impact of a specific PBL case on the performance and final scores of the students enrolled in the afore-mentioned courses.

Keywords: Problem-based learning, metabolism, biochemistry, higher education, science education.

1. Introduction

In END2018, we presented two communications on PBL and learning contract as two useful tools for the study of metabolism (García-Ponce et al, 2018; Martínez-Poveda et al, 2018). At the University of Málaga (Spain), metabolism is a topic cover by mandatory courses in the Degrees in Biology (*Bioquímica II*, devoted to the study of *Metabolic Biochemistry*), Biochemistry (*Regulation of Metabolism*) and Chemistry (a course entitled *Biochemistry* that is fully devoted to the study of metabolism). Some specific features of metabolism, such as being a complex dynamic network, its extremely high levels of plasticity, its ability to adapt to both internal and external changes through metabolic reprogramming and its multiple levels of regulation and integration, contribute to make metabolism a specially complex and difficult subject for students of biosciences (Vella, 1990; Vullo, 2014).

In the present communication, we show and discuss the results obtained with the application of an extended PBL approach for the study of glycogen metabolism under a learning contract.

2. Objective

Our current Educative Innovation Project (PIE17-145, funded by the University of Málaga) has as its final objective to improve the teaching-learning process applied to the study of metabolism by using a design-based research methodology (Collins et al, 2004) and a problem-based learning approach (PBL) (Barrows, 1986; Gallagher et al, 1995; Dolmans et al, 2016). As already mentioned in our previous END communication (García-Ponce et al, 2018), another important target of this project is to change certain attitudes of students, decreasing their competitiveness and increasing their cooperativity by stimulating their engagement with procedures of co-operative study in a class less hierarchical and more horizontal, with the professor in the role of a facilitator/guide in a flipped classroom.

3. Design

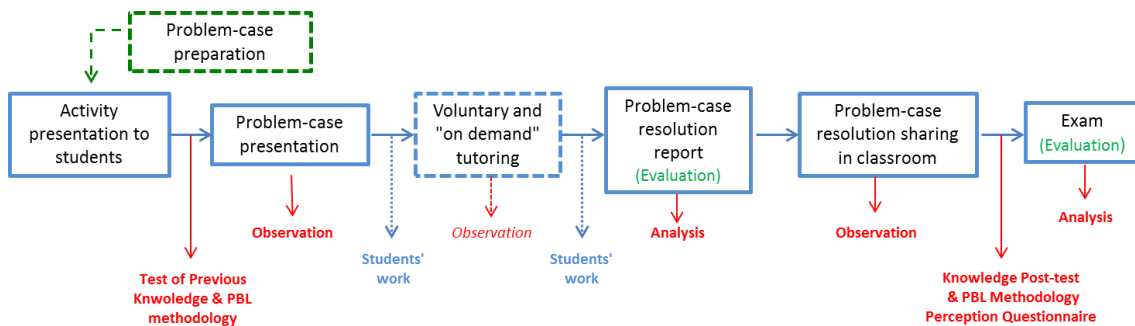*Figure 1. Flow chart of the present study.*

Figure 1 shows the flow chart of this study. The whole extended PBL case for the study of glycogen metabolism and its regulation was designed during the first semester of the first academic year of application of the project PIE17-145. This PBL case included 57 guided tasks organized around five topics: 1) On the structure and properties of glycogen (13 tasks). 2) Historical issues regarding the scientific study of glycogen metabolism and its regulation (5 tasks). 3) On glycogen metabolism and its regulation (24 tasks). 4) Glycogenosis. Biochemical foundations of clinical cases (10 tasks). And 5) Integration of glycogen metabolism (5 tasks). These guided tasks were designed to stimulate the interaction among the members of the different teams/groups of students, their cooperative behavior during learning and their critical thinking. Furthermore, some tasks were designed to encourage the reading of scientific papers and the use of biological databases and online resources of great utility.

The study was implemented in the second semester of the academic course 2017-18. We presented the activity and enrolled volunteer students of both *Metabolic Regulation* and *Regulation of Metabolism* courses to a system of continuous evaluation under a learning contract. In *Metabolic Regulation*, 20 volunteer students who signed the learning contract were split in 5 groups. In *Regulation of Metabolism*, 32 students signed the learning contract and were split in 8 groups. To monitor the learning process, before glycogen case presentation to the students and after the submission of their final reports, they answered anonymously the questions of a test to analyze the impact of the PBL work on their acquisition of knowledge regarding glycogen, its metabolism, regulation and integration.

All the groups received the instructions and rules to solve the "case" and a written document with all this information, along with the 57 tasks of the case. Each group freely decided how to organize the work and how to share the tasks. Groups had two months to prepare a final report with the description of the response provided to each task and a public declaration of engagement, with mention of the specific work carried out by each member of the group in the resolution of the overall case. Throughout the whole procedure groups were allowed to demand tutorial sessions and guidance from their professors.

Before the final examinations of the subjects, enrolled students had a final meeting in which, under the supervision of the instructors, the different groups discussed their answers to the different tasks included in the PBL. In the same session, students anonymously filled a post course mixed questionnaire, elaborated by using the 1 to 4 Likert scale for most of the questions, complemented with some other open answered ones. This questionnaire was designed to evaluate students' perception of this PBL methodology. Finally, the impact of this methodology on the performance of students in the final examinations was evaluated.

4. Results and discussion

Most of the enrolled students (74% of the students in the Biology Degree and 87% of the students of the Biochemistry Degree) declared that had no previous knowledge of the PBL methodology and very few had used previously this methodology (14% of the students in the Biology Degree and 13% of the students of the Biochemistry Degree). Regarding the perception and the satisfaction of students with the PBL methodology, students of both courses considered this methodology useful (scores 3,6 and 2,8 in a Likert scale for Biochemistry and Biology students respectively), believed that they had learned more (75% of both Biochemistry and Biology students), but almost 100% of them declared that they had to work more and harder than for the preparation of other kind of tasks in the same or in other subjects. Overall, 83% of Biochemistry students and 75% of Biology students enrolled in this study declared to be "very satisfied" or "satisfied" with their experience.

Regarding the percentage of correct answers provided by the enrolled biochemistry students for each of the 10 multi-option questions in both the pre-test and the post-test on the topic, in all the 10 questions there was an increase in the percentage of correct answers in the post-test as compared with the pre-test. Altogether, correct answers increased from 31% to 54%.

This PBL had a real impact not only in the overall knowledge of glycogen metabolism but also on the study of the course on metabolic regulation as a whole for most of the enrolled students in both groups of the Biochemistry and Biology Degrees. In fact, the percentages of students attending and passing the final examinations of both the *Metabolic Biochemistry* and *Metabolic Regulation* courses were higher among enrolled students to the PBL under learning contract. Specifically, in *Metabolic Biochemistry* (Biology Degreed) course, a 63% of the enrolled students passed the final exam, to be compared with only a 37% of students passing the final exam among those not enrolled in the study. In the *Regulation of Metabolism* (Biochemistry Degree) course, the figures were 79% and 50% for students attending the final exam previously enrolled in the PBL activity or not, respectively.

5. Conclusion

The use of the PBL case designed to study glycogen and its metabolism within the framework of a collaborative learning in a flipped classroom has contributed to improve the experience of our students learning metabolism and its regulation. Furthermore, they have learned that cooperation is a better strategy to study than competition.

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THE MEDIATING EFFECT OF PSYCHOLOGICAL EMPOWERMENT BETWEEN RELATIONSHIP SATISFACTION WITH INSTITUTIONS MEMBERS AND COMPETENCE FOR BUILDING EARLY CHILDHOOD EDUCATIONAL COMMUNITY OF EARLY CHILDHOOD TEACHER

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Abstract

The needs for building educational community are gradually growing in Korea and the field of early childhood education are no exception. We focused on the teacher's competence for building early childhood educational community in this study. Then, which factors affect teacher's competence for building early childhood educational community?

The purpose of this study was to examine the mediating effect of psychological empowerment on relationship between relationship satisfaction with institutions members and competence for building early childhood educational community. The subjects of this study were 590 early childhood teachers who lives in Korea and they answered the questionnaire on those three factors. Using this data, correlation analysis and simple regression analysis were carried out. The results were as follows. First, There were a significant positive correlations among relationship satisfaction with other teachers, psychological empowerment and competence for building early childhood educational community. Second, we found that teacher's psychological empowerment partially mediate the effect of relationship satisfaction with members on competence for building early childhood educational community. In other words, there were greater effect on competence for building early childhood educational community when relationship satisfaction with members interacts with psychological empowerment of teacher than there was no interaction. This result shows that the interaction effect of relationship satisfaction with institutions members and psychological empowerment of early childhood teachers is important to increase competence for building early childhood educational community of teachers. Therefore, we need some efforts to make not only positive organizational culture and climate, but also some plans to increase the teacher's psychological power.

Keywords: Early childhood educational community, teacher's competence, psychological empowerment, relationship satisfaction with members of kindergarten teachers.

1. Introduction

This study examined psychological empowerment as mediators in links between relationship satisfaction with institutions members and competence for building early childhood educational community.

2. Methods

The sample of the research consisted of 590 early childhood teachers parents in South Korea. Backgrounds of the sample of teachers participated in this study were showed table 1.

Table 1. Backgrounds of the sample of teachers participated in this study.

		n	%
Age	20s	311	52.7
	30s	163	27.6
	Above 40s	116	19.7
Work experience (year)	1 - 2	139	23.6
	3 - 4	145	24.6
	5 - 9	197	33.4
	Over 10	107	18.1
	No answer	2	0.3
Class in charge (age of children)	1 – 2	222	37.6
	3	120	20.3
	4	109	18.5
	5	110	18.6
	No answer	29	4.9
Education	College	246	41.7
	University	312	52.9
	Graduate school	30	5.1
	No answer	2	0.4
Total		590	100

Variables measured in this survey were self-reported relationship satisfaction with institutions member, psychological empowerment and competence for building early childhood educational community. Relationship satisfaction with institutions member (Shin, 2004) means how much the teachers are satisfied with what they experience in the relationship with institutions director, parents, children and other teachers (17 questions). Psychological empowerment was psychological perception of institutions members on environmental characteristics of group and their work and measured with the 12 questions which Yang (2014) used. Competence for building early childhood educational community (Chung, Yoon, & Park, 2017) consists of psychological competence(27questions) and social competence for sharing values(15questions).

Using the collected data, descriptive analysis, correlations analysis, and the multiple regression analysis for research model test were used. Additionally, Sobel test was used to verify the significant mediating effect.

3. Results

3.1. Correlation with relationship satisfaction with institutions members, psychological empowerment and competence for building early childhood educational community

It showed that relationship satisfaction with institutions members and psychological empowerment were positively correlation with competence for building early childhood educational community as below.

Table 2. Correlation with relationship satisfaction with institutions members, psychological empowerment and competence for building early childhood educational community.

	Competence for building educational community
Relationship satisfaction	*.47****
Psychological empowerment	.57***

3.2. Meditating effect of psychological empowerment

As shown in table 3, relationship satisfaction with institutions members significantly influenced on psychological empowerment and competence for building early childhood educational community. And the results showed that psychological empowerment partially mediates the relationship between other two factors. Further, Z-value was 9.22(p<.001) in Sobel test. It means the psychological empowerment was a significant meditator.

Table 3. Meditating effect of psychological empowerment.

		B	S.E	β	t	R2	F
Step 1	Relationship satisfaction Psychological empowerment	.49	.04	.05	13.90***	.25	193.18***
Step 2	Relationship satisfaction Competence for building educational community	.43	.03	.47	12.87***	.22	165.56***
Step 3	Psychological empowerment Competence for building educational community	.22	.03	.24	6.48***	.37	173.33***
		.42	.03	.45	11.91***		

4. Conclusions

Findings suggest that we need some efforts to make not only positive organizational culture and climate, but also some plans to increase the teacher's psychological power. Then, there are some suggestions for future research. In this research, we only dealt with the relationship satisfaction with institutions director, parents, children and other teachers. However, there are many other members in school like deputy director, cook, concierge etc and they affect dynamic of institutions. So it would be nice if these other members considered in future research.

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EVALUATING RELIABILITY AND DISCRIMINATORY CAPABILITY OF BEMA IN TWO SPANISH ENGINEERING DEGREES

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Abstract

In this work, we analyzed the reliability and discriminatory capability of BEMA (Brief Electricity and Magnetism Assessment) for students of Electricity and Physics courses in Engineering Degrees taught at the School of Engineering Design (ETSID) from Universitat Politècnica de València (UPV). BEMA is a 30-item multiple-choice test designed to assess students understanding of basic electricity and magnetism concepts. The questions are mostly qualitative and some of them require simple calculations. The test is useful when combines validity, reliability and discriminatory capability. The validity is usually determined by expert opinions. The BEMA test is valid for the Electricity and Physics courses because the tested concepts are related to the course subject. A reliable test is consistent within itself and across time. Besides, a large fraction of the variance in scores is caused by systematic variation in the population of the test takers. The reliability of an assessment instrument is particularly important when it is going to be used to compare the performance of different groups. In this work, the reliability and discriminatory capacity of BEMA is assessed statistically. From the post-instructional data three parameters are focused on individual test items (item difficulty index, item discrimination index, item point biserial coefficient) and two parameters are focused on the test as a whole (test reliability and test Ferguson's).

Keywords: BEMA test, reliability, discriminatory capability, Ferguson's.

1. Introduction

Brief Electricity and Magnetism Assessment (BEMA) was developed in 1997 by Chabay and Sherwood, aided by Fred Reif, to measure students' qualitative understanding and retention of basic concepts in electricity and magnetism (Ruth Chabay & Sherwood, 1997) (Chabay & Sherwood, 2006). This standardized multiple-choice test is a useful tool to assess students' understanding about electricity and magnetism concepts. The overall performance of a group of students can be obtained through the mean and standard deviation. These parameters enable the comparison between different groups, which can be useful, for instance, to check if a teaching innovation has had a positive effect or not. The fact that the quality of the test is good enough to measure the knowledge of students is implicit in this approach. The standard measures of the quality of a test consider two parameters: validity and reliability. Validity is an estimate of how well the test measures what it intends to measure. The reliability of a test is a measure of how consistently the test will reproduce the same score under the same conditions. Reliability of a test can be stablished by the Kuder-Richardson formula (Kuder & Richardson, 1937).

There are two standard measures of the quality of items on a test: difficulty and discrimination (Maloney, O'Kuma, Hieggelke, & Van Heuvelen, 2001). Difficulty is usually measured by finding the percentage of subjects who get the item correct. Discrimination is a measure of how well an item differentiates between competent and less competent students. Classical item analysis is concerned with a number of item specific statistics such as classical item difficulty, classical item discrimination, and the item point biserial (Eaton, Johnson, Frank, & Willoughby, 2019). Ding et al. (Ding, Chabay, Sherwood, & Beichner, 2006) evaluated the BEMA test after it had been administered to a large number of students at North Carolina State University (NCSU). Their results indicate that BEMA is a reliable test with adequate discriminatory power. In this work, the BEMA test was administered to students of Electricity and Physics courses in Engineering Degrees taught at the School of Engineering Design of the Universitat Politècnica de València (UPV) as both a pre- and post-test. In a previous paper the gain was analyzed (Vidaurre et al., 2019), and the focus here is if the results obtained in NCSU can be extrapolated to our courses in Spain. In this paper, we analyze the reliability and discriminatory capacity of the BEMA test, as measured by statistical tests, focusing both on individual items and on the test as a whole.

2. Design

This paper is focused on the reliability and discriminatory capability of BEMA for students of Electricity and Physics courses in Electronic Engineering and Industrial Automation (EEIA) and Aerospace Engineering (AE) Degrees, taught at the School of Engineering Design of the UPV. The BEMA pre-test was delivered to students during the first week of the course while the post-test was delivered at the end. The pedagogical aspects of both the EEIA and AE were quite similar, and the methodology used in both cases was a combination of flip-teaching (FT) and traditional methodology where the university's e-learning platform was intensively used.

The BEMA test was administrated following the usual instructions (time limit of 45 min, the same grade for all students who completed the test regardless the score) to 116 students out of 154 in the case of EEIA, and 61 out of 78 students in AE. Using all the data obtained, we performed 5 statistical tests, 3 of them focusing on individual test items and 2 of them on the test as a whole (Ding et al., 2006):

1. The **item difficulty index** is calculated as the ratio of the number of correct answers over the total number of students who tried the question, and it is a measure of the difficulty of a single question.
2. The **item discrimination index** measures the extent to which a single test item distinguishes students who know the material well from those who do not. For a specific test item, it relates the number of correct responses in a high-level group to the low-level group.
3. The **point biserial coefficient** is a measure of the consistency of a single test item compared to the entire test. Reflects the correlation between students' scores on an individual item and their scores throughout the test.
4. The **Kuder-Richardson reliability index** is a measure of the self-consistency of a whole test, by dividing a test into its smallest components.
5. The **Ferguson's delta** measures the discriminatory power of an entire test by analizing how widely the total scores of a sample are distributed in the possible range of scores.

3. Results

Since our objective was the evaluation of BEMA, in this paper we study post-test data in order to test statistics. The data and scores expressed as mean (25-75 percentiles) corresponding to the sample of students of the two courses who participated in the study are shown in table 1.

Table 1. BEMA post-test data results.

Course	Number students	Mean (p25-p75)	Standard deviation
EEIA	116	11.0 (7.0-14.8)	4.5
AE	61	11.8 (8.0-14.0)	5.0

Considering the data of each course, we performed the five beforementioned statistical test. The results of these calculations, expressed as mean (25-75 percentiles) for test items, are shown in table 2, where the indicated desired values are close to those obtained from NCSU (Ding et al., 2006).

Table 2. Summary of BEMA statistical test results for the two courses.

Test statistics	Desired values	EEIA	AE
Difficulty index P	≥0.3	0.37 (0.21-0.55)	0.39 (0.25-0.52)
Discrimination index D	≥0.3	0.25 (0.13-0.37)	0.25 (0.09-0.37)
Point biserial coefficient r_{pbs}	≥0.2	0.33 (0.20-0.44)	0.36 (0.21-0.53)
Reliability index KR-21	≥0.7	0.75	0.79
Ferguson´s delta	≥0.9	0.96	0.94

BEMA item difficulty index values range from 0.03 to above 0.9, with about half of the questions between 0.20 and 0.5 with an average difficulty index value around 0.38 for the two courses, which is above the desired value. Questions 28&29 stand out for having the lowest P value for both courses. Regarding the discrimination index D, it has been calculated dividing the groups into two according to the median, and most items have values between 0.1 and 0.4 (22 for EEIA and 18 for AE) with an average value of 0.25 for both courses. This is not in the desired range of values, and for this reason we have recalculated D using

25%-25% calculation and the average difficulty index values obtained have risen up to 0.36 and 0.50 for EEIA and AE respectively, which are above the desired value. Question 9 and questions 28&29 show the lowest D values for both courses.

The average point biserial factor obtained in BEMA is 0.33 for EEIA and 0.36 for AE, which are greater than the desired value of 0.2. This means that we can consider that BEMA items have a good correlation with the whole test. In the two groups, a majority of questions (24) shows a r_{pbs} higher than 0.2, indicating that they are reliable and consistent. Again, it should be noted that question 9 and questions 28&29 are the ones having the lowest r_{pds} values for both courses.

To get the reliability index, the Kuder-Richardson formula (Kuder & Richardson, 1937) has been used, which is the indicated one for a multiple-choice test where each question has only 2 possible answers: correct or wrong. A widely accepted criterion (Doran 1980) is that if the reliability index of the test is higher than 0.7, the test is reliable for group measurements, which is our case for both groups. If the reliability index of the test were higher than 0.8, then the test would be reliable for individual measurements, being the AE group very close to this value. Finally we found the Ferguson´s delta for BEMA test to be around 0.95 for both groups and since it is greater than 0.9 we can consider that the test offers a good discrimination.

4. Conclusions

The results from BEMA from a post-test from students of Electricity and Physics courses in engineering degrees (EEIA and AE at the UPV-Spain) were analysed statistically, focusing on reliability and discriminatory capacity. Post-instruction mean values and standard deviation for both degrees are in good agreement with those obtained in NCSU.

The analysis of the individual test items, by means of difficulty index, discrimination index and point biserial coefficient, shows average values higher than the desired values (adopted criterion) in the introductory E&M courses in both degrees, with slightly higher values for AE for difficultly index and point biserial coefficient. However, questions 28&29 stand out with the lowest values in both courses, indicating that probably the concept related to these questions should be emphasized. In addition, considering the test as a whole, the two indexes analysed (reliability index and Ferguson's delta) also have values higher than the adopted criterion. Based on the obtained results, we can conclude that the use of BEMA as a tool to measure students' understanding in the delivered E&M courses offers adequate discrimination and reliability.

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LEARNING ABOUT METHODS OR WORKING METHODICALLY

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Abstract

After gaining some years of experiences working and teaching in the field of Product design and development authors are presenting their reflections on the students' performance, the result achieved in the project based course but also their critical thoughts about the problems faced during their work.
In the last 7 years the course was redesigned and developed taking in consideration our own performance and result in training students to build competences in handling and solving design problems but also following the research in the area.
The problem highlighted in this paper is: regardless the well planned course content (including theories about product development process, different techniques and methods to define and solve the problems); neither matters how well the project tasks have been selected; the result from the course depends very much on how the students are taught to think and understand the process they have to apply. To teach them in so called "design thinking" it seems the biggest challenge for the university teachers in this interdisciplinary subject, because it is not only about gaining a knowledge in the subject area and development of skills to manage design problems but it is about achieving better students` performance. It is also to develop a "designer intelligence" - an ability to perceive or infer information, and to retain it as knowledge to be applied towards adaptive behaviours within an environment or context. (Mackay, 2018)
The research question for this paper is- "Is there a way to train students not only "automatically" to apply the methods learned but also to develop a holistic understanding about the product development process, competences and intelligence to work methodically on it?"

Keywords: Higher education, project based learning, product design and development, development of intellectual capabilities, design intelligence.

1. Introduction

1.1. Background

The course "Product design and development" at Linnaeus University, Sweden has over a decade history. The course is given mainly for mechanical engineering students; undergraduate level; third year. The course had duration of one term (approximately 8 weeks), 50% study time. One of the authors of this paper took over the responsibilities for the course seven years ago. The same syllabus was followed and the same course literature – "Getting design right – a systems approach".

Following the best practices in engineering higher education; understanding the interdisciplinary nature of the Product development process in the reality; and perceiving the need of teamwork done by specialist from different background, the course was redesigned to a project based course, with industrial projects and project groups of students were to work on it.

The Project based learning has been recognized, by the research in the area, as one of the most effective teaching frameworks for engineering courses. Benefits of applying project based learning approach occur via developing cognition (critical thinking), skills (e.g. teamwork, good oral and written communication, time management, etc.), and attitudes in the students. (Zancul, Sousa-Zomer, Cauchick-Miguel, 2017).

The industrial projects have been carefully selected – in order to reflect how the subject evolves; to take in consideration students' background. The problems were selected not to vary too much, so to keep similar difficulty and amount of work for the different project groups. A planning for the projects was done; so that the students could manage with performing of all the steps planed in the product development process and manage with the scheduled deadlines.

After having the course in six years and gathering some experiences a re-design of the course syllabus was planned for the fall 2018. Firstly, a need of changing course duration was recognized. It was ambitious and difficult for the students to fulfil all the requirements for the project in less than six real weeks (November – December). Something more, the authors have more than 30 years of teaching

experience in engineering graphics and they are fully convinced than development of Visual-spatial intelligence (Carroll, 1993) of students needs to be distributed in time. It needs time space so the new ability to be realized and applied by the student. The course from autumn 2018 has been planned so, to be placed in two terms (September-December).

Secondly, a need of adding some content of industrial design theory and practice was recognized and satisfied. A second teacher with corresponding background was involved in the course.

1.2. Problematization

The good organization of the course, the balanced schedule, rich of different activities, like company visits, guest lectures from the industry, industrial projects and project seminars resulted in one well appreciated by the students course. The faculty sees the positive sides of the new course syllabus but striving better course syllabus and better student performance some critical recapitulations and conclusions were done:

- The content of the course was well balanced and planed;
- Study visits and guest lectures from leading companies in the region have made the course unique and proved for the students that the theories, they were taught, are applicable in the reality;
- Despite the students were asked before the course start about their wishes about the type of products they wish to work in the projects, and those wishes were fulfilled they worked not with the expected inspiration;
- The time planned for project work was not used efficiently by the project groups;
- The main issue the faculty faced was the way students applied the theory for the different steps, because this affected the result of their work the most.

For each step of the Product development process different tools were presented in the theory, methods and techniques were studied, so that the process could be executed in the right way. Application of those methods needs a deep understanding of the process and perception of what exactly is the logical sequence in the methods used in the different steps - from defining the problem to development of a good solution. It is needed, almost in each step that the student is aware about the input data, to "dive", analyse, study it, and then to "surface", synthesize and define the result of the step, as an output from it. It needs abstract thinking and sense about the systematic approach to solving a problem.

The teachers in the course noted some weaknesses in students´ performants. Their work on completing the project tasks could be describe like flowing in two parallel lines. The one was to try to follow the product development process, attempting to apply the methods learned in a superficial way, without deep understanding and without using the achievements in the next steps. While the second one was to work on solving the problem in completely unstructured and not systematic way. In addition, there was any coherence between those two lines.

This observation made the faculty to set the question of this study – "Is there a way to train students not only "automatically" to apply the methods learned but also to develop a holistic understanding about the product development process, competences and intelligence to work methodically on it?"

2. Objectives and methods

Objective of this study is to develop a new approach to the learning process that will result in better students´ performance. The effect of this new model should result in more developed intellectual skills applied in the six fields defined by (Bloom, 1956) as follows:

- Knowledge - the acquisition of knowledge as the subject to study, and also the related areas;
- Comprehension - understanding of knowledge, organization and relating the new knowledge with previously learned, restructure the information and interpreting the main ideas;
- Application - using the new knowledge, following certain principles, in new situations;
- Analysis - critical thinking, concentration of attention on individual pieces of information, their importance as a whole, ability to compare ideas ant to make conclusions, formulate hypotheses, assumptions, ability to "dive" into the problem;
- Synthesis - critical thinking, focused on connecting selected, pre-analysed data parts into new knowledge, ability to generalize, to "surface" and formulate a final conclusion;
- Evaluation - critical thinking, focused on formulation of a judgment, an assessment, ability to determine the accuracy and reliability of facts and data selected to prove the method and the result.

Actually, Bloom´s taxonomy was one of the basic approaches when the syllabus for the course was developed.

In the subject area of Product design and development the outlined intellectual competence, applied in the six defined fields, could be named "design intelligence". The main purpose of the new approach to the learning method is to enhance the "design intelligence" of the students.

The methods of this study are based on a two popular models. One is the "cone of learning" or also called "learning pyramid" according (2014). The second one is the 70.10.20 model for learning and

development of competences. (Camarda, 2016) The both methods are well known, they appear in many publications in different subject areas. From other hand both of the models have been debated, they are controversial and have weak empirical bases. Despite that fact, both of the models have been used in this study as milestones in analysing the weaknesses in students` learning and to define new strategies for enhance their performance by development of new intellectual competences.

3. Design

Based on the objectives and methods presented in the previous chapter an improved learning model for enhancing the students' performance in the course Product design and development has been suggested:

- The active, project based learning will be the base of the course;
- Even more careful selection of the project tasks has to be done so that the product in design and development scope will inspiring for the students, with a structure close to their background but also providing enough wide design space to free students creativeness.
- Participatory teaching methods are to be more widely applied – re-designing the classical type of lectures in discussions, students will be involved in "teaching others" activities;
- Demonstration and presenting educational examples will be used in order to understand the logical connections in the process and to develop an abstract thinking;
- The industrial design content of the course will be taken fully in workshops sessions;
- Deadlines are to be planed weekly instead for the three main phases of the process, different type of presenting the result for each deadline will be required – seminars, presentations, models, written document, so that the intensity of work on the project is constant, and there is a lull and then overload;
- Feedback will be intensified – for each deadline, weekly;
- Learning by doing is to be applied – firstly applying the different tools and methods in the process, but also the practical work will be intensified, involving students not only in sketching and virtual modelling, but also in building different models in the different steps of the process- scaled models, paper models, 3D printed models etc.
- New requirements to the report writing are to be defined.

4. Conclusions

As teachers at university, we are in a constant urge to improve the quality of the product of our work. In this process, we are dragged by the intention to have successful students, performing well, with highly developed knowledge and intellectual capabilities and we are pushed by so many requirements to the education from different parts.

Already after the first run of a new course an observation could be done what is good, what is week and what could be improved in the teaching methods and learning models. In the study, such analysis was done based on two popular models – 70.20.10 model for learning and development and the learning pyramid. The main problem was found to be the lack of deep understanding of the methods learned and their superficial application, so that they cannot contribute to one methodical and successful process of product design and development.

Some new approaches, to the learning model, have been proposed, in order to improve the learning model and to conduce to development of specific intellectual capabilities of the future engineers that we can name "design intelligence".

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THE AGE OF NEW COMMUNICATION – THE SCREENERS PROJECT

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Abstract

The technological revolution which legitimised the everyday use of computers shows that we are increasingly moving from textual cultural expression to visual/hypertextual. Following books, the Internet has become the new data-medium invention involving a new type of literacy, and it still remains relatively under-researched. Aside from art, new media connected with technical advances has the potential to transform the culture of mass society by means of easily available visual data with various purposes and functions. This contraposition of postmodernity and technologism is also significant in analogue artwork because it determines a new approach to working with visual information as well as changed attitudes towards means of expression in art education.

Contemporary life in our globalised society has already been manifested in two ways: everyday 'biological life offline' in the present without devices and 'virtual life online' though screens. The Screeners project is inspired by David Cronenberg´s screenplays about our obsession with new technologies, in terms of our desire for something new, and the threat of us becoming dominated by these technologies. In his work, Cronenberg also attempts to depict the transition from humanity to post-humanity up to robotics. Everyday situations contemporarily manifested through frequent use of various screens (smartphones, tablets, TV-screens, computers) might already signify the end of traditional communication. Moreover, mobile phones enable us to switch our minds into another virtual reality within a single moment. A growing number of people are increasingly beginning to find it natural to integrate their 'self' as an additional new virtual identity into their life. My focus is on my students born after the year 2005.

Keywords: Extended reality, internet, virtual representation, identity, communication.

1. Basic characteristics and objectives

Biological life offline (life in the present without any screens) and virtual life online (digital and with screens) if we evaluate and compare them with each other, we can see the difference. I use the perspective of variability (identity), simulation, timelessness, representation, and specific self-presentation and self-realisation. I am interested in how my students reflect the difference in the way they experience life though their screens (devices) and their life and communication in the present (presence without mobile phones). What does communication online allow students to do, and what are they allowed to do via personal communication?

How can we currently examine our life? 'What we usually call reality is a "cut". But is the reality in which we live the only possible one? The same material (everyday life) can be transformed into different versions of reality.' (Bourriard, 2004).

2. Theoretical background

2.1. Virtual self versus personal presentation

In the theoretical part, I will conceptualise 'self-presentation' helped by the theories of Jean Boudrillard. I will employ the theoretical framework of *Simulacra and Simulation* and categorise it in individual internet communication platforms and networks. I will focus on the 'avatar' concept as well as the types of virtual identities users can customise themselves and the way they work with this identity. I am also interested in how new tools can be used for the realization of a 'new type of self-presentation' or self-realisation.

2.2. Human–user

Easy-to-understand 'joy' and instant satisfaction as a specific simulative platform, which every user can realise through a variety of software applications and phone games, is aimed at the contemporary technologically accelerated society. Every day, something new is invented which is better and which makes life easier. A study that has already been conducted in the area of neuroscience is trying to warn us against 'digital dementia' (Manfred Spitzer). New technologies are changing our habits and thinking, and they influence our social values and preferences. It will also be necessary to address the concept of neoliberalism and the shades of modern concepts of capitalism, which are often referred to in contemporary philosophical essays attempting to capture the 'expanding' present in its virtual representation; for example, in the theories of William Storr, Alfie Bown, and Marcus Gilroy-Ware.

2.3. The nature of new media

The nature of new media is examined in detail in the theoretical framework of Lev Manowich, who focuses additionally on specific axiological outputs which I will employ in my work as well. It is certainly also interesting to realise how new media and technology reflect a certain human essence. Based on the theories of Palo Fabo, it is possible to say that despite being a machine, the 'thinking' and operations of a computer are a thoughtful and realised overcoming of human limits by humans themselves, regardless of how computers are used.

3. Research questions

From the axiological perspective of our two-sided contemporary world, which values biological life offline and virtual life online stand in opposition? Each one of them has different rules. Which rules from the virtual life come to light in everyday direct communication? What is the difference between these two poles? What are students learning from their 'extended and virtual reality'? Can the experience from the virtual reality be transferred into common life, and in what way? How can we examine social change in art education and in students' artwork? Which social aspects can we talk about if we explore this area?

4. Research process

Within the media education classes (integrated into art education), I have already conducted a research probe. Students were given an assignment to create a mental map on the topic 'online virtual world with a screen' and 'biological world without a device'. I was interested in the actual situation regarding the use of digital devices, whether using the internet, social networks, or games. I was interested in seeing what values would emerge as part of the assignment.

5. Survey

I summed up the values which appear in mental maps for each topic separately. For the axiological evaluation of the mutual discourse of two opposing subjects **reality** (a representative of biological life) and **online** (virtual life) I was searching for symbolised values which can be contraposed against each other. I'm still collecting visual data from mental maps.

From the perspective of the prism of the research question, even a seemingly simple task displays aspects or moments which I include in the research. For example, the strong integration of younger students' personal Facebook profiles into their real lives when completing the 'false identity' assignment. Or, when conducting a 3D modelling project 'My Room, My Space', my colleague and I were surprised by the natural presence of many screens in these physical models. In many of them, they even replaced the windows (window as 'window').

6. Conclusion

My research is still in the process of qualitative evaluation. The aim of this study is to portray the difference between life in the virtual world behind screens and life without screens. Some theoretical predictions envision a transition to the 'singularity', while others theorise the current accelerated technological progress as a social experiment with a big question mark. It is nonetheless clear that the intergenerational communication gap is becoming ever wider. The development of technology and media is also influencing the process of learning and education.

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THE ROLE OF THE EDUCATION SYSTEM IN SOLVING THE SKILLS MISMATCHES ON THE LABOR MARKET

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Abstract

The good functioning of the labor market depends to a large extent on the matching of skills and qualifications to the demands of employers. Significant and persistent mismatches over time, between training, skills, qualifications required and offered on the market can be costly for employers, workers and society in general. Countries are currently facing challenges such as technological and demographic changes that may contribute to deepening skills mismatch in the future.

The purpose of this study is to analyze the correspondence of qualifications in the labor market through the over-qualification rate and the evolution of the Beveridge curve and to contribute to a better understanding of the role of education and training system in solving the mismatches of qualifications in the labor market. The analyses are conducted in dynamics, over the period 2007-2017, at EU level and in two particular cases, Romania and the UK. The data underlying the "normative" measurement of the over-qualification rate, as well as the data used to draw the Beveridge curve, a widely scale used analysis tool in the literature to highlight the balance of the labor market, are derived from official EUROSTAT statistics. Analyses show that the over-qualification rate has increased over the considered period at the EU level and in the cases analyzed, especially among women. Furthermore, the results illustrate the need for additional efforts in order to achieve a balance on the labor market.

Keywords: Qualification mismatch, over-qualification, Beveridge curve, labor market.

1. Introduction

In the OECD Survey of Adult Skills (PIAAC) conducted in 24 OECD countries, around one third of workers were found to be over or under-qualified for the workplace, while a ratio of one to six indicates a mismatch between existing and required skills for their workplace (OECD, 2016). Most over-qualification data presented in Holmes and Mayhew (2015) suggest that over-qualification has increased over time. McGowan and Andrews (2015), which explored the link between labor market mismatch and labor productivity, based on PIAAC data (OECD Survey of Adult Skills) argue that over-qualification and quality mismatch is associated with lower labor productivity due to a less efficient allocation of resources. Grip, Loo, and Mayhew (2002) also argue that workers with sufficient and up-to-date qualifications are more productive and have greater potential to remain in employment. Therefore, it is necessary to improve the ability of economies to efficiently manage their existing stocks of human capital in the context of demographic aging and the decline in working-age population. Changes in supply and demand as a result of technological progress have been reflected in the incapacity of employers to fill vacancies with people with the necessary skills. Various sources have shown that four out of 10 EU employers have declared in 2013 that they have difficulties in finding the right recruitment skills (CEDEFOP 2018). Regarding the influence of technological advances on the world of work, it is estimated that until 2025 about 48% of all job opportunities in Europe will have to be filled by tertiary qualified persons (CEDEFOP, 2016) and the European Skills and Jobs Survey (ESJS) estimates that around 85% of all EU jobs require at least a basic level of digital competence (CEDEFOP 2015).

An effective education and training system should lead to lower levels of persistent non-correspondence between graduate skills and those required by the labor market. Higher education institutions need to ensure that they equip graduates with relevant and up-to-date skills (Europeen Commission 2016). Given that national imbalances can spread, regular studies are needed to assess and anticipate skill needs and potential surpluses and deficits, which are an important reference in the development of employment and education policies.

2. Objectives, indicators and tools used

In this article, we aim to identify the similarities and differences between the EU, Romania and the United Kingdom (UK) as regards the correspondence of labor market qualifications and to understand the role of the education and training system in addressing the lack of correspondence of qualifications in the labor market. Romania was introduced to identify certain deficiencies, pluses or convergence compared to the EU or the UK, which can be an important knowledge base for the design of national policy instruments. The UK was choices for two reasons: 1. The OECD Survey of Adult Skills (PIAAC) concluded that England and Northern Ireland had one of the highest over-qualification rates (30%), the second after Japan in the decreasing hierarchy and 2. to compare the situation on the Romanian labor market with an economically advanced EU Member State. The analysis of labor market dynamics of matching will be done between 2007 and 2017, using the over-qualified rate indicator and the Beveridge curve instrument, based on EUROSTAT data. These indicators were used as there are no commonly agreed indicators in the European Statistical System (SES) to measure the matching of qualifications.

The over-qualification rate refers to "vertical" skills mismatches, analyzing the discrepancies between education and occupations. The over-qualification rate was measured as the ratio of higher education graduates (ISCED 5-8) employed in non-tertiary occupations (ISCO 4-9 groups) and people with higher education.

The Beveridge Curve is a graphical representation that highlights the inversely proportional relationship between the vacancy rate and the unemployment rate. The efficiency of the functioning of the labor market is highlighted by this instrument as a result of the analysis of the curve movements, as follows: the movement along the curve is determined by the economic cyclicality; the movement of curve to the interior or exterior are determined by structural factors such as incompatibility between available jobs and professional training for the unemployed or the extent to which existing jobs are disappearing.

3. Results

3.1. Over-qualification

Over-qualification estimates the amount of skills, abilities and knowledge of an under-utilized workforce that could be better used, especially if there are employers who do not find highly qualified workers. At an individual level, over-qualified workers tend to earn more than others in the same job, which may indicate that their productivity is higher than that of workers whose competence corresponds to that required by the workplace. However, at the macro level, analyzing the degree of over-qualification of the workforce is important to ensure that its skills and knowledge are used to the full potential and where they are needed. The issue also has inter-generational implications, given the need to make full use of available human resources in the context of an aging population to ensure the sustainability of social security systems incorporating fairness and solidarity between generations in society (European Commission, 2017). Over-qualification is most often seen as the incapacity of employers to fill vacancies, despite the high unemployment rate. According to the results of the Cedefop survey (2014), about 25% of highly qualified people at EU level were over-qualified for their position.

The over-qualification rate in 2017, in the analyzed cases, are the following: 22.7%, EU28; 23.3%, AE19; 25.7% UK and 17.7% Ro. The share of people with higher education in jobs that do not require such training increased by 1.9% (EU28); 1.3% (AE19), 2.1% (UK) and 9% (RO) in the analyzed range. Although Romania has the lowest value for this indicator, it recorded the highest growth.

Figure 1. Over-qualification rate during 2007-2017 (%).
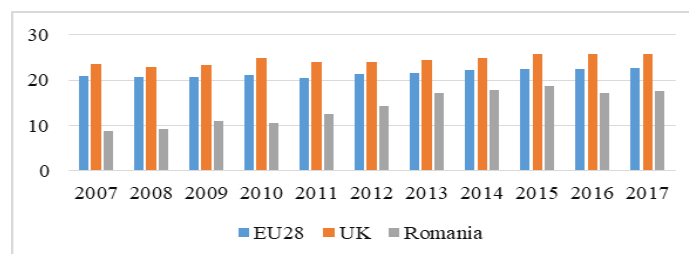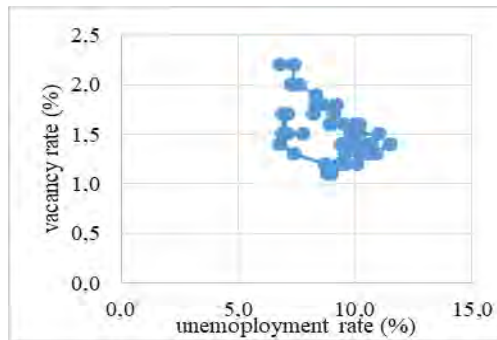

Source: EUROSTAT data

3.2. Beveridge curve

In the EU28, since the end of 2013, a movement along the curve was again visible, reflecting economic expansion with the rise in vacancies and declining unemployment. In 2017, especially in the second semester, vacancies increased sharply and more than the fall in unemployment, suggesting that

skills mismatches could prevent an improvement in the unemployment rate. This would mean that the unemployment rate is approaching its structural rate, which is the rate that could not be further reduced by economic growth. In Romania, 2010-2013 period is characterized by specific elements of the economic crisis, namely the rate of low jobs and a high unemployment rate. The economic recovery starting in 2013 is also on the right-hand side of the recession curve, as in the case of the EU28, but from 2016 the curve moves to the left, indicating a stagnation in the vacancy rate, amid a reduction in the unemployment rate. The low unemployment rate, combined with a general fall in the labor force and persistent shortages in qualified personnel, has led to rigid conditions on the national labor market. In the Beveridge curve for the UK, there is a decline in unemployment coupled with the rise in vacancies, revealing a strong economic recovery.

Figure 2. EU28, 2007-2018 *Figure 3. Romania, 2007-2018*

Source: EUROSTAT data
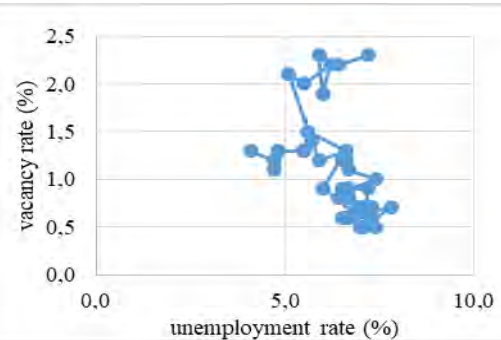
4. Conclusions

The lack of qualified staff due to aging and falling work force and labor market miss-matching have a negative effect on competitiveness. The fall in unemployment rate close to structural value and the growth / stagnation of vacancy rates indicate the need to increase labor market participation, including of the low-skilled and other vulnerable groups. Also, the increase in the over-qualification rate over the last period illustrates inefficient use of the workforce and therefore lower productivity. Over-qualification often hides the heterogeneity of qualifications, so it cannot be the result of a quantitative mismatch between the number of tertiary graduates and the number of graduate job, but rather a skill issue that new employees do not have despite having a degree tertiary. The immediate response of the education system to changes in the demand for qualifications is also crucial, especially in the context of technological progress and innovation. Adult learning and training should address both obsolescence qualifications, continuous training for top-notch qualifications, and new skill requirements due to technological change.

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TOWARDS HIGHER EDUCATION DATA HYGIENE – A CASE STUDY

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Abstract

While developments in data analytics have provided unprecedented opportunities for Higher Education Institutions (HEIs) to understand themselves and fulfill their missions, it remains a challenge to maintain good institutional data hygiene, with well-known barriers including lack of incentives beyond regulatory compliance, and thus lack of data sharing within the institution (Krawitz, Law, and Litman, 2018). The paper is a case study of the efforts of NYU Shanghai to improve institutional data hygiene when building the infrastructure for analytical transformation, with its nature as a Sino-US joint venture adding to the complexity. By addressing the above-mentioned challenges through establishing a central workgroup, actively utilizing regulatory reports, and engaging operational units into the process of defining and visualizing institutional data structure, NYU Shanghai made significant progress, including successfully initiating its Data Warehousing Project to integrate data silos and to improve institutional data hygiene at large. The paper also discusses how the experience of NYU Shanghai may be applied to other HEIs at a similar stage of data maturity.

Keywords: Higher education institutions, data hygiene, regulatory compliance, data silos, analytical transformation.

1. Background

Developments in data analytics have provided unprecedented opportunities for Higher Education Institutions (HEIs) to understand themselves and fulfill their missions. However, often underrepresented in the discussion is the importance of building a foundation for analytical transformation through institutional data hygiene (Jones, 2017), the collective processes to guarantee data integrity (Rouse, 2013), to which well-known barriers include lack of incentives beyond regulatory compliance, and thus lack of data sharing within the institution (Krawitz, Law, and Litman, 2018).

The objective of this paper is to first, through the case study of the efforts of NYU Shanghai towards institutional data hygiene, provide an example in this regard for other HEIs at a similar stage of data maturity. It also aims to raise awareness, and initiate a comprehensive discussion, both in and out of the university, on the risks of poor data hygiene.

2. NYU Shanghai and its data characteristics

New York University Shanghai (NYU Shanghai) was jointly founded in 2012, by New York University in the United States and East China Normal University in China. Located in Shanghai, the university enrolled its inaugural undergraduate cohort in 2013, and graduated its first class in 2017. It has so far grown into a campus with about 1300 full-time undergraduate students and 200 full-time faculty.

The institutional data at NYU Shanghai were characterized by three underlying factors. Being a comprehensive research university indicates a wide scope of data domain areas and a complex data structure, while the small scale allows more accuracy and resilience in locating and addressing institutional data hygiene crux. Besides, as the first Sino-US joint venture, NYU Shanghai has a unique dual identify, being both an independent university in China, and part of the global network of NYU as a degree-granting campus, which not only requires compliance with both systems, but also poses additional challenges to the dynamic data processes.

The university initiated its efforts towards institutional data hygiene in 2017, as the first step of its attempt to build the infrastructure for analytical transformation. The efforts were facilitated at this time for two reasons. After going through an entire student life cycle from application to graduation, NYU Shanghai had obtained the knowledge and experience of a fully-functional university, as well as the

institutional data generated in the cycle, and had equipped itself for such data initiatives. Besides, it was also before the data issues accumulated at the bottom of operational systems, providing more flexibility in addressing the identified issues.

The data characteristics at NYU Shanghai make it a suitable subject for this case study, taken into consideration the generalizability of its experience to other HEIs due to its comprehensive and complex data landscape; the feasibility of in-depth analysis of institutional data hygiene from the small scale and lack of historical burden; and also the specificity of the discussions in which it is involved, derived from its dual identity, in the wave of the internationalization of higher education.

3. Towards institutional data hygiene

The initial efforts of NYU Shanghai to improve institutional data hygiene were unfolded in three parts, respectively establishing a central workgroup, actively utilizing regulatory compliance reports, and engaging operational units into the process of defining and visualizing institutional data structure. The three elements intertwined with each other to address the institutional data hygiene challenges by incentivizing and enabling data sharing and integration among data silos.

3.1. Establish a central workgroup

Similar to Conway's law that "organizations which design systems … are constrained to produce designs which are copies of the communication structures of these organizations", data silos are usually created by operational silos within the institution, where lack of interactive collaboration beyond minimum sufficiency is preventing active data sharing and integration.

In order to connect the data silos, an Institutional Research Workgroup (IRWG) was established at NYU Shanghai in 2017, led by university's Associate Vice Chancellor. With a wide range of centralized data initiatives on its agenda, the workgroup has also been serving as a liaison among operational units, both administratively and statistically. The core of the connection is a reciprocal process, where IRWG addressed data integrity issues directly through integrating data from different operational units and performing data audits, and indirectly through collecting data needs from operational units, and eliminating needs for quality-threatening shadow systems, which are siloed spreadsheets or databases, for example, stored on user's computer, usually derived from the failure of central systems to meet their needs.

Instead of instilling the function in an existing unit, the new IRWG is functionality-driven, enabling it to push data flow among units beyond traditional practice, and to integrate unit-specific needs into a larger central initiative.

3.2. Actively utilize regulatory reports

Instead of articulating a new data mandate to add to the busy daily routine of operational units, NYU Shanghai adopted a different strategy to actively utilize regulatory compliance reports that had already been on the task list of the units.

The establishment of IRWG provided an opportunity to systematically investigate the multiple regulatory reports beyond the capacity of any single operational units. A series of steps targeting institutional data hygiene were employed, with the above-mentioned data audits being the initial step. After the audit of the regulatory reported data, there were two major findings in addition to successfully identifying data integrity issues. The first was that the regulatory reported data highly overlapped with core institutional data, thus making it a good representation of institutional data status and a start point for data hygiene efforts. The second was a reinforcement of data silos in the reporting process, where operational units independently provided data in their own subject areas, which had resulted in struggles in fulfilling the requests, especially from both Chinese and US sides that did not naturally reconcile with each other. A re-visit of the reporting process, with IRWG coordination at the center, formed a larger picture for all operational units to better know how they fit into the puzzle of institutional data, instead of being isolated in their own.

Being an existing and struggling task for operational units, the active utilization of regulatory reports not only incentivized data sharing among units, but also brought the units to work together.

3.3. Engage operational units in visualizing institutional data structure

Despite the essence of IRWG in forming centrality of communication, the successful engagement of operational units in the efforts towards institutional data hygiene, from the beginning, was key to the accomplishments of the university.

The subject matter expertise of operational units was leveraged in the process of investigating institutional data status, and visualizing institutional data structure. IRWG conducted several rounds of communication with operational units for these purposes, and multiple units in different stages of the same data pipeline were gathered to discuss the matter together, such as Academic Affairs and Registrar on student study-away and course election. The communication guaranteed that the conclusions are based on coherent and shared understandings.

As the frontline data custodians, operational units also had more ownership and accountability in maintaining data hygiene through their direct engagement in visualizing institutional data structure.

4. Accomplishments and implications

Through the above-mentioned efforts, NYU Shanghai has made significant progress towards better understanding of its data, and thus better institutional data hygiene. An Institutional Core Data Inventory has been developed, which serves as a uniform and sole source of reference for core institutional data items, a visualization of the institutional data structure, and a documentation of the metadata. Besides, Institutional Data Reporting has been coordinated and streamlined to both guarantee data integrity and address business priorities. The efforts culminated in the initiation of the first institution-wide Data Warehousing Project, which would provide the infrastructure to reinforce the accomplishments so far by avoid system-perpetuating data silos, and also lays the foundation for further analytical transformation of the university.

The experience of NYU Shanghai can be applied to other HEIs at a similar stage of data maturity, in following aspects. Both technical and subject matter expertise need to be leveraged and brought together in these efforts, as they respectively hold perspectives of methodology enhancement and business priorities. An interconnecting part between the two expertise is extremely beneficial in terms of communication efficiency and standardization, as well as targeting immediate business needs to gain buy-in from operational units. Last but not least, advanced data users in operational units are valuable resources and pioneers that can drive changes in their own units if engaged appropriately.

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VIRTUAL PRESENTATIONS

TEACHERS' EDUCATIONAL AND MISBEHAVIOR MANAGEMENT STRATEGIES IN WORKING WITH PRIMARY SCHOOL STUDENTS WITH ATTENTION DEFICITS[*]

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Abstract

Children with attention deficits are usually integrated in regular primary school classes in Croatia, without any special educational treatment nor interventions. Teachers, whose primary education does not include educational methods for working with children with developmental disabilities or procedures of inclusion of such children in regular classes, must do their best to be successful in education and integration of this specific group of children.

The main objective of this research was to determine the differences in use of educational strategies (upbringing and teaching) and misbehavior management (positive and negative) among primary school teachers working with children with attention deficits in respect of their gender, level of education, years of work experience and whether they teach in lower or upper grades of primary school.

The research covered 31 primary schools from 3 counties of the eastern part of the Republic of Croatia. Participants were teachers (N=103) teaching in lower grades (from 1st to 4th) (51%), and in higher grades (from 5th to 8th) (49%) of primary schools. 12.8% of them were male and 87.2% female teachers. Teachers gave estimations for their students who had attention deficits (N=305), 85.6% (N=261) were male and 14.4% (N=44) were female students. The age span of estimated students was 7 to 15 years, and the average age was 10.69 years (SD=2.26). Teachers filled out the Educational desirable behavior-oriented strategy scale (upbringing and teaching subscales) and the Scale of misbehavior management strategy (positive and negative discipline subscales).

The results implicate that teachers in the lower grades of primary school use more positive disciplinary strategy than teachers in the higher grades of primary school. The results of the research have shown that teachers working with children having attention deficits more often use the educational strategy of upbringing than teaching. Teachers from lower grades of primary school and also female teachers more often used the educational strategy of upbringing. As in Croatia formal education for primary school teachers teaching in lower grades of primary school differ from the education for teachers teaching in higher grades of primary school, it can be concluded that teachers in lower grades of primary schools are more sensitive and better educated for working with children with attention deficits.

Keywords: Attention deficit, educational methods, discipline, teachers.

1. Introduction

In school, children with attention deficits have difficulties with fulfilling their obligations, organizing themselves, looking after their things and losing them, they are distracted by the stimuli from the environment and they do not respect the given instructions (Bouillet, 2010). Students with ADD, if not having other difficulties, do not need to adaptation of teaching content, but in the work with them it is important to individualize the methods of teaching with an emphasis on their strengths (Zrilić, 2013). Ivančić (2010) further emphasizes the importance of applying appropriate educational strategies.

Previous studies suggested that teachers in lower grades of primary school (or class teachers) were more likely to use appropriate educational strategies in dealing with students with deficits such as: prolonging exam time, providing assistance and motivating other students to provide support and assistance (Martan, Skočić Mikić, & Puljar, 2016). In addition, younger teachers have a higher level of emotional intelligence which would mean they are more effective in leading the classroom and also female teachers have a more developed interpersonal dimension of emotional intelligence (Di Fabio

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& Palazzeschi, 2008). Teachers who teach in lower grades of primary school use different educational strategies, most of which are writing, drawing, talking, and creative activities while teachers in upper grades of primary school (subject teachers) reduce variety of their educational strategies (Buljubašić Kuzmanović & Petrović, 2014). Game proved to be an important educational method (Nikčević Milković, Rukavina, & Galić, 2011), and it was more often used by class school teachers (i.e. several times a week).

When there is a student with disabilities or disorders in the classroom, maintaining the class discipline could be problematic. Rijavec and Miljković (2015) described that in the model of positive discipline everything is a matter of agreement, there is no place for rewards and penalties. If a student does something that violates the discipline in the class, the natural consequences will follow. The Model of assertive (negative) discipline is directed to the teacher and it is based on setting rules and corrective actions. Rijavec and Miljković (2015) concluded that the model of negative discipline is more efficient in the short run, while on the other hand for long-term impact it is a more appropriate model of positive discipline.

Recent research has shown that teachers (81.6%) are willing for further education for working with students with disabilities, but also a large number of teachers (83%) stated that they are not offered such education (Goldin, 2017).

1.1. Objectives

The main objective of this research was to determine the differences in use of educational strategies and misbehavior management among primary school teachers working with children with attention deficits. As teachers by themselves estimated which children have attention deficits, it is important to know if they behave differently regarding their own personal characteristics.

First, use of educational strategies (upbringing vs teaching) in working with children with attention deficits was checked, i.e. it was assumed that in working with attention deficit children teachers have to use upbringing educational strategies more often than teaching ones.

Second, use of misbehavior management (positive vs negative) in working with children with attention deficits was checked, i.e. it was assumed that in working with attention deficit children teachers have to use positive disciplinary strategies if they want help include children in regular class.

Third, differences in use of educational strategies (upbringing and teaching) and misbehavior management (positive and negative) in respect of their gender and whether they teach in lower or upper grades of primary school (class vs subject teachers), were examined. It was assumed that female teachers (because of more sensitive and caregiving nature of woman) and class teachers (because they spent more time with a specific child and have a better education about inclusion of students with developmental disabilities in regular schools) use more often upbringing educational and positive disciplinary strategies.

2. Method

2.1. Participants

The research covered 31 primary schools from 3 counties of the eastern part Republic of Croatia. Participants were teachers (N=103) teaching in lower grades (from 1st to 4th) (51%), and in upper grades (from 5th to 8th) (49%) of primary schools. 12.8% of them were male and 87.2% female teachers. In average, teachers estimate that they know student for 2.5 years (SD=8.43), with giving him on average 11.25 classes weekly (SD=8.43). The average teachers' age was 41.3 years (SD=9.76), and average working experience in schools 16.53 years (SD=10.01).

Teachers gave estimations for their students who had attention deficits (N=305), 85.6% (N=261) were male and 14.4% (N=44) were female students. The age span of estimated students was 7 to 15 years, and the average age was 10.69 years (SD=2.26). There were 51.2% of students in lower grades and 48.8% in higher grades of primary school.

2.2. Instruments

At the beginning, the teachers fill out the questionnaire about some general data: their sociodemographic data (age, gender, years of professional experience, subject that they teach and grade in which they teach) and data about students for whom they filled out the questionnaire (age, gender, grade, academic success).

Educational desirable behavior-oriented strategy scale (Kovačić & Vlah, 2018) was constructed for the purpose of a larger project. It consists of 24 items which operationalize only those aspects of teacher competence regarding practical teaching methods. For the purpose of the obtained study two educational subscales were used: the upbringing subscale (k=12, Cronbach α=0.77) examines the teacher's frequency of application of educational methods such as communication, collaboration, listening and encouraging (e.g. *I reward students for doing tasks on time*), and the teaching subscale (k=12, Cronbach α=0.76) examines the teacher's frequency of application of educational methods such as text reception, learn how to learn, evaluation of their educational methodology (e.g. *In a suitable way,*

I emphasize words, images and concepts to focus attention to them). At 7-point Likert scale, teachers should assess how often a particular educational method they applied in working with students, whereas as 0 means - almost never, 1 - very rare, 2 – rarely, 3 - often, 4 - very often, 5 - almost always, 6 - always. The overall result is the arithmetic mean of the particular items.

The scale of misbehavior management strategy (Martin, Linfoot & Stephenson, 1999) was translated and validated as a part of the project aims. It consists of 24 items, and for the purpose of the obtained study it has been split into two subscales: positive discipline (k=14, Cronbach α=0.79) measures frequency of teachers' use of positive disciplinary strategies when student misbehave (e.g. *I speak with the student*), and negative discipline (k=10, Cronbach α=0.67) measures the frequency of teachers' use of negative disciplinary strategies when students misbehave (e.g. *Sending students to the corner / back of the room*). At 6-point Likert scale teachers should rate how often they are using described procedures in working with the student, whereas value 0 represents never, 1 - rarely (no more than once a month), 2 - occasionally (two to three times a month), 3 - frequently (at least once a week), 4 – regularly (at least once a day) and 5 - always. The overall result is the arithmetic mean of the particular items.

2.3. Procedure

The data collection process took place during the summer semester of 2018. At the beginning of the data collection process, school principals were contacted via e-mail or during personal visits to the schools. After they gave consent for the school to participate in the research, the official letter from the Faculty of Education in Osijek was sent to the schools. After the schools received the letter, co-operation was agreed through the research coordinator, i.e. pedagogues or psychologists working in the particular school. The questionnaires that the teachers were supposed to fill out were sent to the schools and the research coordinators distributed them to the teachers. The completion of the given questionnaires was voluntary and their anonymity was emphasized. After the coordinator was informed that all submitted questionnaires were completed, the main researchers personally picked them up.

3. Results

The preconditions for conducting parametric statistics were met so the data was analyzed by paired-samples t-test and ANOVA. In processing the results, descriptive statistics for the variables included in the study (Table 1) were calculated first. Indexes of asymmetry did not exceed values greater than ± 4.00.

Table 1. Descriptive statistics for measured variables (N=305) and paired-samples t-test results.

Variables	N	Min	Max	M	SD	Paired-samples t-test	p-value
Upbringing educational method	305	2.08	6.00	4.23	0.68	19.90	0.00
Teaching educational method	305	1.50	6.00	3.54	0.88		
Positive discipline	305	0.30	4.57	2.87	0.71	32.96	0.00
Negative discipline	305	0.00	3.75	1.26	0.57		

In table 1 the results of paired-samples t-tests have shown that teachers more often use upbringing educational methods compared to teaching ones, and also more positive discipline compared to negative ones, in working with children with attention deficits.

ANOVA results for gender differences have shown only one significant difference ($F_{(1,304)}$=7.11, p<0.01), i.e. female teachers used more often upbringing educational method (M=4.27, SD=0.66) in comparison to male teachers (M=3.96, SD=0.76) in working with children with attention deficits.

Finally, statistically significant differences were found between class teachers and s subject teachers. Class teachers more often use upbringing educational methods ($M_{(class)}$=4.40, SD=0.59 vs $M_{(subject)}$=4.03, SD=0.73; $F_{(1,304)}$=22.35, p<0.01) and more positive disciplinary strategies ($M_{(class)}$=3.06, SD=0.63 vs $M_{(subject)}$=2.65, SD=0.74; $F_{(1,304)}$=27.13, p<0.01).

4. Discussion

According to statistical data, the frequency of diagnosis of attention deficit disorder is 5% in most cultures (APA, 2014), which means that students with these disorders can be found in each class. In addition, there are a large number of children who may show symptoms of attention and concentration problems but have not yet been diagnosed. In the Osijek-Baranja County it is about 25% of these students in primary schools (Velki & Dudaš, 2016).

In accordance with the first research objective, it has been confirmed that primary school teachers working with students with attention deficits are more likely to apply upbringing educational strategies in relation to teaching ones. By applying upbringing educational strategies, teachers encourage the students' development of positive relationship to tasks and self-improvement, and the students' participation in the activities. According to the results of previous research, when working with children with learning disabilities teachers often try to apply the upbringing educational methods of co-operation, encouragement, communication that is manifested in encouraging other students to help, providing support and creating positive emotional school climate (Martan et al., 2016). Teachers often use upbringing educational methods such as creating opportunities which help students with disabilities emphasize their strengths.

Furthermore, it has been confirmed that teachers in lower grades of primary school use more positive disciplinary strategies in working with students with attention deficits. Positive disciplinary strategies include talking to a student about his behavior, praising and highlighting good student behavior, emphasize examples of his own good behavior, encouraging peer support, and other ways of creating a two-way relationship between student and teacher based on trust. The positive relationship between the teacher and the student with disabilities reduces the symptoms of difficulties and problems of student behavior (Masoumparast, 2016). The greater usage of positive disciplinary strategies than the negative ones shows the greater competence of teachers in working with students with attention deficits.

Finally, the last objective results have shown that female teachers more often use upbringing educational strategies in comparison to male teachers. In fact, women are by nature more emotional, more patient and show a greater degree of empathy towards their students. They give students more personal information and practice examples that can teach them different values (Di Fabio & Palazzeschi, 2008). They successfully interact with their students, colleagues and are good at maintaining interpersonal relationships. Interpersonal communication is a significant factor in teaching, which through various educational strategies contributes to the personal development of students (Stevanović, 2002).

Furthermore, class teachers more often use upbringing educational strategies and also more often use positive disciplinary strategies than subject teachers, which is consistent with a previous study (Buljubašić Kuzmanović & Petrović, 2014). Class teachers more often use cooperative learning and the method of individualization which are actually all upbringing educational methods. Another problem is that teachers' motivation, as an important factor in teaching children with disabilities, as well as using of other educational strategies, is significantly falling in upper grades (Buljubašić Kuzmanović & Petrović, 2014). One of the important teaching methods is the game and usually only class teachers use this educational strategy (Nikčević Milković, Rukavina & Galić, 2011). The game has a great educational effect, such as adopting social skills that for children with disabilities pose a big problem, helps expressing emotions and creating a positive self-image. Moreover, class teachers considered themselves more qualified and competent for inclusive education (Kiš-Glavaš, Nikolić, & Igrić, 1998) which is a reflection of formal education. While class teachers in their education go through a series of didactic and methodological courses, subject teachers (as same as high-school teachers) primarily learn the subject matter and only in a small amount listen to methodological and didactic courses. Also, class in the educational program have far more practice. They have more experience and spent more time with students, which results in better knowing students with deficits and their specific strengths and limitations. Subject teachers are on average only a few hours a week with a student with attention deficits, so they do not succeed in getting enough knowledge of the students and therefore use less positive disciplinary strategies in their practice.

4.1. Study limitations

The obtained study has some methodological limitations which is important to stress. First, teachers gave estimations of students' attention problems. It was their subjective opinion, students were not diagnosed with an attention deficit disorder. To get more objective data future studies should compare students' and also parents' estimation of attention deficit problems in students, or maybe compare data with students who actually have diagnosed attention deficit disorder. Second, except of regular educational programs during graduate studies, it was not examined if some teachers had extra education for working with children with disabilities, which could affect their educational and disciplinary strategies. Finally, for practical work and school results it is important to get information from students, for example, his school progress, decreasing of his deficit problems or his misbehavior. Future studies should consider what would be the best way for including students in research in order to directly measure their behavioral and school-related changes.

4.2. Practical implications

When children start school, parents are not the only one that educate them anymore, instead teachers take the main role in their education. Therefore, it is very important for teachers to be ready and willing to face new challenges in working with children with different types of deficits. Lifelong learning is the primary task of every teacher. For the successful completion of that task teachers need extra

education about educational methods for working with students with deficits, and to be open to co-operation with both school and out-of-school services, and to involve parents in this process. A child with attention deficits often has a number of other difficulties, such as learning disorder or deficits in social skills, which negatively reflects to school life, so the school should, in such cases, provide assistance and support for teachers who have students with disabilities in their classroom. Furthermore, teachers often referred to students for whom they filled out the questionnaire, that they were rejected in the classroom by their peers. For this problem the key role has the teacher, as one of the undisputed role of the teacher is also to be a good behavior model for the students. Working with a student who lose concentration, interrupt other students or not listening for instructions can be very stressful and demanding. But the teachers must show understanding and respect for such students, as a good role model for others.

5. Conclusion

Although in recent years educators had a lot of discussions about students with the diagnosis of ADD, students who do not have ADD diagnosed but show some attention deficits should not be neglected or excluded from these discussions. It is important for such students to provide appropriate educational methods that will help them overcome attention difficulties and mastering the curriculum. As in Croatia formal education for class teachers differs from the education for subject teachers, it can be concluded that class are more sensitive and better educated for working with children with attention deficits. It is neseccersy to assure additional education of inclusive educational methods, especially for subject teachers.

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EFFECTIVE PROGRESSION MANAGEMENT WITHIN VERY LARGE CLASSES IN COMPUTER SCIENCE EDUCATION

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Abstract

For some students, attaining the programming skills required to become an effective software engineer can be a difficult process. The initial steps taken in this journey are critical for success, but in all too many cases, lack of early engagement leads to a high attrition rate across associated education programs. Against the background of ever increasing class sizes, this work focuses on novice programmers enrolled on a software engineering degree program and considers how group activities, peer mentoring and self-assessment, can positively influence retention rate and performance.

Keywords: Active research, computer science education.

1. Introduction

Software engineering continues to be a popular choice for further and higher education students, driven largely by demands from the software industry and the well remunerated careers on offer. Associated degree programs are generally over-subscribed and will generally attract well qualified applicants. However, the subject can be viewed as difficult to get to grips with, particularly in the initial phase of study. This is evidenced by progression figures which (year on year) show that in excess of 20% of year 1 students do progress directly to year 2, which is recognised as a significant problem as indicated in the work of Matthews (2014) and O'Brien (2016).

There are a number of indicators that typically arise which can impact progression rates for novice software engineers: The ***material is inherently difficult***:- learning to write software programs requires strong mathematics, logic, problem-solving and language skills; the ***material is progressive***:- given the nature of the subject matter, each topic presented requires competence in previous topics, so missing lessons can present significant problems for the learner; ***learners can feel isolated***:- class friendship groups form naturally, but many learners lack the social skills to work effectively in a group context. Consequently, for some learners, difficulties in making a good start with this discipline, all too often spirals out of control leading to decreasing confidence/performance and ultimate disengagement.

Progression issues have been addressed across a number of studies through encouraging enhanced peer interaction. For example, Freeman (2014) considers how replacing more traditional teaching practices with active learning can significantly increase the success rate for completion of ICT and STEM courses. This is further supported by work of Carver (2007), which describes the results of an active research study investigating the use of peer/pair programming techniques (working in small groups) in teaching computer science and software engineering subjects. A significant goal of this study was to examine how retention could be improved and the reason for fluctuations, with the main conclusion indicating increased retention and a favorable student response.

However, issues with retention and progression remains a significant problem, further compounded by increasing enrolment figures; current statistics for Queen's University Belfast (QUB) indicate an intake on excess of 400 students across a range of associated degree programs, with class sizes in excess of 270 for individual programming modules. Classes of this size are difficult to manage and offer a poor staff/student ratio.

Introductory programming modules at QUB typically do not require prior knowledge or formal group work and students are individually assessed. Clearly, group/peer associations form an essential part of any career in this discipline but these activities seem to be widely ignored at this formative stage, and retention and progression problems remain. Consequently, based on the experiences obtained from an initial study, the main aim of this work is to look at how learner engagement and retention figures can be

improved for novice programmers by encouraging early peer/group activities and learner reflection on progress. This work considers the suitability of introducing informal group associations to the first year programmers with a view towards assisting all learners with the course material. The application of peer mentoring and peer review techniques are considered, with particular emphasis on helping learners identified of being most at risk of achieving lower performance. The next section considers the background and results from this initial study conducted with smaller class groups and how this can be enhanced for significantly large classes.

2. Active research study and analysis

Using a smaller class group (of around 21 learners), an initial action research study was conducted to address progression issues. This class group was divided into teams of 4/5 members, where each group was encouraged to sit together in lessons, meet as a team outside lessons and mentor one another with course material and associated exercises. In addition, all teams were tasked with a group project, complementary to lesson material. Team members were encouraged to work collectively to solve given tasks and asked to periodically reflect on their progress/participation and the involvement/performance of peers. A randomised mechanism for team allocation proposed by McClelland (2012) was initially considered. However, to enable an effective initial baseline for the study, teams were composed to reflect a balanced range of abilities as informed by an initial formative assessment. To enable effective analysis of this work, evaluation criteria was bound to what can be usefully measured, in terms of quantitative and qualitative data:

a. *Leaner Attendance*: This information is readily available from registers, with a positive outcome measurable through a sustained (or improved) attendance over the study period.
b. *Team Performance*: As this study was conducted during normal course delivery, a number of (formative and summative) assessments were applied at different points prior to, during and after the action step, providing a useful indicator as to how groups/teams and individual learners responded to the intervention.
c. *Peer Assessment*: Individual learners were asked to assess the performance of peers over the duration of the study, in terms of the contribution made, to provide a direct measurement of individual engagement and team cohesion.
d. *Self-Assessment*: Learners new to programming, particularly those that indicate difficulties, typically demonstrate lower confidence in the material as a course progresses. Consequently, as each stage of the action step is delivered, learners were surveyed to obtain a 'confidence measure' on how they perceive their progress. This was applied at team/group level and at the individual level, where leaners participate in the collective team view and (in confidence) could express their personal views.
e. *Impact on 'At Risk' Students*: Learners in this category were tracked as the study progressed to both encourage and facilitate peer support and/or tutor intervention as required.

2.1. Action step structure

Content of the action step was chosen to reflect a semi-formal software engineering context, as informed by the work of Pope-Ruark (2011) and consisted of three elements of work (software design, implementation and testing) conducted over a three week period, with defined deliverables at the end of each phase. All teams were asked to participate in a brief quiz related to the given topic as each phase was completed. Teams were also surveyed to get a measure on perceived team performance and to reflect on individual performance. The main aim in monitoring team and individual perception of performance together with actual assessed performance, was to provide a better insight into the uptake of the material not just in terms of raw figures but also in terms of obtaining a realistic measure of learner 'confidence'. As mentioned in the introduction, one of the difficulties associated with learning to program (and one of the main reasons for lack of progression or 'dropping out') is the perception of 'being lost'. This is exacerbated by the progressive nature of the material, with attendance gaps magnifying the problem. These problems ultimately become visible through summative assessment but this (in many cases) is too late to rectify. In addition, learners are not good at coming forward directly with difficulties with the learning outcomes.

To facilitate a balanced study, the class group was divided into four teams of four learners, with an additional team of five learners. Team selection was based on performance in a class test (formative), given as a normal component of the programming module, with each group containing a level distribution of attainment overall. Given the study requirement of assisting learners considered to be most 'at risk', candidates in this category were identified using a combination of assessments scores and attendance figures to date.

2.2. Outcome and analysis

Attendance: The attendance for learners participating in the study is provided in figure 1 below. This gives a broad indication of engagement prior to, during and immediately after the action step.

Figure 1. Attendance.
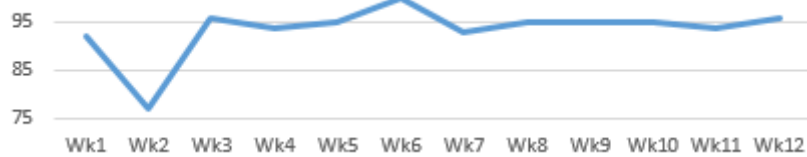
Attendance figures, while initially uneven, are more settled prior to and for the duration (weeks 8, 9 and 10) of the study and remained at a strong level of above 95%. On analysis, levels of attendance are considered to be excellent and were typically above other module attendance during the same period.

Team Performance: This data was collected at the end of each weekly cycle and represents team quiz and task submissions, together with collective team feedback as a (team) prediction of estimated performance. An ideal comparison would demonstrate a close alignment with actual and expected performance, representing an accurate perception of progress, irrespective of the level of actual attainment. Underestimation of performance (if severe) could indicate a lack of confidence to some degree. Some overestimation of performance could be considered as indicating team confidence. However, significant overestimation of performance could be considered more of an issue, indicating problems with the material and lack of engagement. It is important for individuals to have a realistic view of how well the team is functioning in terms of meeting the learning outcomes. A closer convergence between actual and perceived performance indicates that a team is able to identify problems (where they exist) more rapidly, thus building on confidence as work progresses. What follows is an analysis of each team's performance measured against a performance estimate, over the three week period of the action step.

Figure 2. Team Performance.
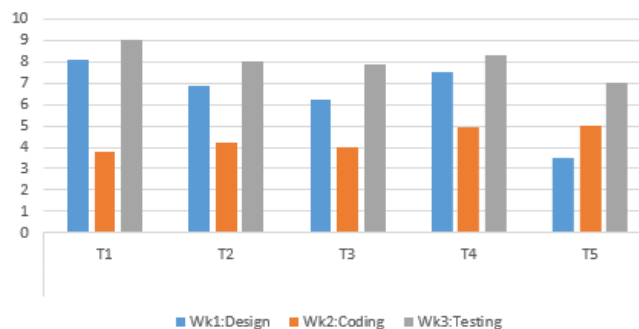
For two thirds of the study, team 1 performed better than their estimate, indicating some initial wobbles in confidence. However, as the study progressed, this seems to improve with a degree of convergence between actual and estimated performance. In consideration of performance as a whole, the graph indicates a rising trend, notwithstanding the dip in week 2 (which contains the most technically challenging work), demonstrating good progression with the material.

The comparative results for team 2 indicates some over estimation of performance across the study period. However, this converges somewhat by week 3 and the level of confidence remains high across the study. Actual performance is at an excellent level, although this dips a little in week 2 (as is the case for most teams), which is reflective of the level of task difficulty. Again, team 3 slightly over estimated across the study but does indicate a rise in confidence through time. Actual performance is generally in line with other teams and demonstrates a rising trend. Actual and estimated performance by week 3 is close, sitting at around 80%, indicative of a team that is both confident and capable.

Team 4 demonstrated a very similar performance profile to the other teams, with an overall rising trend. Overall performance is excellent with actual and estimated performance converging nicely by week 3. Results indicate that (again) this team is functioning well together to produce an effective outcome. The profile for team 5 differs a little from teams 1 to 4. Results indicate a linear rising trend across the study, with a slight overestimation for each task. Overall performance is strong by the end of the study and demonstrates a significant growth in both confidence and ability, from some difficulties in week 1 to sound performance in week 3.

Peer Assessment: One important part of the study was to consider how team peers viewed each other's contribution. Consequently, teams members were asked to rate their peers on a scale of 1 (low contribution) to 10 (high contribution). The peer assessments for each individual were averaged to give a rating per team member. These ratings were then averaged for each team and is presented in figure 3 below.

Figure 3. Peer Assessment.
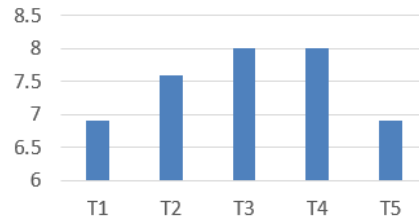
For all teams, results indicated a good degree of cohesion. In particular, teams 2, 3 and 4 appeared to be most comfortable together, as evidenced by the peer assessments and by observations within the classroom.

Self-Assessment: Results indicated a rising trend in both confidence and actual performance with the task material. The team confidence measure was supplemented by individual confidence (self-assessment) survey, taken privately to allow learners to express their thoughts aside from the collective team view. This data, averaged across the three week study period across the whole class group, indicates a general rising trend, in line with broad team perceptions.

At Risk Learners: On establishing team membership prior to commencement of the study, a number of learners (A, B, C and D) at most risk of disengaging (or 'dropping out') were identified, using a combination of initial and attendance data. In addition to data generated through group activities, the results of the first summative (interim) assessment for the programming module were brought into consideration to review the overall impact of the study. Three individual learner measurements (pre-study assessment, interim assessment and peer assessment) are presented for comparison in Figure 4 below.

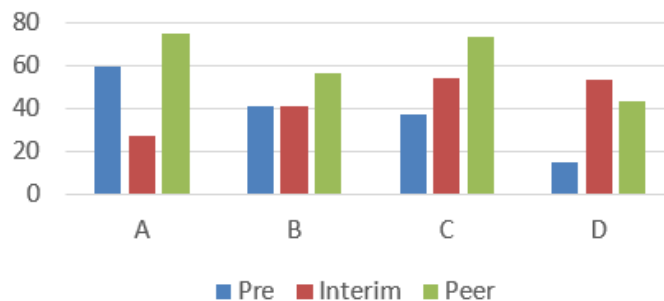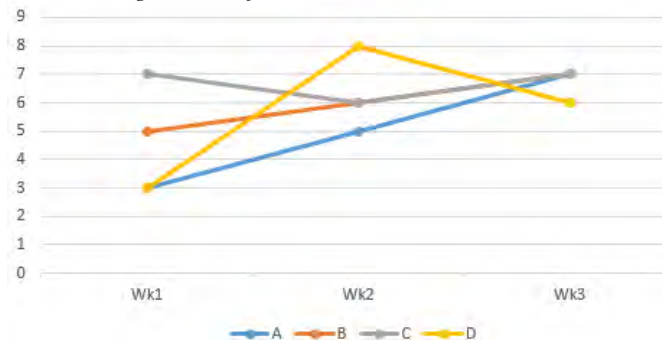*Figure 4. Assessment Profile: Learners at Risk.*

Figure 5. Confidence Measure: Learners at Risk.

On analysis, learner A performed fairly well in the initial assessment but dipped significantly in the second. However, engagement as perceived by peers was at a high level and in line overall team performance backed up by the confidence measures, which indicated a rising trend. Learner B achieved a slight improvement between the first and second assessments. This, coupled with a good peer assessment

from the associated team and a rising confidence measure, demonstrates a positive impact for the intervention. For learner C, there is a sustained increase across the three measurements, with a strong indication of team contribution. For learner D, an improvement in assessment performance is evident, however, peer opinion indicates a moderate level of engagement, which could be improved upon. This could perhaps be linked to an initial rise, followed by a fall in confidence and warrants further investigation.

3. Conclusion and further work

By and large, individuals were very willing to engage with their respective teams. This became apparent in the competitive nature of team behaviour and by the lack of tutor input required to achieve a good outcome. Teams formed natural focus groups and genuinely relished the opportunity to influence the study and working with peers was very well received. During the study, it was clearly evident that learners considered 'at risk' of falling behind, were not allowed to lapse; perhaps this can be attributed to engendered team ethos and the desire 'not to let the side down'. Feedback from students involved with the initial study was very positive. Moreover, an element of 'sporting challenge' between teams has produced good results and (without encouragement) they have continued to support one another well beyond the scope of the study. More importantly, 3 out of 4 students initially identified as 'at risk' successfully completed the module, with overall results significantly above other class groups external to the initial study.

These results have been very encouraging. Consequently, an enhanced study is currently underway, encompassing a much larger class group of 270 learners currently taking a year-long (2 semester) introductory programming course, with lab exercises and weekly formative assessments as an integral component. In this new study, learners are divided into groups of 10 and are required to sit at the same bench for each weekly session. At time of writing (December 2018), the first semester has been completed. During this time, learners have been working individually on course material and formative assessments and while they have been encouraged to assist one another, there has been no formal requirement to work as a group. Learners have been regularly surveyed, asking each to assess weekly progress/performance with the material (as a measure of confidence). This has provided a rich data set (in conjunction with summative assessment results), forming a baseline for continued work in semester 2.

Going forward, learners will be actively encouraged to work on small group projects. It is envisaged that three such projects will be examined (each of a three week duration) with a restructuring of individual groups at the end of each period to normalize performance across the entire group. This would avoid formation of new 'comfort zones' and should encourage sustained engagement (and hopefully an increase in performance to match).

In line with the previous study, the performance (both actual and self-assessed) of learners considered to be at risk will continue to be monitored. Results will be published, post analysis at the end of semester 2 in this academic cycle.

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THE IMPACT OF READING COMPREHENSION ON MATHEMATICS WORD PROBLEM SOLVING

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Abstract

Word problem constitutes an important part of the mathematics curriculum of the elementary school. Different studies have argued that the understanding of the problem is the most difficult part for students, because of the lack of understanding of the 'keywords' used in the problem contexts. Thus, because the process of word problem solving is related to reading comprehension, as a most important factor in this study it was examined the impact of reading comprehension for improving student's skills for mathematics word problem-solving. Participants in the study were fifty-fourth-grade students and their teachers. The methodology of the study is the collaborative action research. The researchers (authors) have worked together with two class teachers and have used the Reciprocal Teaching method as an intervention for eight weeks aimed to improve the student's skills for reading comprehension. The Reciprocal Teaching method includes prediction, clarifying, questioning and summarizing strategies. The data collection instruments used in this study were teachers' reflections and pre and post-test. The results from this study show that the improvement of student's skills for reading comprehension has a positive impact on the improvement of student's skills for mathematics word problem-solving.

Keywords: Mathematical word problems, reading comprehension, reading strategies, reciprocal teaching.

1. Introduction

Studies have shown that the mathematics word problem-solving is of great importance for learning mathematics, but it is as well associated with highlighted difficulties by students (Jitendra, Griffin, Deatline-Buchman & Sczesniak, 2007; Capraro, Capraro & Rupley, 2012; Özsoy, Kuruyer, Çakiroglu, 2015; Zhu, 2015, Vula, Avdyli, Berisha, Saqipi, & Elezi, 2017).

The word problems represent situations described by words that students should first translate into mathematics language and then present their solutions (Burns, 2007: 172). Mathematics word problem-solving are a complex cognitive activity that involves a number of processes and strategies. According to Zhu (2015), word problem solving represents a series of actions required by students during this process. It requires students high-level thinking rather than simply memorizing facts or practicing certain routine procedures. Even though, Daroczy, Wolska, Meurers, & Nuerk, (2015) classifies word problems, as the most difficult and complex that students encounter during their mathematical development. The most common difficulties in mathematics word problem-solving are skills for reading comprehension of the contexts of the problem (Pearce et al., 2013). To accomplish mathematics problem solving, students need to understand, analyze, represent, execute and evaluate problems. Polya (1957) has proposed four steps to help students in solving mathematical word problems: understanding the problem, designing a plan, implementing the plan, and reviewing. On the other hand, Van Garderen (2004) states that the effective mathematics word problem solvers are able to understand the purpose of a problem. While according to Polya (1957) the first step in solving problems is the understanding the problem as one of the most important components of the process. Students need to understand the problem and not just understand it but they need to identify and examine the data before they start implementing algorithms. Therefore, comprehension of the verbal statements of the problem is essential (Polya, 1957: 6). Word problem solving is related with reading comprehension as an important factor that includes understanding the problem within linguistic complexity of the text (Vilenius-Tuohimaaa, Aunolab and Nurmib, 2008; Capraro et al, 2011; Özsoy,Kuruyer, Çakiroglu, 2015; Boonen, De Koning, Jolles & Van der Schoot, 2016; Vula et al., 2017). Reading in mathematics requires to be achieved the correct

mathematical understanding of words for developing and understanding problem solutions. 'Students need to understand the word problem to be able to solve it, not just simply to read it, they should be good readers. Good readers and good math word problem solvers have the ability to observe their understanding '(Capraro, et al., 2011). Achieving the meaning of written texts or sentences is one of the main pillars of developing the reading skills. However, the simple fact that children can read does not mean that they also can understand what they have read. Therefore, performance in word problem solving is closely related to reading comprehension performance (Vilenius-Tuohimaa et al., 2008; Özsoy, Kuruyer, Çakiroglu, 2015). Students should develop skills of good readers and use the reading comprehension strategies for understanding the mathematical content of word problems. Theoretical models and teaching strategies for solving word problems in mathematics proposed by many researchers are based on the use of reading comprehension as a tool for enhancing the level of achievement in solving this type of problems (Carparo et al., 2012; Jitendra et al., 2007).

Reciprocal Teaching is a method which includes reading comprehension strategies to help students to improve reading comprehension. Reciprocal teaching is characterized as a dialogue through which teachers and students work together to understand the text (Palinscsar & Brown, 1986). This approach includes strategies: prediction, clarifying, questioning and summarizing. Each of the strategies of the reciprocal teaching method promotes both comprehensions of text and comprehension monitoring. When students make predictions, they hypothesize what the author will discuss next in the text. To do this successfully, they must activate the relevant background knowledge that they already possess. Clarifying is particularly important with students who have comprehension difficulties of the text they read. Question generating gives the students an opportunity to identify the kind of information that provides the substance for a good question and summarizing is an excellent tool for integrating the information presented in the text (Palincsar & Brown, 1986).

The purpose of the study is to examine the impact of reading comprehension on mathematics word problem-solving. Firstly, it was important to see how reciprocal teaching can improve the reading comprehension and secondly, how this improvement has an impact on students' outcomes for solving the mathematics word problems.

2. Method

In this study, we chose to conduct collaborative action research. This approach focuses on empowering teachers in schools, improving teaching practices and the active involvement of teachers and students in teaching and learning activities. Thus, as researchers (authors) and two teachers collaboratively have planed the intervention in their classes. During the study through observation, review of student's work and reflection of teachers, it is possible to explore the dynamics, challenges and possible limitations.

The data collection instruments and techniques that have been used in this research are pre- and posttest with mathematical word problems and journals with teachers' reflections.

2.1. Procedure

The intervention method used in this study was the implementation of reading strategies of reciprocal teaching method, based on the reciprocal teaching method created by Palincsar & Brown (1986). This method was implemented by reading comprehension strategies: predicting, clarifying, questioning and summarizing. Two teachers received the instructions from us as the researchers for the implementation of reading comprehension strategies in their classrooms with students in small groups. The instructions for the teachers were related to the use of the reading comprehension strategies of reciprocal teaching method: predicting, clarifying, questioning and summarizing. The reading strategies were introduced through whole class instruction and then in smaller groups to practice the strategies. The teachers went over the process making the strategies very clear and they worked with their students for implementation of reading comprehension strategies.

Predicting Teachers taught the students to make predictions for the text they read and to relate with their previous knowledge, students find the information, relate to the previous knowledge and predict what might be or what they have to do after.

Clarifying Students have to clarify the unclear words, keywords, and concepts, look up for the words and phrases that are not clear and try to clarify them.

Questioning Students generate questions about the reading text, they make questions, they lead the discussion with group members about the text they read.

Summarizing Summarize meaning of the text they read, including the main idea and the main request from the text (Palincsar &Brown, 1986).

Teachers used those strategies with reading texts and with word problems to practice with their students.

Before the implementation of the intervention method, students were assessed with pretest for mathematics word problem solving and again after the implementation method they are assessed with post-test. The pretest and posttest (were the same) and they included five mathematical word problems.

The reading comprehension strategies are implemented during eight weeks and the two fourth grade teachers worked with their students in their classrooms during this time. Two teachers participated in the research with the researcher for changing their student's attitudes toward word problem-solving in mathematics and developing their teaching practices. My role as a researcher was to guide two teachers and to collaborate with them in this collaborative action research, we gave them the guidelines for the implementation method we work together in a whole process.

Figure 1. Examples of mathematics word problems from pre-test and posttest.

Në "Klubin e gjelbër" janë të regjistruar 276 fëmijë, kurse në "Klubin e artit" 105 fëmijë më pak. Sa fëmijë janë të regjistruar në të dy klubet?	In the "Green Club" are registered 276 children, whereas in the "Art Club" 105 children less. How many children are registered in both clubs?
Andi vendosi në një album 420 fotografi që kishte bërë gjatë pushimeve. Ai vendosi 7 fotografi në një faqe të albumit. Sa faqe të albumit mbushi Andi?	Andy put on an album 420 photos he had taken during the holidays. He placed 7 photos on an album page. How many pages of the album did Andi fill?
Në treg u shitën javën e parë 1249 kg fruta, kurse javën e dytë 80 kg më shumë fruta. Sa kg fruta u shitën gjatë dy javëve në treg?	In the market were sold the first week 1249 kg of fruit, while the second week 80 kg more fruit. How many kilograms of fruit were sold over the two weeks in the market?

2.2. Instruments for data collection

Data collection instruments were tests (pretest and posttest) and teacher's reflective diaries. Pretest was implemented before the intervention method and posttest after the intervention method in order to evaluate the impact of reading comprehension strategies for student's learning outcomes in word problem solving in mathematics, and semi-structured interviews with teachers in order to define the effectiveness of reading comprehension for improving student's skills for word problem solving in mathematics.

2.3. Sample

Participants of the study were fifty-fourth grade students, 26 students from class IVA and 24 students from class IVB (age 9-10 years old), IVA (M=9.6, SD= 0.494) and IV B (M=9.5, SD= 0.503) and their two classroom teachers from the "Mustafa Bakija" primary school, from Gjakova, Kosovo. The sampling was purposeful.

3. Results

In order to examine the impact of intervention method of reading comprehension strategies in solving mathematical word problems by students, the results from pretest and posttest were analyzed statistically and teachers' reflective diaries are analyzed by using the content analyses. A paired sample t-test was conducted to compare student's scores in pretest before the intervention and after intervention on reading comprehension strategies. Results showed that students in both classes achieved better results in posttest comparing the pretest after intervention method for improving reading comprehension. In Table 1 are presented the basic statistics for the pretest and the post-test.

Table 1. Results from pretest and posttest.

	Pretest		Posttest	
	Mean	SD	Mean	SD
Class IV A	2.38	1.98	3.88	3.16
Class IV B	3.0	1.81	4.46	2.14

The t-test was utilized in order to compare the results of the pre-test and the post-test. There was a significant difference from pretests to posttests in the scores of pretests for class IV A (M= 2.38, SD=1.98 and posttest (M=3.88, SD=3.16), t (25) = -4.431, p=.000 in the class IVB (M= 3.0, SD=1.81 and posttest M=4.46, SD=2.14), t (23) = -8.085, p=.000 respectively).

Results have shown the significant improvement of student's skills for mathematics word problem-solving in both classes IVA and IV B after the intervention program for reading comprehension.

From the reflection from teacher's diaries, it was found out that one of the main reasons why students struggle during mathematical word problem solving is the difficulty to comprehend the text within the words. The intervention for reading comprehension has a positive effect for supporting students to improve their word problem-solving skills.

Before it was noticed that students don't understand the text within the word problem. There were some keywords and expressions which make students confused when they read a text or a word problem. Sometimes, the words are not familiar with them. But using reading comprehension strategies was helpful for the students to get a better meaning of the text they read as the main step to solve the word any word problem.

(Teacher A)

When students read the word problem some of them get the partial meaning of what they read. It was helpful for students to use reading comprehension strategies in small groups because they felt more comfortable when they collaborate with each other. I see that there was a significant improvement in students' word problem skills.

(Teacher B)

4. Discussion and conclusions

This study investigated the impact of reading comprehension for improving student's skills for mathematics word problem-solving. The results from the study shown that the use of reading comprehension strategies impact reading comprehension and have a positive effect on improving student's skills for mathematical word problem-solving. The reading comprehension strategies enabled student's clearer meaning and comprehension of the word problems. Students after receiving the instruction of reading comprehension strategies achieved better results in mathematical word problem-solving. This finding is supported by earlier studies (Vilenius-Tuohimaa et al., 2008; Özsoy, Kuruyer, Çakiroglu, 2015) which showed the relation between reading comprehension and mathematical word problem-solving.

The results from the study confirmed that students improve their comprehension when they work through comprehension strategies in groups, they clarified the misunderstanding content of the word problem and unclear expressions, they generate questions for better comprehension of the text they read and summarized their understanding. Therefore, when students improve their reading comprehension, they can perform better outcomes in mathematical word problem-solving. From this, it can be concluded that teachers should use the reading comprehension strategies in their classes. They should work for improving student's reading comprehension to achieve better results in mathematical word problem solving, and they can do this in cooperation with each other. Finally, different students have different needs, thus it is suggested that other approaches to word problem solving should take into consideration.

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USING ARTISTIC ILLUSTRATION TO COMMUNICATE ABSTRACT AND INVISIBLE IDEAS IN THE SOFTWARE ENGINEERING DOMAIN

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Abstract

Computer software is invisible and the discipline of software engineering includes a number of complex abstract concepts which are near impossible to visualize. We educate learners in a variety of ways using metaphor and comparative example but often people need to see the problem before they can understand even the need for a solution. To this end a set of illustrations have been created using the metaphor of bridge engineering to help beginners in software engineering to understand the fundamental problems of coping with changing requirements and evolving systems. These, along with the narrative they describe, are presented as an example of one possible approach to making software engineering more accessible.

Keywords: Software engineering, art, illustration, science communication.

1. Introduction

Computer science, and specifically software engineering, is full of complex abstract concepts. Computer software has no physical form and other than perhaps any user interface to a system, there is no visibility to the scaffold and structure that lies behind. These concepts then are hard not just to comprehend in operation but very hard to understand in terms of the fundamental functions they perform. If one cannot see the problem then even the need for a solution is not apparent, let alone what shape or form a solution may take. The aim of software engineering is specifically focused on these abstract invisible ideas; how elements within the software relate and communicate with each other, how they are layered and structured, and how best can we organize our solutions to be both efficient and flexible for future evolution.

Education addresses this in a number of different ways including letting learners experience problems first-hand before introducing software engineering concepts as a way to make their lives easier and more productive. This can work well with an audience of expert learners, those that have a good understanding of core concepts and, critically, wish to become better and more effective programmers. But such an approach can fail to engage a wider audience who often have little or no vested interest in software engineering as a discipline, for example groups such as natural science students who are learning programming but only as a means to an end. The challenge is how to communicate the need for and purpose of software engineering techniques to such cohorts.

One possible approach is through using metaphor and comparison with traditional physical engineering problems – how could one engineer a vehicle to meet emerging and flexible requirements or the relative ease with which a new house is built compared with extending an existing one and having to fit within the existing constraints for example. Our technique has been to pair such metaphors with illustrative line-art created by local artists, forming graphic panels which can be used together to form a storyboard to describe a particular concept. The initial work focused on maintainability in software systems and how poor early decisions with no consideration of future evolution can lead to highly unstable and risky systems after organic growth. Using the metaphor of bridges, these show design evolutions made to fit emerging problems without though of further changes and the end result. In the next section we present these illustrations and storyboard as an example of how such an approach can be used.

2. Software engineering and building bridges – an example application

Software engineering is about, in addition to other concerns, ensuring that the systems we build are flexible enough to be evolved in the future. Few engineering solutions are ever finished, the requirements evolve over time and this is as true in software as it is in physical disciplines, perhaps even more so. However, our common approach to software as an invisible intangible entity is to solve quickly just the problem in front of us, with little or no regard for how we may need to evolve in the future.

To help understand this let's try and consider the following: what if we built bridges the same way we so often build software?

First, we start with an initial problem many years ago, we need to cross the river (Figure 1).

Figure 1. Our initial problem – how to cross the river?

We solve this simply and immediately, dumping stones into the river means we can easily jump from one to the next and cross (Figure 2).

Figure 2.

Time goes on and the technical abilities of our race evolve. We invent the wheel and immediately try and attach it to animals. Several unimpressed chickens, pigs, and one angry crow later we try the horse and jackpot – the cart is born. But the cart can't cross the river, it needs a platform over which to travel rather than jumping from stone to stone. Our requirements have changed, the situation has evolved and so must our solution. We fix the problem and lay planks over the stones so now people and carts can cross (Figure 3). We can get to market and buy bronze, or spears, or something.

*Figure 3. A solution evolved – carts and people.*

This solution works wonders. The wheel is voted "best thing before sliced bread" four years in a row and horses, carts, and people cross the bridge back and forth. But progress continues, someone has the brilliant idea of building a steam powered cart on rails and, much to the annoyance of the horses' union the train is born. The train is much heavier than the cart, it can't go up and down banks, so again the requirements change. Our evolved solution? Raise the deck, lay the rails, building on top of the planks which in turn are on the stepping stones (Figure 4).

Figure 4. Steam powered brilliance with our new raised deck featuring rails.
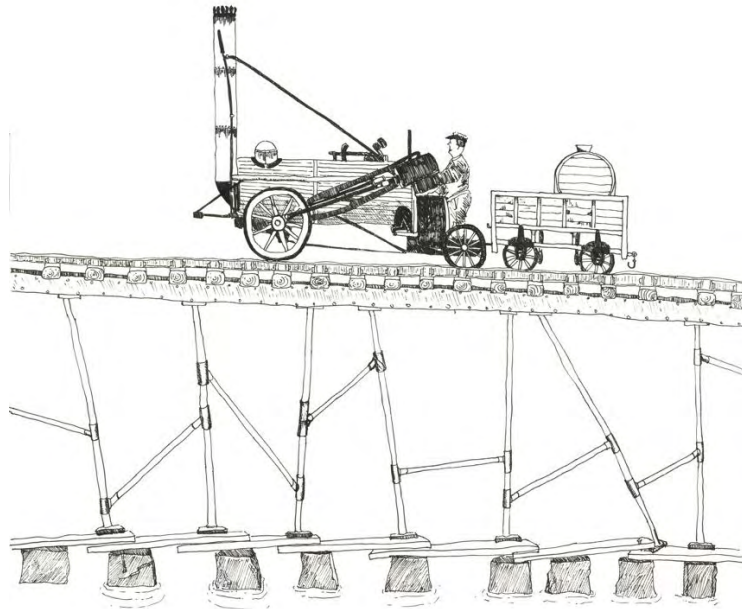
The train is, if anything, even more successful than the cart if only for the number of murder mysteries which can be staged on them. Trains evolve, they become more powerful, faster, and heavier. To meet these new requirements we again evolve, we use stonework to reinforce in increasing volumes as each new train comes out (Figure 5).

Figure 5. The stone reinforced bridge for high speed trains.
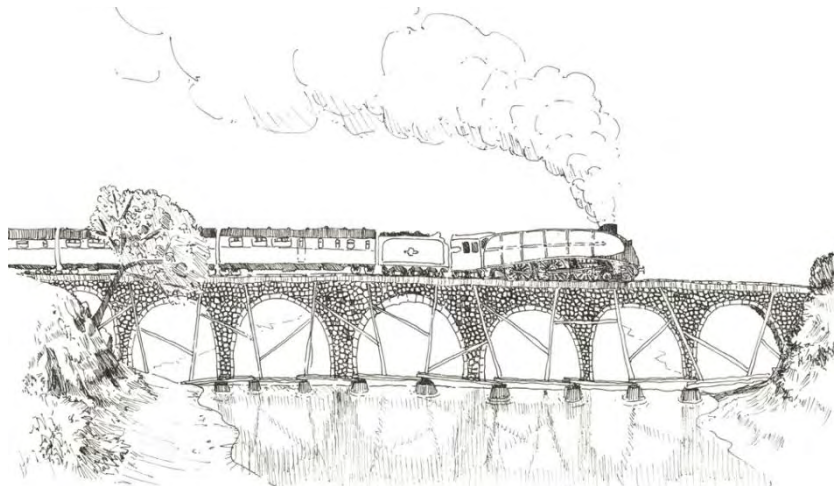
Innovation continues apace and the internal combustion engine is born and put into its own little chariot, the motor car is here. Cars don't run on rails, that would be too sensible, and cars and trains it turns out don't mix well. Trains have a habit of vengefully crushing all cars before them, but cars and trains need to cross the river.

Our solution? Fix the problem in front of us, building up from the reinforced train bridge put in another deck and allow cars then lorries to pass unhindered overhead (Figure 6).

Figure 6. Cars and trains all crossing in harmony together.
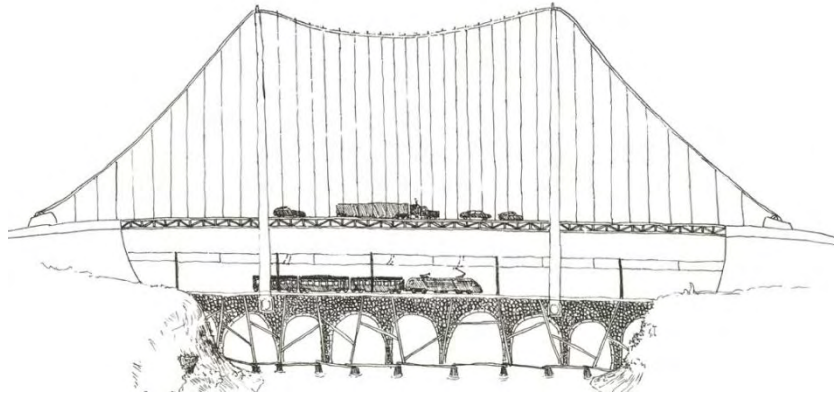
So now we have a working solution, a bridge allowing the free passage of all sorts over the river, day and night, problem free. We have a car deck supported off the train bridge. The train bridge is stonework put on to reinforce wooden posts and supports used to raise the deck from the river level. These supports sit on the planks underneath which are held up by the original stepping stones put into the river by a crossing engineer long since gone. The system works, the system is complex, the system has evolved. We still need to maintain the bridge and one day our brave, present day, engineer spots a loose cable and begins to tighten (Figure 7). He does this unaware of exactly what it connects to, what connects to what, which components rely on each other, and how the overall system is structured. Figure 8.

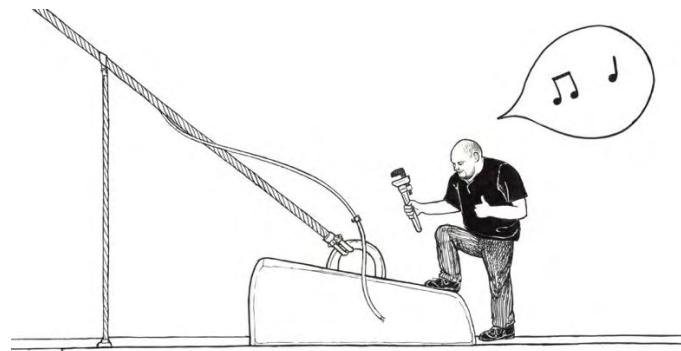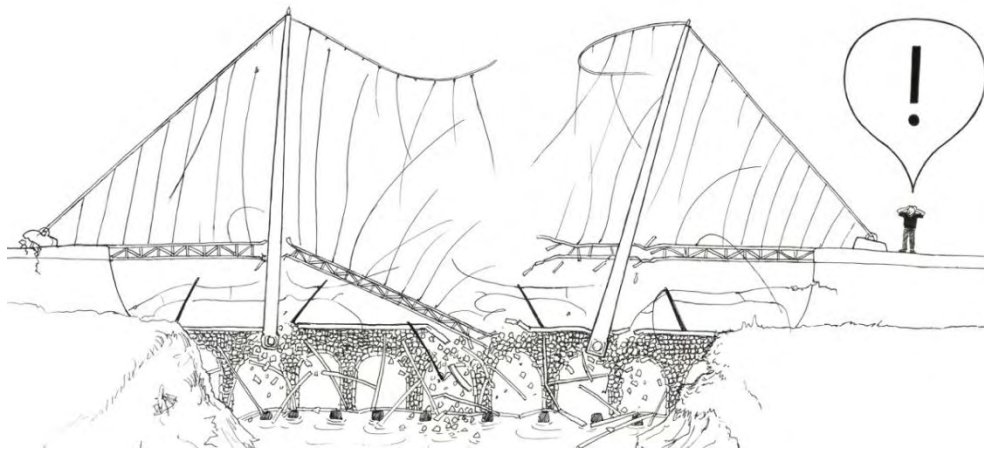*Figure 7. The engineer and a ratchet.*

Figure 8. The result of tightening something just a little too much-

Because we evolved at every step just to meet the problem in front of us, because we never took the time to consider the future or even look deeply at the past, we built a system with complex and unpredictable emergent properties. At each step the decision seemed right and passed our tests (it met the change in requirements), but ultimately we ended up with something unstable and dangerous.

The reality is that we even probably held the information needed to predict what would happen, to understand the complex beast we had created, but for our last engineer this would have been too voluminous and too disorganized to actually be of use (Figure 9).

What we should have done, what we could in hindsight have done, was to take the time at each step to consider what had come before and what might come afterwards. No system is ever truly finished, we can't predict the future but through controlled processes, careful planning, and construction in a modular and flexible fashion to allow for less risky future evolution, we can do a lot to help our future selves and avoid the dangerous instabilities that can result.

Figure 9. Trying to make sense of it all, and failing.

3. Conclusion

The example shown above was created in 2015 from a fairly simple concept. The artwork assets and the general story narrative around them have since been reused in numerous presentations, some winning awards, to a variety of audiences including the general public (Cutting and Noppen, 2015). The eye-catching nature of the illustrations act as an attractor, help to step away from the dry nature of the subject at hand, and succeed in communicating the problems inherent in system evolution in an effective manner. Work is now underway to investigate ways in which other computer science concepts may be opened up using illustrative art.

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EXPLORING THE SOUTH AFRICAN PHYSICAL SCIENCES PRE-SERVICE TEACHERS PEDAGOGICAL ORIENTATIONS

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Abstract

The most essential aspect of teacher education is to attain different way of teaching science for learner's conceptual understanding. However, in most South African universities, science methodology modules do not fully expose pre-service teachers to different science teaching approaches. In these modules, pre-service teachers often are exposed to readings materials, observing one another in microteaching or create lesson plans for assessment purposes. To teach science effectively, teachers are encouraged to possess a good content knowledge and knowledge of how to translate content knowledge into appropriate teaching ways for specific topic. The study investigates physical science pre-service teacher's pedagogical orientations in one of the South African universities. The phrase 'orientation' refers to teachers' knowledge and beliefs for teaching science. Literature shows various classifications of pedagogical orientations. Based on research conducted in South Africa, orientations are classified into two approaches, namely direct approaches divided into direct didactic and direct interactive and a second approach is an inquiry approach divided into guided inquiry and open discovery. A qualitative method approach was adopted to obtain teachers pedagogical orientations using a questionnaire from the University of Western Michigan. The questionnaire comprised of 10 items and each item has four alternative teaching methods, students were requested to select the most appropriate and the most inappropriate options. For this paper, only the most appropriate teaching orientations were analysed and only two items were analysed, physics and a chemistry item. A descriptive statistics analysis was used. We then calculated a percentage distribution to the four teaching orientations. For calculation purpose, we arbitrarily ordered the spectrum of orientations along a scale of 1–4, where 1= didactic direct; 2 = direct interactive; 3 = guided inquiry and 4 = open inquiry. The results show that pre-service teachers exhibited a preference for learner-centered teaching method, which is centered within guided inquiry for both items.

Keywords: Pedagogical orientation, pre-service teachers, inquiry-base.

1. Introduction

Researchers around the world in science education for many years debated over the merits about the importance of 'inquiry base and direct' teaching approaches (Coberna, Schuster, Adamsa, Applegatea, Skjolda, Undreiub, Lovingc & Gobertd, 2010). However, there is a strong opinion on both sides for these teaching approaches. For many years in South Africa, the focus was more on teacher-centred or direct teaching approaches than the inquiry approaches up until the introduction of the new national curriculum referred to as the Curriculum Assessment Policy Statement (CAPS) and Inquiry-based was one of the teaching methods that were advocated. Inquiry-based approach is a strategy that is employed in education where learners/students follow methods and practices similar to those of professional scientists when constructing knowledge (Keselman, 2003). Students are expected to discover new knowledge on their own where a teacher act as a facilitator, learner formulate hypotheses and testing them by making observations or conducting investigations (Pedaste, Mäeots, Leijen, & Sarapuu, 2012). Inquiry-based stresses active participation and learner's responsibility for discovering knowledge that is new (de Jong & van Joolingen, 1998).

However, various countries around the world, adopted inquiry base approach long time before South Africa emphasized its importance in the school curriculum and teacher preparation programs in most universities (Crawford, 2014). In some countries education systems in-service teachers and pre-service teachers are encouraged to use teaching approaches that are learner-centred to maximise learning opportunities. Cobern, Schuster, Adams, Skjold, Muğaloğlu et al., (2014) asserts that the important aspect of teacher education to develop pre-service teacher to acquire different ways of teaching

science for conceptual understanding. Therefore, this study investigate a key dimension in science teaching that will assist in the implementation of inquiry-based approach in teaching which is referred to as teacher's pedagogical orientations. The phrase 'orientation' insinuates teachers' knowledge and beliefs about the purposes and goals of teaching science at a particular grade level (Magnusson, Krajcik, & Borko, 1999). There are different types of orientations investigated in the literature.

Since South Africa emphasized the importance of inquiry-based, it is of the essence to evaluate the pedagogical orientations physical sciences pre-service teachers assume towards their own classroom teaching when they are teaching during their school teaching experience. The aim of this study was to explore the pedagogical orientations of physical science pre-service teachers' using a multiple-choice questionnaire. To achieve the above aims of the study, the following research question was set:
    i. What are the preferred pedagogical orientations of physical science pre-service teachers towards their own teaching?

We administered questionnaires to the physical science pre-service teachers in our university to determine their pedagogical orientations using an existing pedagogical orientation instrument in the form of standardized Multiple-Choice Question (MCQ) format developed by (Cobern, et al., 2014).

Pedagogical Content Knowledge (PCK) underpins the study. PCK is a blend of pedagogical and content knowledge that formulates the transformation of the two knowledge into most powerful, teachable forms to formulate subject and make it comprehensible for learners understanding (Shulman, 1987). PCK emphasises the significance of representation and understanding of content knowledge, it distinguishes science teachers from scientist's knowledge given that science teacher knowledge is different from scientists' knowledge in terms of organization. Science teachers organise their content knowledge in various forms learners can understand, while scientists have specialised knowledge and their knowledge is to develop new things or transform the universe (Cochran, 1998). Within PCK, Magnusson, Krajcik, and Borko (1999) identified a key aspect in teaching and they referred to it as teacher's orientations. Teacher's orientations are "teacher's knowledge and beliefs about the purposes and goals of teaching science at a particular grade level" (p.97). These orientations play an important role in shaping teacher's decisions and goals for science in the classroom.

2. Pedagogical orientations

The research on measuring pedagogical orientations of in-service teachers has been conducted around the world and there is a framework that has been developed by a group of the University of Western Michigan researchers. These researchers produced a set of case-based assessment items that present realistic teaching scenarios for most of the science topics (Cobern, et al., 2014). These assessment items are multiple-choice questions but differ from conventional multiple-choice questions in that each of the response options represents a particular pedagogical orientation, rather than a normal MCQ. Cobern et al. (2010) designed a teaching orientation instrument that focuses on the objective of understanding scientific explanations. These items aim to elicit teachers' orientations towards teaching science and encourage the teacher to visualise himself or herself in a teaching situation, play the role of a decision-maker, and respond as if he/she is going to teach that particular lesson.

There are various classifications of pedagogical orientations, based on the research conducted around the by world Anderson and Smith (1987) referred to teaching orientations as various approaches to teaching science and general patterns of teachers' behaviours and thoughts to promote learners' chances of comprehending science concepts. While Magnusson et al. (1999) proposed nine orientations towards science teaching; orientations toward science teaching, academic rigour, didactic, conceptual change, activity-driven, discovery, project-based Science, inquiry, and guided inquiry. Recently, Friedrichsen et al. (2011) reviewed the orientation definitions found in literature and came up with a revised definition that accommodates all previous definitions. Friedrichsen et al. (2011) defined science teaching orientations as a construct that consists of interrelated sets of beliefs teachers hold about the goals or purposes of science teaching, the nature of science and science teaching. This definition of orientations is multidimensional and deals with different facets of teacher beliefs, which in turn affect teacher practice (Campbell, Longhurst, Duffy, Wolf, & Shelton, 2013). Base on the research conducted in South Africa by Ramnarain and Schuster (2014), they classified orientations into direct didactic, direct active, guided inquiry and open discovery. Ramnarain and Schuster (2014) used Magnusson et al. (1999) teacher orientation definition, however, used a different term 'pedagogical orientations. Below are the four (4) types of orientations and one example of the items used in the questionnaire.

Figure 1. A description of each of the Pedagogical Orientations adapted from Cobern et al. (2014).

i. **A direct didactic approach**, a teacher presents and explains the science concept or principle directly to the students and illustrates with examples and/or demonstrations. Students apply this knowledge to questions and problems. There are no or few student practical activities in this method, but there are usually discussions and problems with the content.

ii. **A direct interactive orientation** similarly entails direct teacher exposition, but this is followed by a student activity based on the presented science content, for example, hands-on practical verification of a law.

iii. In adopting **a guided inquiry orientation**, the teacher plans an activity where students explore a phenomenon or idea, and from this, the teacher guides them to develop the desired science concept or principle.

iv. In **open inquiry**, students explore a phenomenon or idea on their own, devising ways of doing so, minimally guided, after which they report what they did and found. The teacher facilitates the student activity but does not intervene more than necessary.

Figure 2 below shows an example of an item used in a questionnaire administered to students.

Figure 2. An example of a teaching Scenario administered to students, Adapted from Cobern et al. (2014).

Temperature and solubility

Ms. Clark's 7th graders have learned that sugar becomes more soluble in water as the water temperature increases. Now she wants her students to learn that, unlike sugar, the solubility of salt does *not* increase with temperature. Graduated cylinders of hot and cold water, salt, sugar, and stir sticks are available.

Thinking about how you would teach, of the following, which one is most similar to how you would conduct this lesson?

A. I would explain that while we found that sugar is more soluble in hot water, not all solids behave the same way. I would demonstrate using salt instead of sugar in the graduated cylinders of hot and cold water.

B. I would pose the question of whether all solids might dissolve better in hot water like sugar did. I would ask them to design and do an experiment to test whether salt dissolves better in hot or cold water.

C. I would give my class sets of graduated cylinders, salt, sugar, and hot and cold water, and ask them if they could find out anything about salt versus sugar dissolving in water. I would not prescribe what they should do. Later, we would discuss what they did and what they found out.

D. I would explain that while we found that sugar is more soluble in hot water, not all solids behave the same way. I would then have them verify this in the lab using the same amount of salt in each cylinder of hot and cold water.

The item presents a practical case, in the form of a teaching vignette describing a realistic teaching situation for a particular topic. The selected item is in a standard multiple-choice question (MCQ.) format as indicated above. At the end of the vignette, the respondent is requested to reflect upon the approach he or she would adopt when teaching this topic. This is followed by four options from which the respondent selects one he/she considers as the most appropriate. Each option corresponds to a pedagogical orientation, namely direct didactic, direct interactive, guided inquiry and open discovery.

3. Research methods

We employed a quantitative survey approach; the questionnaire with ten items was administered to all 2018 physical sciences Bachelor of Education final year students at a South African university. For this paper, only two items were analysed due to space or length of the paper. The sample comprised of forty-five students. In their final year of study, students take a year module on the methodology of physical sciences teaching. One of the core themes is to enable students to understand the nature and significance of physical sciences and then develop competencies necessary for successful and effective teaching in physical sciences. Pedagogical Content Knowledge features as a topic within this theme. Throughout the module, students are encouraged to be reflective of their own practice and to justify pedagogical actions taken. Pre-service teachers also do a school practicum that extends for twelve weeks. During this period, a senior teacher at a school mentors one pre-service teacher. The pre-service teachers are expected to design lesson plans, do classroom observations and teach several lessons. We used a descriptive statistics analysis and the percentage distribution of responses to the four teaching options was calculated. For calculation purpose, we arbitrarily ordered the spectrum of orientations along a scale of 1–4, where 1= didactic direct; 2 = direct interactive; 3 = guided inquiry and 4 = open inquiry. Thereafter the coded data were analysed by employing descriptive statistics. Table 1 below reports the pedagogical orientations of pre-service teachers.

4. Descriptive results and discussion

The results of the analysis of quantitative data collected through the questionnaire are presented below. We provide illustrative data comparison between physics and chemistry item responses for pre-service teacher responses to individual items and the overall results for the two items. In each case, we show results for the most preferred pedagogical orientation and display the distributions of responses across the four pedagogical options visually as bar charts. Illustrative data for the two example items given earlier are shown below.

Figure 3. Comparative bar charts for chemistry and physics teacher responses to the most appropriate choices for the two items.
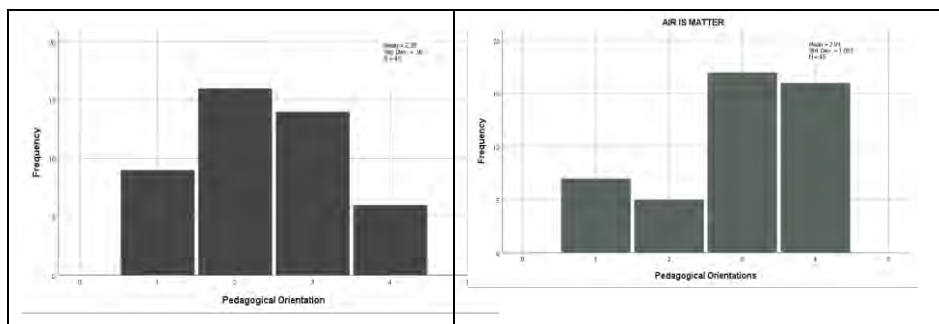

Figures 3 indicates the difference in distributions, for item 1 'acid base indicator', it is evident that direct active was the most appropriate pedagogical orientation among the pre-service teachers. For item 2 'Air is Matter, physical sciences pre-service teachers preferred guided inquiry as a preferred teaching approach. However, several participants selected open discovery as a preferred orientation. But beyond this, for physics items most pre-service teachers preferred orientation lies within teacher cantered modes while physics item lies solely within learner centred mode, this reflecting a clear difference overall between the two items.

5. Results for the overall questionnaire instrument

Table 1 presents a comparative result from the overall questionnaire instrument administered to all the physical sciences, pre-service teachers. The table gives the descriptive statistics for pre-service teachers' pedagogical orientations. For each item, the percentage of responses for the four teaching options over the two items is provided.

Table 1. Presents a comparative result from the overall questionnaire instrument.

	Direct Didactic (%)	Active Direct (%)	Guided Inquiry (%)	Open Inquiry (%)	Mean score	Standard deviation
Acid-Base indicator	15.6	11.1	37.8	35.6	2.93	1.053
Air is Matter	20	35.6	31.1	13.3	2.38	0.960
Overall physical sciences pre-service teachers preferred orientations for the two items (n=45)	17.8	23.35	34.45	24.45	2.65	1.0065

The table above shows the pedagogical orientations means scores and std deviations for the two items. The mean score for the first item 'air is matter' is 2.93, this mean the item responses is centered within guided inquiry and the standard deviation 1.053. The mean score for the second item 'acid-base indicator' is 2.38 and lies within direct active and standard deviation 0.960. The overall mean score for the two items is 2.65 and standard deviation 1.0065 meaning the preferred physical sciences pre-service teachers' pedagogical orientation is guided inquiry for the two items. Below are the two bar graphs that shows the overall preferred pedagogical orientations for the two items.

6. Discussion and conclusion

To respond to the research question 'What are the preferred pedagogical orientations of physical science pre-service teachers towards their own teaching?' the results show that pre-service teachers exhibited a preference for learner-centered teaching method which more guided inquiry for is both items.

For physics item, it was evident that there was a clear distribution of orientations among the students. In South Africa, inquiry-based learning is starting to receive recognition that it deserves from the teacher preparation programs and curriculum developers as the current curriculum emphasise the implementation of inquiry-based classrooms. The results indicate that guided inquiry is the most preferred orientation among the 2018 final year physical sciences pre-service teachers. A guided inquiry orientation is a learner-centred teaching orientation where the teacher plans an activity where students explore a phenomenon or idea, and from this, the teacher guides them to develop the desired science concept or principle. The descriptive statistic tests indicate there is no statistical relationship between the pedagogical orientations while on the other hand the categorical results, the bar graphs show there is a relationship between school type and context. When comparing these results to the findings obtained by Ramnarain and Schuster (2014) study, their findings also revealed differences between the orientations of township teachers and teachers at suburban schools. Township schools' teachers were more centred on active direct teaching orientation overall, while teachers at suburban schools exhibit a guided inquiry orientation.

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A COLLABORATIVE LEARNING PLATFORM TO ASSESS THE USE OF AGILE METHODOLOGIES IN ENGINEERING STUDIES

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Abstract

The success of using agile methodologies for collaborative work in industry, has led to adopt these methodologies for teaching Software Engineering. The curricula has evolved in recent years in order to introduce the use of agile development, so that the students practice their use and train the required skills for project-based collaborative work. Agile methodologies are characterized by being iterative and incremental, with short cycles, constant deliveries and a high level of interaction among team members. These characteristics constitute a challenge for educators and students since, in short periods of time, it is necessary to evaluate and provide feedback to individual and group work, regarding aspects like methodology usage, tools management, and collaboration within the team. For that reason, a Computer Supported Collaborative Learning (CSCL) environment has been developed to assist academics in evaluating and providing feedback to students. The CSCL environment is based on the collaborative platform GitLab, which has been adapted to implement concepts associated to SCRUM, an agile methodology widely adopted. Additionally, the use of GitLab allows to automatically collect information regarding individual and team work of students. Using GitLab data collected, a Learning Analytics platform has been developed in order to analyse group and individual work during the execution of student projects using SCRUM. The objective is to determine if SCRUM helps students to elaborate better software, by evaluating methodology adoption and quality of the resulting software. A prototype of the platform was developed and used in a Software Engineering undergrad course at a Spanish University, in which 79 students divided into groups of 3-4 people, developed two independent projects. Preliminary results show that the proposed CSCL environment helps in providing insight for evaluating and giving feedback to students. Additionally, the data collected by the CSCL environment showed a good correlation of SCRUM adoption by students and quality of resulting software.

Keywords: Collaborative learning, Learning analytics, Undergraduates, SCRUM methodology, Gitlab, software

1. Introduction

Due to the increase in the use of agile methodologies in the software development industry (Kropp & Meier, 2013), agile development has been introduced as part of the Software Engineering (SE) courses with the aim of making students knowledgeable of the methods and tools most used in companies, and develop skills for collaborative work (Anslow & Maurer, 2015). Agile methodologies are characterized by an iterative and incremental development strategy, with emphasis on collaboration and direct communication. The development is made in short iterations and, at the end of each one, a product that complies with a set of predefined requirements must be delivered. During each iteration, the development team must make decisions, and adapt to unforeseen events. It is necessary to evaluate both students and work teams and provide feedback promptly so that they can apply corrections and improvements between the iterations (Bai et al., 2018).

On the other hand, there is no consensus on which metrics are the most appropriate to evaluate the performance of groups and students, in terms of collaboration and communication (Alperowitz, Dzvonyar, & Bruegge, 2016). In this work, we propose to create a Computer Supported Collaborative Learning (CSCL) environment endowed with a Learning Analytics platform to evaluate the collaborative work of the students instead of just evaluating the final product. The projects are developed following the agile

methodology SCRUM, widely adopted in industry nowadays. Additionally, students used GitLab, an online tool for collaborative software development, which in turn is used for automatically register the development activity.

2. Background

In the field of education in SE, there are different studies dealing with the teaching of agile development through projects. Some studies focus on how to define projects, and strategies for working in class (Anslow & Maurer, 2015), other authors provide recommendations and lessons learned related to the practical teaching of these methodologies (Mahnic, 2012), including suggestions for tools (Scharf & Koch, 2013). In other cases, the studies analyze the gaps in the industry in terms of skills related to agile methodologies and suggest how to develop these skills in SE courses (Kropp & Meier, 2013). There are also proposals to modify curricula to adapt to learning objectives related to this type of methodologies (Kropp, Meier, & Biddle, 2016).

On the other hand, there are studies in which neural networks and data mining have been used to, based on the information generated during the SCRUM process, to understand past events, and predict success factors or future risks in the use of the agile methodology as well as its final result (Helwerda, Niessink, & Verbeek, 2017). In a similar way, this work automatically collects the information generated during the SCRUM process, but data is mined to evaluate the students in terms of methodology adoption, instead of using such information with predictive purposes.

3. Objective

Create a Computer Supported Collaborative Learning (CSCL) environment in the hand-on of the subject Middleware of a degree in Computer Engineering in a Spanish University. Additionally, a Learning Analysis Platform is implemented and used to automatically extract information that allows evaluating how students apply the SCRUM Agile methodology, the performance of individual and team work, as well as their evolution through development iterations. The evaluation of methodology adoption is compared with the quality of the software developed by students, in order to study possible correlations between both factors: SCRUM adoption and quality of software.

4. Method

During the practices of the Middleware course, two projects were implemented using SCRUM. In each project, a different software product was developed. Groups of 3-4 people were formed, in order to assign the different SCRUM roles. The Project Owner (PO) role, focused on the business, is in charge of transmitting the vision of the project to the team, formalizing and prioritizing the requirements. The SCRUM Master (SM) role, whose objectives are: leading the team, ensuring that rules and process are met, managing risks, and working with the PO to maximize the quality of the product. Finally, the Developer role is purely in charge of development tasks with the necessary technical knowledge to generate the product.

In SCRUM, a *sprint* is the temporal unit to represent a development cycle or iteration. In our case, each *sprint* has a duration of one week. On the other hand, each software requirement consists of a non-formal description, called *story*. Before each *sprint*, the PO presents the prioritized *stories*, then the team collectively decides how many and which ones they can commit to. Based on this, the team performs the task planning required to complete the *stories*, and meets regularly in order to synchronize, check the development process as well as analyze possible problems. Due to the initial time frame of the course, the number of *sprints* for each project is established to 5 for the first one, and to 4 for the second one.

Evaluation of students is performed assigning the following weights to four different aspects: methodology (40%), functionality (50%), code quality (5%) and usability (5%). Additionally, four categories are defined for the evaluation of the methodology: suitable use of roles, feedback, reliability of planning, and development activities. In turn, each category is evaluated based on metrics, which values are automatically obtained through the Learning Analysis Platform by querying the GitLab framework.

4.1. Participants

In this pilot test participated 79 students of a Software Engineering course at a Spanish university. Students were arranged in groups of 3-4 people, resulting 20 groups. A mixed strategy, between random assignment and affinity choice, were used to define the development groups. First, groups were created randomly, and then, a maximum of one student per group was allowed to change groups. Subsequently, students are asked to distribute the SCRUM roles within the team so there will be a PO, a SM and, one or two Developers.

4.2. Instrument and data collection

Students are asked to record all their activities during project development using the GitLab framework. This framework provides storage for projects, and allows teams to work concurrently on the same project while tracking changes that each team member makes on the software. SCRUM elements such as *roles*, *sprint*s, and *stories* are mapped with GitLab elements.

To obtain information from GitLab, we develop a tool that automatically extracts information from GitLab; the extraction of data can be scheduled to run periodically. Due to the large amount of data obtained from GitLab, we selected the set of data of interest for this study. Some of the data comprises: the role that creates/assigns a given *story*, number and frequency of meetings, planning fulfillment, and number and frequency of software updates per team member.

In addition to information extraction, the developed tool allows the generation of different graphs to assist in the analysis of SCRUM usage and team performance, contrasting information such as: *stories* assigned/completed within the same *sprint*, or the number of product updates within a *sprint*. Such graphs are obtained by performing different data queries, where the scope can be customized: by project, by *sprint*, or by date. The data extraction and information visualization capabilities are the basis of the Learning Analysis Platform for providing a useful tool to give feedback to the teams.

4.3. Statistical analysis

Using the data collected through the Learning Analysis Platform, the statistical analysis has been based on a correlation study by comparing the level of SCRUM adoption by students with the quality of the resulting software developed by students.

On one hand, the quality of the resulting software has been evaluated by one of the professors of the course. Thus, as mentioned above, the quality is obtained from the grade calculated as a weighted sum of three aspects of the students' projects: functionality (50%), code quality (5%) and usability (5%). In this way, using a homogeneous criterion, which in turn is applied by a single evaluator, enforces a fair evaluation process.

On the other hand, the level of adoption of SCRUM is obtained through the Learning Analysis Platform. The information automatically collected and the plots generated by the platform, assist in the task of assessing the adoption of the development methodology. Concretely, the development activity collected by the platform is combined for generating three types of graphs: the individual activity of each student within his/her group, level of adoption of SCRUM roles by students and the temporal distribution and qualitative/quantitative measurement of each group activity. Due to space limitations only an example of the latter type of graph is shown in Figure 1. Thus, Figure 1 shows temporal distribution of the development activity for each group by plotting, on a per-sprint basis, the development items and SCRUM activity (i.e. *meetings*, *user-stories, features, bugs and others*).

Figure 1. Graph showing the time distribution and qualitative/quantitative measurement of each group activity.
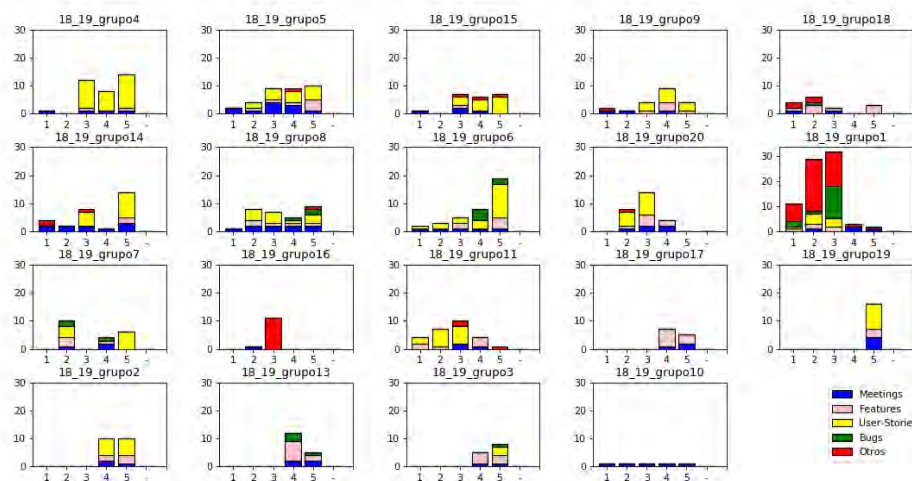
Using the data resulting from the evaluation of software quality and the level of adoption of SCRUM by each group, a correlation analysis is performed in order to assess if the use of SCRUM helps students during the development process.

5. Results and discussion

According to the statistical analysis, described above, results have been obtained showing the relation between level of adoption of SCRUM and the quality of the software developed by students. This relation has been obtained for the two projects carried out by students within the context of the course.

5.1. Results

Results are shown in the form of correlation plot. Fig. 2 shows the correlation obtained for the two projects developed during the course. The plot on the left corresponds to results for the first project and plot on the right, corresponds to results for the second project. The different points plotted in Figure 2 represent a single group. The label associated to each point is the group number, displayed for tracking purposes. Additionally, the plots in Figure 2 are complemented with a fitting line, to show the correlation trend.

Figure 2. Scatter plots showing correlation among SCRUM and projects grades. Left: 1st project. Right: 2nd project.
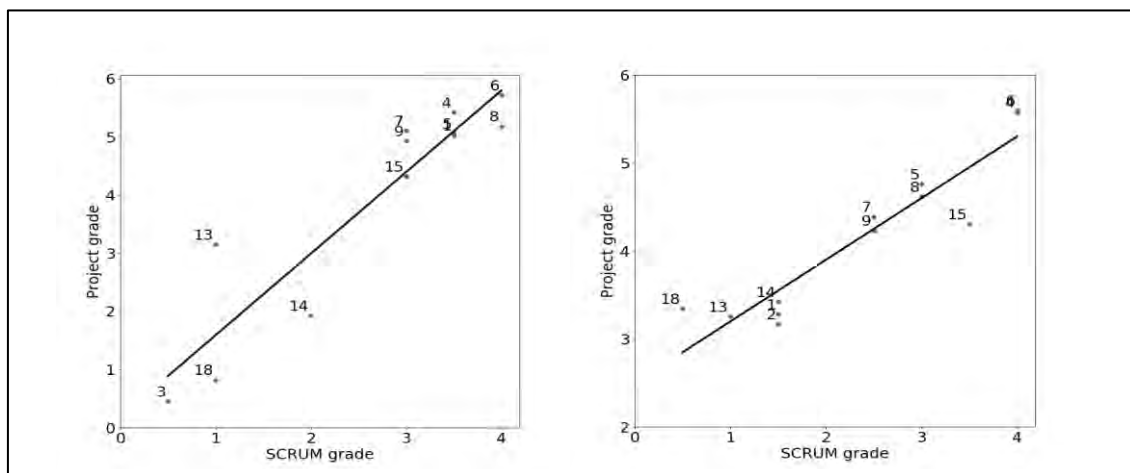
5.2. Discussion

Different conclusions can be extracted from Figure 2. On one hand, it can be observed the level of correlation between the use of SCRUM, measured as SCRUM grade, and the quality of the developed software, measured as Project grade. Looking at both plots, there is almost perfect correlation, since teams with a low level of adoption of SCRUM have resulted in software with bad quality, in terms of functionality, code quality and usability.

On the other hand, Figure 2 also shows more relations between groups with a bad and good use of SCRUM. Student groups can be classified in two sets: one with a SCRUM grade lower or equal to 2 (considered as bad) and another one with SCRUM grade higher than 2 (considered as good). Thus, the set of groups with bad SCRUM grade for the first project would be: 3, 13, 14 and 18 (see left plot in Figure 2). The same set for the second project would be composed of groups: 1, 2, 13, 14 and 18. On the other hand, the set of groups with good SCRUM grade for the first project would be: 1, 4, 5, 6, 7, 8, 9 and 15. The same set for the second project would be composed of groups: 4, 5, 6, 7, 8, 9 and 15.

From a quantitative perspective and according to the sets described above, the ratio of groups with bad:good SCRUM grade, would be 4:8 for the first project and 5:7 for the second project. The fact that these ratios are similar across projects, shows that the number of groups with good use of SCRUM in the first project were not discouraged from continue using the methodology in the second project while still obtaining a good project grade.

From a qualitative perspective, the sets of groups mentioned above show that groups with good use of SCRUM and obtaining a good project grade remained mainly the same (i.e. 4, 5, 6, 7, 8, 9 and 15) with the exception of group 1 which made a good use of SCRUM in the first project but refrain from doing so in the second project. Nevertheless, the fact that group 1 obtained a lower project grade in the second project supports the initial hypothesis about the link between the use of SCRUM in the course and the quality of the software developed by students.

The qualitative and quantitative analysis of Fig. 2 also shows that groups using SCRUM did not increase from the first project to the second project. Additionally, from the twenty groups formed to take part in the course, only twelve groups actually participated in both the first and second project. We leave as a future work the analysis of the possible reasons behind this behavior. Nevertheless, as informally stated

by several students, the calendar and academic duties, carried out simultaneously with this course, was an important limitation for using SCRUM properly.

Finally, this study was possible thanks to the implementation and use of the Learning Analytics platform, since it helped in analyzing and understanding the amount of data generated by students groups while developing the assigned projects using the GitLab platform.

Acknowledgements

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PROPOSITIONAL LOGIC WORD PROBLEMS AND MS EXCEL AT PRIMARY AND SECONDARY EDUCATION

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Abstract

It seems that propositional logic word problems are interesting for pupils aged 9 to 16 years. Younger pupils usually solve the propositional logic word problems by means of the systematic analysis of possible cases. In this way they significantly develop their combinatorial skills.

Nevertheless, we can solve the propositional logic word problems almost automatically using logical connectives and truth tables. Moreover, there are software applications for solving problems of mathematical logic. For example, MS Excel can help to work with the truth table.

We carried out research with the aid of a questionnaire to find out the preparedness of prospective elementary teachers to use MS Excel for solving propositional logic word problems.

In our paper we show some examples of propositional logic word problems for pupils of different ages. In our opinion, using MS Excel for solving propositional logic word problems can make such word problems even more attractive.

Keywords: Propositional logic, word problems, MS Excel.

1. Introduction

Example 1. Kattie, Lucy, and Emily are quarrelling triplet. If Kattie goes on the trip, then Lucy will not go. If Emily goes on the trip, then Lucy will not go. Kattie or Emily will go on the trip. Lucy or Emily will go on the trip. Can a couple of girls go on that trip?

The previous problem can be solved even by younger pupils aged 9 or 10 years by means of systematic analysis of three possible cases:

1. Kattie and Lucy will go together on the trip.
2. Kattie and Emily will go together on the trip.
3. Lucy and Emily will go together on the trip.

It is very simple to verify given conditions that only Kattie and Emily can go together on the trip.

Nevertheless, we can solve the previous propositional logic word problem using logical connectives and truth table.

In our paper we recall the most common logical connectives (Section 2) and explain how to use MS Excel to create a truth table for solving a propositional logic word problem.

2. Logical connectives

By means of ("Logical connective", Wikipedia) we recall the most used logical connectives. Moreover, we use ("Using logical functions", 2018) to show how MS Excel can help in creating truth tables of logical connectives.

2.1. Negation

Negation is an operation on one logical value, typically the value of a proposition that produces a value of true when its operand is false and a value of false when its operand is true. So, if a statement P is true, then $\neg P$ (pronounced "not P") would therefore be false; and conversely, if P is false, then $\neg P$ would be true.

Table 1. Truth table of negation.

P	$\neg P$
0	1
1	0

In the previous truth table 0 means false and 1 means true. In MS Excel, we can use the IF function:

Table 2. Truth table of negation generated by MS Excel.

	A	**B**
1	P	$\neg P$
2	0	=IF(A2=0;1;0)
3	1	=IF(A3=0;1;0)

2.2. Conjuction

Logical conjunction is an operation on two logical values, typically the values of two propositions, that produces a value of true if and only if both of its operands are true. Conjuction of two statements P, R is denoted by $P \wedge Q$ (pronounced "P and R").

Table 3. Truth table of conjuction.

P	R	$P \wedge R$
0	0	0
0	1	0
1	0	0
1	1	1

In MS Excel, we can use the IF function together with the AND function:

Table 4. Truth table of conjuction generated by MS Excel.

	A	**B**	**C**
1	P	R	$P \wedge R$
2	0	0	=IF(AND(A2;B2)=TRUE;1;0)
3	0	1	=IF(AND(A3;B3)=TRUE;1;0)
4	1	0	=IF(AND(A4;B4)=TRUE;1;0)
5	1	1	=IF(AND(A5;B5)=TRUE;1;0)

2.3. Disjunction

Logical disjunction is an operation on two logical values, typically the values of two propositions, that has a value of false if and only if both of its operands are false. Disjunction of two statements P, R is denoted by $P \vee R$ (pronounced "$P \vee R$").

Table 5. Truth table of disjunction.

P	R	$P \vee R$
0	0	0
0	1	1
1	0	1
1	1	1

In MS Excel, we can use the IF function together with the OR function:

Table 6. Truth table of disjuction generated by MS Excel.

	A	B	C
1	*P*	*R*	*P* ∧ *R*
2	0	0	=IF(OR(A2;B2)=TRUE;1;0)
3	0	1	=IF(OR(A3;B3)=TRUE;1;0)
4	1	0	=IF(OR(A4;B4)=TRUE;1;0)
5	1	1	=IF(OR(A5;B5)=TRUE;1;0)

2.4. Implication

Implication is used to form statements of the form $P \Rightarrow R$ which is read "if P then R". P is termed the antecedent of the implication and R is termed the consequent of the implication. The implication $P \Rightarrow R$ is false if and only if P is true and R is false.

Table 7. Truth table of implication.

P	*R*	$P \Rightarrow R$
0	0	1
0	1	1
1	0	0
1	1	1

In MS Excel, we can use the IF function by the following way:

Table 8. Truth table of implication generated by MS Excel.

	A	B	C
1	*P*	*R*	$P \Rightarrow R$
2	0	0	=IF(IF(F1;G1=1;TRUE)=TRUE;1;0)
3	0	1	=IF(IF(F2;G2=1;TRUE)=TRUE;1;0)
4	1	0	=IF(IF(F3;G3=1;TRUE)=TRUE;1;0)
5	1	1	=IF(IF(F4;G4=1;TRUE)=TRUE;1;0)

2.5. Logical equality

Logical equality is an operation on two logical values, typically the values of two propositions, that produces a value of true if and only if both operands are false or both operands are true. Logical equality of two statements P, R is denoted by $P \Leftrightarrow R$ (pronounced "*P* iff *R*").

Table 9. Truth table of logical equality.

P	*R*	$P \Leftrightarrow R$
0	0	1
0	1	0
1	0	0
1	1	1

Now, the IF function in MS Excel can be used very simply:

Table 10. Truth table of implication generated by MS Excel.

	A	B	C
1	*P*	*R*	$P \Leftrightarrow R$
2	0	0	=IF(F1=G1;1;0)
3	0	1	=IF(F2=G2;1;0)
4	1	0	=IF(F3=G3;1;0)
5	1	1	=IF(F4=G4;1;0)

3. Examples

Now, using MS Excel eventually, we can create a truth table for Example 1. We denote by K the proposition "Kattie will go on the trip", by E the proposition "Emily will go on the trip", and finally we denote by L the proposition "Lucy will go on the trip".

Table 11. Truth table of Example 1.

K	E	L	K⇒ ¬L	E⇒ ¬L	K∨L	L∨E
0	0	0	1	1	0	0
0	0	1	1	1	1	1
0	1	0	1	1	0	1
1	0	0	1	1	1	0
0	1	1	1	0	1	1
1	0	1	0	1	1	1
1	1	0	1	1	1	1
1	1	1	0	0	1	1

Of course, the use of MS Excel is more advantageous in the case of a larger number of examined variables. The following example is intended rather for older pupils aged from 14 to 16 years.

Example 2. A handball team coach is thinking about a line-up for a match. He is taking the following conditions into account:
1. If player K plays, then player L will play.
2. If player O plays, then players K and N will play.
3. Players L and M will not play together.
4. Player M will play if and only if player N will play.
5. Player N or player O will play.
Who of the players K, L, M, N, O will play?

We can use MS Excel to create a truth table. With respect to its extant (it has 1+32 lines), we show only its part:

Table 12. Truth table of Example 2.

K	L	M	N	O	K⇒L	O⇒(K∧N)	¬(L∧M)	M⇔N	N∨O
0	0	0	0	0	1	1	1	1	0
0	0	0	0	1	1	0	1	1	1
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
1	0	0	0	1	0	0	1	1	1
0	0	1	1	0	1	1	1	1	1
0	1	0	1	0	1	1	1	0	1
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
1	1	1	1	0	1	1	0	1	1
1	1	1	1	1	1	1	0	1	1

4. Research

A total of 67 prospective elementary teachers studying at the Faculty of Education in Olomouc, Czech Republic, answered the following simple question (after the propositional logic lessons):
Had an idea of using MS Excel come to you during solving propositional logic word problems?
On this question only 8 students answered yes and 59 students answered no. As much attention is paid to MS Excel at primary and secondary schools, the previous result is not very positive.

Acknowledgements

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STUDENTS' PERCEPTIONS, PROCESS AND PRODUCT IN A CSCL EXPERIENCE

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Abstract

Following up students' progress in collaborative activities is a crucial element in the teaching task if we want to properly scaffold learning and assess students' performance. Considering this, a Computer Supported Collaborative Learning (CSCL) environment was created in the subject Middleware, devoted to the development of collaborative software projects delivered to undergraduates from Computer Engineering in a Spanish university. Students (n= 46) were asked to work in teams using the SCRUM methodology and the GitLab software. In order to analyse their individual performance, a Learning Analytics platform was created and an online survey was designed to complement the results obtained collecting students' perceptions. One of the aims in our project was to explore the relationships between students' outcomes and their perceptions about teamwork and the tools used. Specifically, we analysed the relationship between students' final mark, students' perceptions of teamwork and their SCRUM competence. Their sense of flow during the collaborative activity was measured as well. Results show correlations among these variables. Further discussion is provided around the students' perceptions as a key aspect for understanding students' behaviour and performance.

Keywords: Computer supported collaborative learning (CSCL), undergraduates, perceptions. collaboration, teamwork.

1. Introduction

This research arises from the teaching need to provide adequate follow-up to the collaborative work of engineers in training and, in particular, to solve one of the main difficulties in this monitoring, such as documenting the collaborative tasks carried out (Wise & Schwarz, 2017). To this end, a Learning Analytics (LA) platform has been implemented, and this implementation has been studied from a multidimensional perspective, seeking to identify its possible impact on the effectiveness of the learning achieved, not only in the instrumental competence of the students, but also in its psychological, social and individual aspects.

LA can be defined as "the measurement, collection, analysis, and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs (ECAR-ANALYTICS Working Group, 2015, p. 2). These tools are expected to allow teachers a more refined monitoring of students work, while also providing greater precision in evaluating the two main lessons learned from online collaboration.

The effectiveness of group learning in the training of computer engineering university students, and in their preparation for professional performance, has been widely studied (Hernández Sellés, González Sanmamed, & Muñoz Carril, 2014, Zhan, 2008). By requiring not only collaborative learning, but learning to collaborate, group learning fosters active, constructive and reflective learning (Zariquiey Biondi, 2016; Zhan, 2008), while also developing much-needed interpersonal skills in the flexible working environments of the 21st century (Schwendimann, Beat A., De Wever, Bram, Hämäläinen, Raija, Cattaneo, 2018).

In recent years, in the university training of computer engineers, the curricula have been adapted to incorporate the learning of agile methodologies, due to their growth in the software industry as a means for collaborative work (Kropp & Meier, 2013a). Agile methodologies are characterized by being iterative and incremental, with short work cycles, constant deliveries and a high level of interaction among team members (Dybå & Dingsøyr, 2008; Kropp & Meier, 2013b). These characteristics present a challenge both for professors and students since it is necessary to evaluate and to provide feedback, on individual and group level, on aspects such as use of the methodology, management of the tools and collaboration in teams (Mahnic, 2012).

This learning context can be conceptually located within the Computer-Supported Collaborative Learning (CSCL), a multidisciplinary field focused on studying how technology and computers can improve and make collaborative work more efficient (Cheng, Yu, & Li, 2013; Shawky, Badawi, Said, & Hozayin, 2015). The literature on CSCL identifies as determining factors: the type of collaboration established, the collaborative model and the tools and support provided to students (e.g. Borges, Mizoguchi, Bittencourt, & Isotani, 2018). On the other hand, although there are several terms related to online collaborative learning that are in some way interchangeable (Zhan, 2008), CSCL specificity relays in its emphasis on the collaborative online resources used (Wise & Schwarz, 2017, p.427)

To face the challenge of monitoring the students, especially when using agile methodologies, the literature on CSCL recognizes the importance of an adequate teacher planning, able to take into consideration both the students' real capacity to collaborate, as well as providing an effective pedagogical use of the implied resources (e.g. Kropp & Meier, 2013a; Walter, Tramontini, Fontana, Reinehr, & Malucelli, 2013). In that sense, SCRUM methodology can be a good guide.

On the other hand, deepening in the factors that allow to understand and predict the positive results of students in virtual environments, in general, and in CSCL in the training of computer engineers, in particular, research in eLearning in the last decades has identified several variables, such as: self-efficacy (Muñoz *et al.* 2017), and specifically self-efficacy in relation to learning computer programming and online collaboration (e.g. Tek, Benli, & Deveci, 2017), self-regulation (e.g. Chakraborty & Muyia Nafukho, 2014), metacognition (e.g. Cocea & Weibelzahl, 2006; Järvelä et al., 2016), implicit theories about their own capacities (e.g. Güeto Rubio, 2018), intrinsic motivation and the flow state (Cocea & Weibelzahl, 2006; Cristea, 2017; Walter et al., 2013) and the influence of emotions, especially anxiety in groups. of online collaborative work (e.g. Syed-Abdullah, Holcombe, & Gheorge, 200). In this paper we focus specifically on the study of the flow state.

2. Design

This study is part of a broader investigation devoted to analyse the effectiveness of the implementation of a Learning Analytics (LA) platform as a tool for teachers to monitor the CSCL of their students. For this research, a mixed parallel design has been chosen under the general form of a Design-Based Research (DBR). Our aim is to elaborate a framework useful as a guide to achieve a personalized follow-up in the scope of the CSCL. The purpose of this design is, firstly, to deepen the understanding of the CSCL in the context of software engineering and, secondly, to study the features of the instructional tool designed, in this case, the LA platform.

3. Objectives

This work is aimed to identify the effectiveness of online collaborative learning based on its determining factors, both social and individual. This is the reason why it has been explored the relationships between the students' results and their immersion in the work carried out. Our goal is to understand what social, individual psychological factors can be influencing students' CSCL. Specifically, we analyse the relationship between the students' final mark, students' perceptions of teamwork, students' perceptions of the tools employed and students' competence with SCRUM. Their sense of flow during the collaborative activity is measured as well.

Table 1 shows the research questions and related hypothesis in this design.

Table 1. Research questions and related hypothesis.

Research question	Hypothesis
How do students' perceptions about teamwork and the tools employed influence their performance with SCRUM within the GitLab environment?	Hypothesis 1: Better students' perceptions about teamwork and the tools employed influence their performance with SCRUM within the GitLab environment
How do these variables affect the students' degree of immersion in the work carried out in relation to their performance?	Hypothesis 2: Flow states in online collaboration correlates with positive perceptions of the students towards the activity and the tools used and with a better performance in the collaborative activity.

4. Methods

This study has been carried out with the 46 students of the aforementioned Middleware subject. This subject, eminently practical and with a teaching load of 3 ETCs, is offered in the third year of the Computer Engineering Degree at the Polytechnic University of Madrid (UPM). According to the academic itinerary chosen previously by each student, previous experience with programming or online collaboration may be different for each student.

To work on the two software development projects included in this course, a CSCL environment was developed based on the GitLab platform -a wikis-based software repository-, which has been adapted to implement concepts associated with SCRUM, an agile methodology widely adopted. Students were asked to work in teams of three or four freely formed by the same students.

For an initial descriptive exploration of the study, a questionnaire was developed. It was implemented online after the completion of the practices of the Middleware subject. The teacher of the subject was responsible for introducing and monitoring its completion. Those students doing their internships were sent a link to the electronic questionnaire to be answered outside class time.

The items of the questionnaire developed were organized in 7 sections (for this study we only used the items from Section 1 and 6):

- Presentation: students are informed about the purpose of the questionnaire and aspects about anonymity.
- Section 1: students' own perceptions of their expertise with tools for collaborative work, as well as about collaborative work and the tools to be used during the practices of the Middleware subject.
- Section 2: general self-efficacy of the students. Scale of general self-efficacy (Sanjuán Suárez, Pérez García, & Bermúdez Moreno, 2000).
- Section 3: student's self-compassion. Spanish version of the Self-Compassion Scale (SCS) (Garcia-Campayo et al., 2014).
- Section 4: students' implicit theories about their learning.
- Section 5: students' level of anxiety. Spanish version of the Kuwait University Anxiety Scale (S-KUAS) (Abdel-Khalek, Tomás-Sabádo, & Gómez-Benito, 2004).
- Section 6: students' flow state during the collaborative work. The Spanish version of the Flow State Scale (FSS, Jackson & Marsh, 1996; Spanish version, Calvo, Castuera, Ruano, Vaíllo, & Gimeno, 2008).
- Section 7: sociodemographic data as well as informing students about data protection.

Students' marks concerning their process and product elaborated during a collaborative activity were collected as well.

5. Results

In the following table, correlations among the variables analysed for our study can be observed:

Table 2. Correlations among variables.

		Activity mark	SCRUM competency	Perceptions of tools for collaboration	Teamwork perception	Flow
Activity mark	Pearson correlation	1	,798**	,270	,245	,376*
	Sig. (bilateral)		,000	,069	,101	,010
	N	46	46	46	46	46
SCRUM competency	Pearson correlation	,798**	1	,371*	,155	,305*
	Sig. (bilateral)	,000		,011	,302	,039
	N	46	46	46	46	46
Perceptions of tools for collaboration	Pearson correlation	,270	,371*	1	,591**	,491**
	Sig. (bilateral)	,069	,011		,000	,001
	N	46	46	46	46	46
Teamwork perception	Pearson correlation	,245	,155	,591**	1	,584**
	Sig. (bilateral)	,101	,302	,000		,000
	N	46	46	46	46	46
Flow	Pearson correlation	,376*	,305*	,491**	,584**	1
	Sig. (bilateral)	,010	,039	,001	,000	
	N	46	46	46	46	46

**The correlation is meaningful at level 0,01 (bilateral)

* The correlation is meaningful at level 0,05 (bilateral)

Adaptive perceptions of teamwork strongly correlates with positive perceptions of tools for collaboration The sense of flow along the collaborative activity strongly correlates with adaptive perceptions of teamwork and positive perceptions of tools for collaboration. To a less extent, it correlates with the activity mark and the SCRUM competency. Lastly, SCRUM competency strongly correlates with the activity mark and to a less extent with positive perceptions of tools for collaboration.

6. Discussion

The use of Learning Analytics (LA) is a highly promising research area in educational technology for supporting the teaching activity (Wise & Schwarz, 2017). In this context, it is important for us to investigate the role of different factors in the learning process such as performance, competences or perceptions.

Our study shows that adaptive perceptions of teamwork and positive perceptions of the tools employed influence students' performance with SCRUM within the GitLab environment. Furthermore, it also shows that the flow state in online collaboration correlates with positive perceptions towards a collaborative activity, the tools used and with a better performance.

Although some studies address the flow state (Cocea & Weibelzahl, 2006; Cristea, 2017; Walter et al., 2013), there is a gap in studies relating it with perceptions, process and products in a CSCL experience. It is interesting in our study how the sense of flow correlates more strongly with perceptions than with performance and competency. Therefore, it seems that individual perceptions play a key role in the sense of flow. However, when thinking of competencies, they correlate stronger with performance than with perceptions.

Considering that LA has to do with transversal learning of social skills and teamwork (Hernández-Sellés, González-Sanmamedy, & Muñoz-Carril, 2015, page 151), our work brings some light into some aspects that show students' sense of flow along collaborative activities such as their individual *perceptions* (adaptive perceptions of teamwork and positive perceptions of tools for collaboration), *process* followed (the SCRUM competency) and *product* obtained (the activity mark). Future research should deep in these lines.

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INTERACTION BETWEEN TEACHER AND PUPIL AND ITS INFLUENCE ON THE PERCEIVED CLOSENESS OF PUPILS

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Abstract

The paper deals with the relationship between teacher and pupil in a school environment. The first part is focused on the theoretical framework which defines the specifics of the asymmetric interaction between the two main subjects of the education process. Research of the teacher's immediacy and perceived closeness is evaluated in this context. These are important aspects that seem to be directly reflected in student's learning and the classroom climate. The second part presents the results of a qualitative study which aimed to analyze the interactions in the relationship between teacher and pupil, their impact and influence on the perceived closeness of pupils. Narrative interviews with humanities students and their analysis identified several aspects in the relationship between teacher and pupil. It seems that relations with teachers are reflected in students' lives and their attitudes towards themselves, authority and education.

Keywords: Perceived closeness, pupil, relationship, school environment, teacher immediacy.

1. Introduction

For the most part, the educational process arises from the social interaction of at least two entities and takes place within interpersonal relationships. The importance of relationships and interactions in teaching is supported by a social constructivist theory that emphasizes the irreplaceable role of social interaction in building knowledge (Vygotsky, 1978). The whole educational experience can be shaped by the quality of the relationship to a great extent, and therefore the processes of interaction and communication are the cornerstones supporting or hindering the motivation and learning of pupils (Koca, 2016).

Several types of interactions are observed in or outside the school environment. In terms of the positions and roles of entities in the interaction, we distinguish symmetric and asymmetric interactions (Gavora, 2005; Kumpulainen, Wray, 2012). Typically, the symmetric form of interaction occurs between pupils where their positions are equivalent. However, as a formal social institution, the school has a set of rules that also include the positions and roles of participants in the learning process which are asymmetric due to the degree of responsibility and authority of individuals in the institution. In the context of the classroom, an asymmetric interaction occurs in the teacher-pupil relationship where the teacher is superior to the pupils and is allowed to determine the form of teaching and to decide on matters in the classroom. Many experts agree that the interaction between teacher and pupil, pupils or class is a specific type of human action and influence (Haffen et al., 2014, Hurst, Wallace & Nixon, 2013; Gavora, 2005). Nelešovská (2001) provides details on this claim, stating that in addition to psychological and social aspects, teacher-pupil interactions also include pedagogical aspects, where the pupil is influenced not only by the teacher's knowledge or experience but also by their personality, approach to pupils, interests, character qualities, way of acting or speaking.

In this context, the asymmetry of this relationship stems mainly from the formal aspect of teaching, which is established by the School Rules and the School Legislative Framework. Despite that, informal aspects beyond School Rules and education, in general, are reflected in the relationship. One of these aspects is the degree of perceived closeness, known as the teacher immediacy. The concept of teacher immediacy comes from studies of implicit communication by social psychologist Albert Mehrabian (1969; 1971), who described a communication behaviour enhancing the sense of closeness in human interaction. He coined the term "immediacy behaviour" and based it on the principle of approach – avoidance. According to him, people are more intensely and more often involved in interactions with people whom they regard as sympathetic and with whom they experience a higher degree of closeness.

Conversely, people have an evasive tendency to interact with people with a low degree of closeness between interaction participants. In the educational environment, from the perspective of instructional communication, teacher immediacy can be defined as behaviour including verbal and nonverbal communication stimuli which provide a sense of proximity and reduce the perception of the psychological distance between the teacher and students or pupils (Zhang & Witt, 2016). In simple terms, it encompasses expressions of affection; teachers show that they like their students (Richmond & McCroskey, 2000). Traditionally, teacher immediacy is transmitted non-verbally through smile, relaxed posture inclined towards the pupils, seeking eye contact, or variations in voice (Gorham, 1988). Conversely, if the teacher neglects eye contact, uses monotonous voice, does not smile, leans away from students, and does not show enough warmth in general, the development of a positive relationship between the teacher and a pupil is probably impossible. Verbal immediacy is manifested, for example, by addressing the pupil by their name, using the collective pronouns ("our", "we"), verbal empathy, talking to pupils about topics selected by the pupils or sharing the teacher's personal experience (Gorham, 1988).

Research suggests that a higher level of immediacy affects both the affective aspects of learning and cognitive learning (Richmond, Gorham & McCroskey, 1987; Gorham, 1988; Rodriguez, Plax & Kearney, 1996; Zhang & Oetzel, 2006). It also encourages participation, engagement, willingness to communicate or meet teacher's requirements (Manzel & Carrel, 1999; Burroughs, 2007; Robert & Friedman, 2013). At the same time, it can act as a neutralizing variable that can compensate for occasional mistakes in teacher's behaviour (Kearney et al, 1988; Thweatt & McCroskey, 1998; Mottet et al., 2006).

However, all these studies are based on the claim that there are patterns of teacher behaviour that are stable over time. In addition, research concepts are mainly based on quantitative research which, even though it results in new knowledge, is considerably limited by such framing. The idea of stable manifestations of teacher immediacy cannot be conclusively refuted, but it is also necessary to consider whether situational influences affect the perception of proximity. In this context, we want to research: How can the interaction between the teacher and the pupil influence the perceived closeness of the pupil?

2. Methods

This research employed methods of qualitative research for the purpose of the research questions. First, narrative interviews were conducted with seven students of humanities; five women and two men. All participants attended regular state primary schools. We chose the narrative conversations deliberately because we assumed that the timeline can be followed retrospectively in order to analyze interactions and their influence on the relationship and perceived proximity. This prediction was confirmed and rich data was obtained for analysis and open coding.

The next part presents the results of the analysis. For purposes of data transparency, the results are complemented by the participants' original statement.

3. Results

Teacher-pupil interactions seem to take place in relationships that are perceived as positive, negative or neutral. Those can be either stable or variable. Let's take a closer look at the different types of relationships and the interactions of the two entities in the educational process.

3.1. Interaction and teacher immediacy in stable relationships

During school attendance, the participants and experienced stable, constant relationships with their teachers. Stability is supported in particular by established patterns of behaviour employed by the teacher at school. One of the participants literally said: "He acted the same all the time. At no point did he change anything, he applied his approach to everyone and in all circumstances". Behaviour may be closely linked to teacher's personality traits which, according to the participants, played a dominant role, e.g. "for some teachers it was the same for the whole four years, it was clearly given by their nature" or "she had such a cold, dominant nature and that's how she has been treating us the whole time."

3.1.1. Positive, neutral and negative perception of a relationship.
Positively perceived relationship shows the highest degree of perceived closeness. The pupil classifies the teacher as their favourite in the early stages of the relationship and this preference lasts throughout their school attendance. "From the very beginning, she was so kind, often talking to us and asking us how we were. I loved that about her". This stability provided the students with a sense of security and safety, so it was in this type of relationship where they most often said: "when I did not know what to do, I asked her because she was the closest to me and I was sure she would not refuse me". In return, the students tried to be

accommodating to these teachers and tried to meet their demands. This can be supported by the statement "when she asked us to behave nicely towards a certain unpopular teacher, I took her words seriously".

The second type of relation, perceived as neutrally stable, represents the middle ground between the two relational poles. It is a type of relationship that does not provide closeness between the actors of interaction. Teachers do not create or make use of situations that could shape and develop teaching on the interpersonal level. Participants mostly acknowledged teacher's lessons taught in an interesting manner but also said that they did not perceive such a teacher as significant to them. "He wasn't a bad teacher, but he wasn't anyone to me, just someone without a face, an unknown person, he was just teaching..." or "Her lessons were interesting, she could narrate very well, but the teacher wasn't interested in anything else, so there was just emptiness between us".

In a negatively perceived relationship are characterised by a high degree of tension and a low level of teacher immediacy. Inappropriate behaviour of both the teacher and the pupil may occur and we can observe delaying tactics and avoiding interaction with the teacher. A relationship assessed as negative from the pupil's point of view begins with minor negative stimuli that interact with a persistent negative assessment of the teacher and interaction with them.

Interactions in this relationship overreach into a personal level, making them more sensitive for the pupils. Specifically, Participant stated: "I hear as if it was today how he always said that I was useless and I'll end up in a factory as a worker and he mocked me when I submitted my high school application". These interactions may have a stronger impact on the pupils, for example, "I have often struggled with the feeling of inferiority" or "because of that, I do not trust teachers anymore", "it's actually because of her that I feel bad about school".

3.1.2. Confirmation. Although this is an interpersonal plane where no major changes occur, the interactions still take place within situations. In this context, we have identified s phenomenon that we call confirmation. The participants stated that at least one significant situation has emerged in a stable relationship that has confirmed the relationship between the teacher and the pupil. In some cases, a subjective deepening of the perceived closeness occurred at the same time. This fact is reflected in the following statement: "At that moment I was expecting him to react negatively, whereas she accepted the situation perfectly. That's how she won me over even more than before. I thought she was an angel, not a human". In another case, the confirmation may occur in a negatively perceived relationship. "He didn't have to deal with it in such radical manner. He even said he didn't have to, but he went ahead and made it an issue. By doing that, he definitely changed my perception of him for the worse".

3.2. Interaction and teacher immediacy in variable relationships

The results suggest that teacher immediacy may be subject to situational influences that affect perceived closeness through interaction with the pupil. Within that context, we have identified a model (Fig. 1) that illustrates how relationships, interactions, and perceptions of closeness work.

3.2.1. A model of changes in relationships and perceived closeness. Figure 1 shows the changes in relationships and interactions related to perceived closeness. Every social interaction occurs within a certain relationship that seems to be evaluated on the scale of negative - neutral - positive. In variable relationships, the initially perceived relationship plays a crucial role as it can determine the degree of closeness that will be perceived after a breaking point.

A breaking point is a situation in which an interaction had a radical impact on the perceived closeness and understanding of the relationship. Interactions leading to increased perceived closeness can manifest themselves in different forms on the teacher's part. Usually, the teacher acted "unexpectedly" better than predicted.

For example, the statements included: "I was quite surprised that she was defending me", "I did not expect that he would notice and ask what was going on", "I did not believe that he would ever acknowledge that I had done it and gotten better". In the wake of this interaction follows a more intense experience of closeness, which in the case of an initially neutral relationship has a very positive impact on the transformation of the relationship and its further development. Whether the higher perceived closeness will last long will be determined by following interactions that will either confirm or disprove the state.

Reduction the closeness where the pupil grows more distant follow from deeply disruptive interactions between the teacher and the pupil. Participants reported that certain teacher behaviours have irreparably affected their ongoing coexistence in the school environment, for example perception of betrayal by the teacher, disregarding the pupil, failure to provide help, teacher's hostile behaviour, or false accusation. This point shows that teacher-pupil relationships are fragile and can have an impact on pupils attitude toward teachers, learning, and authority in general.

"I was never good at math, but I thought I'd just learn for the test and make the teacher happy as well. I passed the test with great success but the teacher did not believe me that I wrote it. I was really upset by her suspicions and that was it for me – after that, I stopped caring about her and also about math".

In these cases, however, there may still be a turning point when a situation neutralizing the negativity of the previous interaction occurs. This compensation is not so strong that it could completely erase the pupil's previous negative experience. However, it can increase the level of perceived closeness in cases where the teacher increases their manifestations of immediacy.

"When we were dealing with truancy issues, I thought she would scream and threaten, but she acted in a completely different manner. When we came to her office, she was nice, and she was very interested in what motivated us to do that. She listened to us and accepted the reasons. I had the feeling that she cared about us. This improved my perception of her, despite what happened."

Most of the participants stated that after these turning point interactions, they changed their opinion of the teacher, made more effort to understand and explain their previous behaviour as "everyone can make a mistake". However, none of the investigated cases has completely inverted the polarity of a negatively perceived teacher relationship. It is, however, appropriate to assume that this could happen, especially if we consider the influence of social perception which is subject to errors such as Halo effect, stereotypes.

Figure 1. A model of changes in relationships and interactions related to perceived closeness.
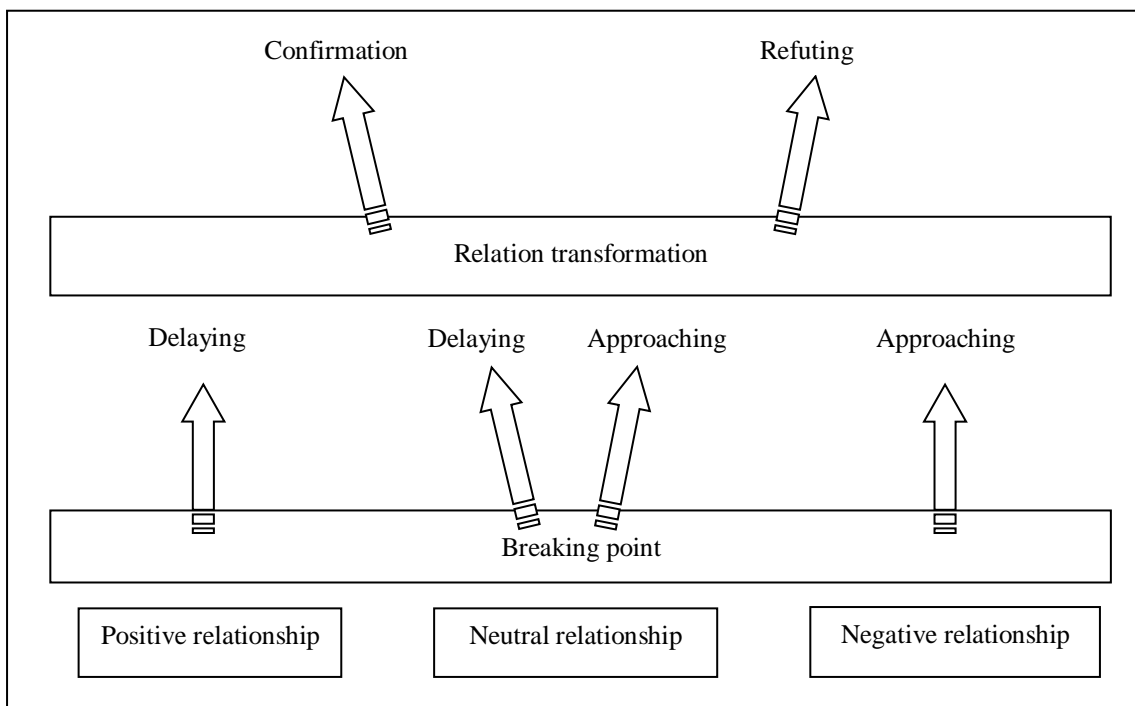
4. Discussion

The results of the study suggest that immediacy, relationships and interactions inseparably intertwined and require a holistic approach. It is probable that the degree of perceived closeness can be assumed based on how pupils evaluate their relationships with teachers. Relationships with teachers can be reassessed based on situations and interactions that can be seen as a breaking point. This would mean that the degree of perceived closeness follows the dynamics of teacher-pupil relationships and is not necessarily stable. We consider significant the finding that, despite a negative assessment of the pupil's relationship with a teacher, it can be turned by increasing teacher immediacy and other positive components of teacher's communication strategies.

These results are consistent with theories of teacher immediacy. For example, we have identified situations where, by failing to confirm expectations, the effect of the situation on the pupil was increased. This is explained by the theory of expectancy violations (Burdoon, 2015; 1988) which emphasizes this phenomenon. Approach – avoidance of pupils was also reflected here, depending on the perceived degree

of closeness. Furthermore, we must point out that a turning point can neutralize negative perceptions of a teacher. Similar results appear in quantitative studies (Thweatt & McCroskey, 1998; Mottet et al., 2006). These findings stem from students' retrospective views, from their subjective view of the interactions and behaviour of teachers at primary school. Despite its limitations, qualitative research offers a new perspective in terms of changes in relationships and perception of the closeness of pupils. Given that the relationship between the teacher and the pupil is not only asymmetric but has also proven to be informal, shaped by personal views, these aspects deserve examination and determination of their role in the interaction but also in the pupil's learning and motivation.

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MEDIATION AND CONCILIATION AS APPROPRIATE METHODS OF CONFLICT RESOLUTION (MASCS) FOR THE PROMOTION OF ACCESS TO JUSTICE AND CULTURE OF PEACE

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Abstract

In this study, we analyze mediation and conciliation as appropriate methods of resolving conflicts for the realization of access to justice and the construction of a culture of peace. The interest in this study arose from the observance of the social mobilization and the Brazilian public power in implementing mechanisms for resolving appropriate, effective and efficient conflicts. In the year 2013, the Justice in Numbers Report, of 2015, indicated the total number of 95.1 million processes In the Brazilian courts, and this number, according to projections, can reach the brand of 114.5 million in 2020. Thus, the Judiciary instituted the National Judicial Policy for appropriate treatment of conflicts (Resolution No. 125/2010, BRAZIL, 2010) as a way to consolidate a permanent policy of incentive and improvement of the mechanisms Autocompositive. The Problem of this research is to ask how mediation and conciliation as conflict resolution techniques have been employed in the Brazilian legal system and to investigate how these techniques have been constituted and effective as a public policy for the Access to justice. To this end, a bibliographic research is carried out on the conceptions of conflict, mediations and Appropriate Methods of conflict Resolution and analyzed how these guidelines have permeated the Brazilian public policies of access to justice and the promotion of the culture of peace. The Judicial Centers for Conflict Resolution (CEJUSCS), which are units of self-composition in the judicial system, were also investigated with the objective of knowing the structure, organization, functioning and implementation of these centers. They were also examined as mediators and conciliators have been trained to act in the judiciary. O theoretical framework is based on Cappelletti and Garth and Kazuo Watanabe, as regards access to justice and fair legal order in search of a socially just and equitable society. The analyses indicated that mediation and conciliation are instruments that were incorporated into the Brazilian Judiciary for the realization of access to justice and social pacification and because it is understood that the judicial function is not restricted to a decision imposed by the judge to the extent that it also seeks to promote mechanisms that allow access to justice, by means of non-heteronomous.

Keywords: Conflict, mediation, conciliation, justice.

1. Introduction

This research examines the methods employees for conflict resolution, as the mediation and the conciliation, as a means of access to justice and the promotion of the culture of peace.

The interest by this study came of research conducted by the National Council of Justice (CNJ) in 2013, which culminated in the publication the "Report Justice in Numbers 2015". The survey carried out for this report indicated that in the year 2013 there were 95.1 million processes In the Brazilian Judicial proceedings. According to projections made by the CNJ, this number can reach the mark of 114.5 million in 2020. Thus, the Judiciary instituted the National Judicial Policy for appropriate treatment of conflicts (Resolution N ° 125/2010, BRAZIL, 2010) As a means of consolidating a permanent policy of incentive and improvement of consensual dispute settlement mechanisms, considering that the right of access to justice is to have access to a fair legal order in accordance with CRFB/88. The action of the Judiciary by installing the mediation and conciliation of conflicts in its units of self-composition called the Judicial Centers for Conflict Resolution and Citizenship (CEJUSCS) contributes to the democratic process by promoting access to justice In a broad, effective, democratic manner and co-participated as a fundamental element of sustainable human development.

The problematic main of this research is to inquire as a mediation and conciliation of conflicts have been employed in the Brazilian legal system seeking to investigate how these techniques have constituted and become effective while a public policy for access to justice. Thus, the present work aims

to analyze mediation and conciliation as mechanisms of conflict resolution in the implementation of access to justice in the Brazilian legal for the construction of peace culture.

The importance of access to justice is highlighted by Cappelletti and Garth (1988, p. 11-12) when they say that: "First, the system must also be accessible to all; Second, it should produce results that are individual and socially fair". The authors complement these statements by saying that "the access to justice can be regarded as a fundamental requirement – the most basic human rights – of a modern and egalitarian legal system that intends to guarantee, and not only to proclaim the right of all". Thus, the present research aims to understand the contribution of mediation and conciliation for the realization of access to justice and the promotion of the culture of peace.

2. Conflict

To Chrispino (2007, p. 15), the conflict is: "every divergent opinion or different way of seeing or interpreting any event". Conflict is part of society, there is visto that, we live with plurality of people with interpretations, opinions and ways of looking at situations in a different way. So, as you say Chisprino, (2007, p. 17): "In a community that is trained to inhibit the conflict, this is seen as something bad, an anomaly", while something to be suppressed. And according to Chrispino (2007), Vasconcelos (2015) and Tartuce (2015), conflict is understood as a crisis, as a dispute. However, because it is part of society and because it is derived from different human perceptions, the conflict it is a phenomenon that should not be understood in a negative or polarised way. The negative perception of the conflict demonstrates the "difficulty in dealing with the conflict, because of our inability to identify the circumstances that derive from the conflict or to be reduned in it" (CHRISPRINO, 2007, p. 15). So the conflict comes to be regarded as something inevitable but also positive in relation to social relations.

By losing the notion that equals conflict to something negative, it is possible to perceive it as a phenomenon that is likely to be conducted, that is, that does not necessarily lead to violence. Second Galtung (2005) Intervention Situation of conflict may enable them to not trigger Relations Violent. The solution of the conflict for the parties in dispute would entail a process of building peace. The Peace considered by Galtung (2003), is a positive relationship between the parties, a union, a communion. The condition for peace is mutual respect, dignity, equality, reciprocity – all in the three spheres: spirit, mind and body; Political culture and economics.

The Culture of Peace movement began in 1999, the United Nations Educational, Scientific and Cultural Organization (UNESCO). The purpose of this movement was to prevent conflicts or situations that could threaten peace and security – such as disrespect for human rights, discrimination and intolerance, social exclusion, extreme poverty and environmental degradation – using the main tools to raise awareness, education and prevention. It is Based on the principles of tolerance, solidarity, respect for life, individual rights and pluralism. Culture of Peace, as defined by Chrispino and Dusi (2008 p. 604), Implies "Um set of values, attitudes, traditions, behaviors and lifestyles based on full respect for life and the promotion of human rights and fundamental freedoms, fostering peace between people, groups and nations" being able, including, be a political strategy for the transformation of the social reality.

Since 1995, the debates on education for peace have been intensified, considering respect for differences, overcoming situations of exclusion, solidarity between peoples and dialogue as an instrument of negotiation. These discussions have mobilized governments, civil society, ONGs and educators (VON, 2003, p. 9). In This Way, instruments have been sought in order to manage conflicts so that they are dealt with in a way that does not trigger acts of violence. Among These mechanisms are the Mediation and conciliation as conflict resolution techniques.

3. Mediation and conciliation as appropriate methods of conflict resolution

Castilho *apud* Tartuce (2015, p. 15), highlights three possible solutions to a conflict situation: self-guardianship, hetero-composition and self-composition. The self-guardianship does not behave, because the individual solves the conflict by his unilateral strength, acting without the intervention of another, in order that his interest preponder on the other, seeks to gain advantage over the other. Self-guardianship means the use of unilateral force, there is no external care, but rather the use of the power of one over the other.

The main difference between self-composition and hetero-composition, relates to the model called adversarial (jurisdiction and arbitration) characteristic of the hetero-composition, where there are winners and losers. In the self-composition carried out by means of trading "The solution seeks the gain of all parties, that is, observance of the interests of all involved". (SPENGLER, 2016, p. 75).

Mediation and conciliation are mechanisms of self-composition, called Tartuce (2015, p. 47), as "facilitated bilateral self-composition". According to Didier (2015, p. 165) "this modality of composition of conflicts occurs through the spontaneous consent of one of the contenders in sacrificing self-interest, in whole or in part, in favor of others interests."

Conciliation is a technical Autocompositive Facilitated conflict management, which may occur judicial or extrajudicial, conducted by an impartial third party suggesting possible solutions to the parties, assisting in the administration of the conflict. Right a method used in simpler, or restricted conflicts, in which the facilitator can adopt a more active, but neutral and impartial position. It Is a brief consensual process, which seeks an effective social harmonization and restoration, within the possible limits, of the social relationship of the parties. (BRAZIL, 2015). To Spengler (2016, p. 75), the conciliation "aims to reach a neutral agreement voluntarily and has the participation of a third-conciliator – who intervenes and can, Including, suggest proposals for the purpose of directing the discussion. "

Mediation is a mechanism of conflict resolution imported from the North American model of the Multiport Court, in which the third, Impartial and capacitated, it approximates the parties to a dialogue, conducting communication, without giving suggestions, so that the parties themselves reach the solution of their controversy, whose nature is more complex and the relationship between the parties has a continuative bond. Therefore, mediation is the appropriate method for restoring and strengthening the bonds between the parties, who have a continued relationship (Sales, 2018). Mediation is the most suitable technique. When conflicts are of a family, affective, neighborhood order, in which the parties have a relationship that can last for years, or the life all, and the financial restoration is insufficient to end the conflict.

Conciliation and mediation as conflict resolution techniques are considered important instruments of social pacification. Conflicts are objects of action of the judicial system, since the State, in its judicial function, the function is to resolve the conflicts. The modality of solution used by the judiciary was predominantly the hetero-composition, however, it has been perceived the importance of the methods Autocompositive. In this way, the mediation and conciliation were adopted as public policies for access to justice, because it is understood that they are social harmonization techniques, contributing with and effective results of existing conflicts.

4. Conciliation and mediation as public policies for access to justice and promotion of the culture of peace

A Conciliation and mediation are, as we have already pointed out, "public policies aimed at access to justice" (Spengler, 2016, p. 70).

Bucci (*Apud* FONTE, 2015, p. 49) defines public policies as "government action programs for achieving determined objectives in a certain time space". To Secchi (2015, p. 11), public policies, is "one abstract concept that materializes through varied instruments ... take form of public programs, projects, laws, advertising campaigns, political clarifications, technological and organisational innovations, governmental subsidies, administrative routines, judicial decisions, coordinated actions of a network of Actors, direct public spending, formal and informal contracts with *Stakeholders*, among others".

A Constitution of the Federative Republic of Brazil, that establishes democracy in Brazil and ensures fundamental rights, in his preamble already reveals commitment with the peaceful settlement of controversies in domestic and international orders. In its normative body it brings several devices reaffirming as fundamental rights, o due to legal process, the incompetence of jurisdiction, the comprehensive and free legal assistance, a reasonable duration of the process, among other the that reveal the concern of the constituent with access to justice and its effectivity.

The mechanisms that effect access to justice are as important as the right to fair and equitable legal order. Cappelletti and Garth (1988, p. 8) clarify that access to justice "serves to determine two basic purposes of the legal system – the system by which people can claim their rights and/or resolve their disputes under the auspices of the State." Access to justice has the purpose not only the right to claim and resort to the Judiciary to obtain a definitive answer (jurisdiction), but especially the access to a fair legal order: the right of protection and guarantee to the entire order of rights and values protected by the legal framework.

Access to justice is right to have rights. Among them in a broad, fair and egalitarian manner, mechanisms capable of resolving conflicts. As they say Mingati and Ricci (*apud* Grinover, 2007, p. 8): "the access to justice is a broad right to obtain the fair solution to the conflicts of interest" and "more than a mere instrument of jurisdiction, applicator of legal norms" is "an instrument capable of producing decisions according to an order of values identified in the legal". Thus, access to justice "is the most basic human right, among individual and social rights, whose mechanisms for its effectivation constitute the meaning of the right, being fundamental requirement to ensure a modern and egalitarian legal system." (CAPPELLETTI, GARTH, 1988, p. 11).

The implementation of these public policies Mediation and conciliation in 2013 with the publication of the Report Justice in Numbers 2015. Second Grinover (2007, p. 2) "soon was perceived, but That the State does not would be able to direct all the mass of disputes brought to the courts. And again the interest for the non-jurisdictional modalities of conflict resolution, treated as alternative means of social pacification", was reborn provided that the mechanisms for such pacification are efficient and fair. Continuing, the author states that "the perception that the State has failed in its peacemaking mission,

which it tries to accomplish through jurisdiction and through the forms of the process" no the extent that the sentence authoritative the judge does not pacify the parties, be imposed, for as it says "there will be a part - and often the two - dissatisfied with the decision of the judge and recalcitrant in its fulfillment. On the other hand, the formalities of the procedure - the necessary limit to ensure their guarantees - require time, and time is the enemy of the pacifying function". (GRINOVER, 2007, p. 2). Therefore, one of the aspects used to overcome the difficulties faced by the Judiciary, in the sense of social peacemaker, was the insertion of mediation and conciliation.

As Sales and Chaves (2014) the results obtained by mediation and conciliation mobilized the Judiciary in the institution, regulation and organisation of these practices. The growing practice of mediation and conciliation across the country demonstrated the feasibility of these mechanisms to achieve social pacification through the solution and prevention of conflicts and for facilitating the access to justice contributing to a fair legal order. So much is that the National Council of Justice, attentive to these the results instituted a public policy that objective organize and standardize services with the Judiciary. (SALES and CHAVES, 2014, p. 267).

This policy provoked a mobilisation of the whole society and the Judiciary to find solutions to provide citizens with the fundamental right of access to justice, with regard to the appropriate, swift, fair and effective treatment of conflicts.

In This way, these instruments have proved to be of paramount importance at the global level in promoting the culture of peace. They are mechanisms that can be used without territorial obstacles or bureaucracies. Learning to solve conflicts through mediation and conciliation means the possibility of peaceful coexistence, not without conflict, but with effective, less costly and more accessible instruments.

5. Final considerations

The mediation and conciliation are appropriate methods of resolving conflicts incorporated in the structure of self-composition of the Judiciary, by Resolution n°. 125/2010/CNJ, as a way to broaden the forms of treatment of conflict in society.

The Mediation and conciliation, as mechanisms of self-composition, were adopted as public policies for access to justice, contributing to the comprehensive ness and more effective results of existing conflicts and strategies incorporated by the Judiciary to promote the Culture of Peace, since they are mechanisms with the ability to encourage democratic participation, cooperation, mutual respect, equality and the construction of conflict resolution, developing skills to converge interests, opposing opinions. They are mechanisms that promote access to justice, in a broad sense, that is, not only access to the Judiciary, but to the right to fair and equal legal order.

And, so we believe, they must be public policy to be encouraged.

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THE BRAZILIAN HIGHER EDUCATION: THE UNDERGRADUATE COURSES IN LIGHT OF ITS RECENT POLICIES

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Abstract

Higher Education has been considered of unprecedented relevance when it comes to the effects of globalization on countries as they are responsible for people's training and knowledge generation. HEIs cannot avoid the inevitable global environment, as they are more exposed to the inequalities among the best-internationalized institutions as part of the world system of Higher Education. Despite, they continue to be confronted with some challenges as access, equity, quality and relevance. The Higher Education System in Brazil is the most extensive higher education system and the one who has relied the most on the private for-profit sector among the Latin America countries, and its university governance has assumed characteristics that you do not necessarily see elsewhere. Thus, this research addresses a significant gap: the limited studies considering the context of the HEIs in developing countries. Based on this context, this paper proposes to present an overview of the Brazilian Higher Education to discuss its characteristics, based on the literature review, and to analyze the data of the undergraduate courses, from 2010 to 2015, organized according to the OECD main areas and based on the Higher Education Census microdata. It intends to contribute to a more strategic view concerning the offer conditions of the HEIs, identifying its most recent trends and challenges. We adopted an exploratory and descriptive research methodology and followed an inductive approach to a quantitative research strategy. We used an artificial type of Neural Network (ANN), the Self-Organizing Map (SOM) technique, as a *method of data analysis,* as it mapped data in an easily interpreted form, capable of organizing large, complex datasets robustly and reliably. The main conclusions of the paper were that students have access to the tertiary level of study, mainly in science and engineering fields, areas of preference among abroad students. In Brazil, the findings pointed out the opposite, as the Brazilian Higher Education was concentrated mainly in Education and Social Sciences, Business and Law areas.

Keywords: *Knowledge discovery, higher education, higher education institutions, self-organizing map.*

1. An introduction to the higher education in Brazil

The entrance to Higher Education Institutions (HEIs) in Brazil is based on the completion of the secondary school and on the achievement of some specific exams conducted by the HEIs themselves called "vestibular." Despite that, in 1998, the Ministry of Education implemented another exam called National Examination of Secondary Education (*Exame Nacional do Ensino Médio, ENEM*, in Portuguese) which, since 2009, was the official entrance exam. Since then, lots of HEIs have replaced their proper entry exams by ENEM or used it in addition to theirs. ENEM is not mandatory but has been considered a prerequisite for students who want to enroll themselves or participate in various government scholarship and funding programs during their undergraduate courses.

The HEIs are under specific administrative categorization in Brazil. The public ones are maintained by the government in the form of (1) Federal, (2) State or (3) Municipal institutions. They are financed by the State and do not charge tuition or monthly fees. Private HEIs are managed by individuals or legal entities under private law, whether or not-for-profit.

Regarding the academic classification, HEIs may receive different denominations. (1) The *University* is a multidisciplinary and comprehensive academic institution that has institutionalized intellectual production, besides presenting minimum academic qualification requirements (one-third of masters and doctorates). It is autonomous to create courses and academic and administrative offices, to issue diplomas, to establish curricula and number of vacancies, respecting the current legislation and the constitutional norm. The universities are the only ones obliged to do research. (2) The *University Center* is a multicurricular institution, which covers one or more areas of knowledge. It is like the University regarding structure but does not present the requirement for institutionalized research. (3) The *College* or *Faculty* has two connotations. The first is that of an HEIs that does not have the autonomy to confer titles and diplomas. Also, it does not have the function of promoting graduate studies. The second connotation

refers to specific organic or institutes or similar organizations. The colleges or faculties are concentrated on teaching. Some of them can also develop community services. (4) The *Federal Institutes* are units focused on technical training, with professional qualification in diverse areas and the (5) *Federal Center of Technological Education* equates to university center.

The Brazilian HE offers (1) the *undergraduate courses*, which are tertiary degree courses, open to candidates who have completed the secondary school or equivalent and have been classified in an entrance process, conferring the Bachelor, Licentiate (teacher training) or Technology degrees; (2) the *stricto sensu* graduate courses which comprises master's and doctoral programs, which confer diploma to the graduates; (3) the specialization or *lato sensu* graduate courses, which are programs open to undergraduate candidates who meet the requirements of the educational institutions, and confer them certificates; (4) the medical residency, which is a *lato sensu* graduate program, specializing in the medical field; (5) the multiprofessional residency in health, which is also a *lato sensu* graduate program in health areas other than medicine; and (6) the extension or service community courses which are a training program, aimed at strengthening the relationship between university and society.

The undergraduate courses can be offered in two distinct modes, the classroom mode and the e-learning mode. In Brazil, the e-learning mode courses are also less expensive than the classroom ones, can achieve a higher number of students in different geographic areas – as the Brazilian territory is vast - and have increased its offer substantially in the last decade.

Brazilian Higher Education has some specific characteristics. The entrance to the public HEIs, at the undergraduate level, is very competitive as the public institutions are considered the best and are tuition-free. Historically, only the students with a higher economic and social status can achieve the scores to study in the best public universities. On the other hand, public primary and secondary schools in the country are mainly frequented by lower-income students. According to Fischman (2005), Brazil is still recognized as a 'racial democracy,' although the inequality is at one of the highest levels in the world and, as a consequence, impacts all levels of Education.

2. Objectives

Considering the above overview of the Brazilian Higher Education, this paper proposes to analyze the data of the undergraduate courses, from 2010 to 2015, organized according to the OECD main areas.

3. Methods

This research is focused on the Higher Education undergraduate courses offered from 2010 to 2015 (*Table 1*), organized according to the OECD Main Areas (*Table 2*).

Table 1. Higher Education Institutions and their undergraduate courses, 2010-2015.

	2010	2011	2012	2013	2014	2015
HEIs	2,378	2,365	2,416	2,391	2,368	2,364
Courses	28,577	30,420	31,866	32,049	32,878	33,501

Source: Mec, Inep, 2010-2015.

It adopts an exploratory and descriptive research methodology and follows an inductive approach to a quantitative research strategy. It uses an artificial type of Neural Network (ANN), the Self-Organizing Map (SOM) technique, as a method of data analysis, as it maps data in an easily interpreted form, capable of organizing large, complex datasets robustly and reliably. SOM is a non-supervised neural network which also explores patterns hidden in the data. It is complemented by some descriptive statistics analysis to summarize the data time series. This research used the GeoSOM Suite tool.

Table 2. Variables for undergraduate courses proportion according to OECD Main Area, per year.

	Variable	**Description**
x_1	nC_O1_year	OECD main area 1, Education
x_2	nC_O2_ year	OECD main area 2, Humanities and Arts
x_3	nC_O3_ year	OECD main area 3, Social Sciences, Business and Law
x_4	nC_O4_ year	OECD main area 4, Science, Math and Computing
x_5	nC_O5_ year	OECD main area 5, Engineering, Production, and Construction
x_6	nC_O6_ year	OECD main area 6, Agriculture and Veterinary
x_7	nC_O7_ year	OECD main area 7, Health and Social Welfare
x_8	nC_O8_ year	OECD main area 8, Services

In this study, SOM is used to assess the potential relationship among Higher Education (HE) components – Higher Education Institutions and their undergraduate courses and, further, to identify the institutions that focus their offer in a specific area of knowledge (*niche*). The specific advantages of SOM algorithm and its classification and visualization ability for large Higher Education data are to detect, not only the hidden factors responsible for the data structure observation but to find some HE specific features that will be presented in the discussion.

4. Discussion on a global vision of the undergraduate courses' areas

In 2015, the total number of HEIs had dropped in Brazil. On the contrary, the number of undergraduate courses has increased over the period. Despite this increase, according to the data analyzed, this supply has migrated among different areas of knowledge, which may indicate some tendencies regarding potential demand.

Taken the year of 2010 as a point of depart and a reference for the global analysis, *Table 3* indicates the distribution of the number of courses offered by the HEIs, in each area of predominance, per year, during the period studied. It was observed that, along the period, the offer condition varied significantly. In general, from 2010 to 2015, there was a reduction in the offer conditions for all areas, except for Engineering, Production, and Construction areas. Also, there was a highlight for the Science, Mathematics, and Computing Area, which configured itself as an independent cluster in 2011. Also, there were an increase in the proportion of the courses among the diversified cluster for the Agriculture and Veterinary; and Services areas (*Table 3*).

In 2010 and 2013, the Education area concentrated most of the offered courses. Along the period, Education is also one of the most prominent areas concerning the offer conditions in the country.

In the year of 2014, a group of institutions emerges, in a different cluster, offering courses in several areas, herein titled as *comprehensive*. The year of 2014 represented one of the most extreme scenarios considering the distribution of courses, as there was a significant drop in all areas with some of the worst numbers in the last five years.

Therefore, the year of 2015 demonstrates an attempt to recover from this scenario, with an increase in the diversified group, which raises the supposition that the small institutions are getting smaller.

Comparing to other OECD countries, over the past two decades, in some countries, more students have access to the tertiary level of study, mainly in science and engineering fields which is the opposite to what was achieved. Worldwide, some fields are more popular among students. The areas of science and engineering, per example, have a preference. Despite this trend, Brazilian Higher Education is concentrated mainly in Education and Social Sciences, Business and Law areas. Only in 2015, it was observed an increase in the offer of Engineering, Production and Constructions courses from 19.64% to 29.35% and also in the areas of Agriculture and Veterinary, Health and Social Welfare, and Services which were grouped by the diversified cluster (*Table 3*).

5. Conclusions

HEIs play a significant role in the knowledge economy. For centuries the new scientific knowledge has been produced, validated and disseminated mainly by the Universities. The efficiency of the higher education system and higher education is a complicated socio-economic relationship which generates various effects throughout the society and country development. Based on the data analyzed some new information can be depicted, contributing to a more prospective and strategic view of the Brazilian Higher Education and generating some useful insights concerning trends and future challenges for Higher Education offer conditions also in similar countries or HE systems.

Along the period, the total number of HEIs varied slightly, but the number of undergraduate courses increased. The HEIs which were specialized in a knowledge area called a *niche institution*, on the contrary, suffered a decrease during the same period, in all areas, going in the opposite direction of the world trend. Despite this fact, the literature points out that the niche market, which constitutes a tendency, would allow HEIs to compete in a more demanding, fast-changing and threatening environment. Some other trends were observed concerning the data analyzed: the areas of Education and Social Sciences, Business and Law, predominate in Brazil along the period. On the contrary, the areas of Science, Mathematics, and Computing; Humanities and Arts; and Engineering, Production and Construction are the ones with the lowest number of specialized (niche) institutions which is opposite to other OECD countries. The Agriculture and Veterinary and Services are smaller and not representative of the data group. Most of the HEIs that compose the *niches* were also private institutions characterized mainly as faculties, smaller institutions dedicated to teaching. It was also observed the niches had joined themselves in ever smaller groups oh HEIs along the time. On the other hand, a group of faculties delivering a variety

of courses in different areas (so-called *comprehensive*) appeared. These two groups with different segmentation strategies coexist. The first group illustrates the niche specialization, while the second one, an opposite trend, illustrates the diversification.

The current Brazilian political and economic situation propitiate opportunities to offer courses jointly, as the institutions dispose of different funding and administrative arrangements, and the planning and establishment of new courses can be time-consuming.

As the Higher Education in Brazil is mainly provided by the private sector, this will require new mechanisms of management to grant its sustainability to the long term. It is more evident that the HEIs will compete for students and financial resources, quality, and variety of services offered, diversifying, and adapting themselves according to competitive forces to new constraints and opportunities. Thus, the challenge will be to restate the HEIs mission to be more focused on quality and to pursue student's outcomes.

Table 3. Evolution of undergraduate courses per area during 2010-2015.

	Mainly Social Sciences, Business, and Law	Mainly Education	Diversified		Mainly Health and Social Welfare	Mainly Humanities and Arts	Mainly Engineering, Production, and Construction	Mainly Science, Math, and Computing	Comprehensive (non-exclusive)
2010	33.82%	66.03%	Science, Math and Computing	44.64%	36.85%	8.56%			
			Engineering, Production, and Construction	57.37%					
			Agriculture and Veterinary	32.37%					
			Services	44.66%					
2011	44.29%	47.76%	Humanities & Arts	69.83%	22.49%			4.35%	
			Engineering, Production, and Construction	75.39%					
			Agriculture and Veterinary	51.02%					
			Services	53.61%					
2012	36.33%	47.53%	Humanities & Arts	68.98%	20.26%		19.64%		
			Science, Math, and Computing	64.04%					
			Agriculture and Veterinary	59.89%					
			Services	61.78%					
2013	49.19%	68.56%	Science, Math and Computing	33.09%	20.57%	8.53%			
			Engineering, Production, and Construction	54.91%					
			Agriculture and Veterinary	32.55%					
			Services	36.10%					
2014	22.30%	53.33%	Humanities & Arts	10.86%	14.91%				
			Science, Math, and Computing	12.69%					
			Engineering, Production, and Construction	23.42%					
			Agriculture and Veterinary	18.61%					
			Services	12.26%					
2015	29.29%	51.49%	Science, Math and Computing	58.02%		8.44%	29.35%		
			Agriculture and Veterinary	53.28%					
			Health and Social Welfare	76.54%					
			Services	63.66%					

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