

WHAT INFLUENCE DID A DESIGN THINKING, CREATIVE PROBLEM-SOLVING WORKSHOP HAVE ON BEGINNER STUDENT TEACHERS?

Karen McGivern

Business Department, St Mary's University College (Northern Ireland)

Abstract

The marketisation of education, globalisation, and the requirement for continuous economic growth, have positioned creativity and innovation as essential components of 21st century education. Creative approaches to learning have been shown to support well-being and promote a culture of continuous improvement which in turn, support the development of prosperous and sustainable, digital economies (OECD, 2019). In terms of teacher education then, creativity and innovation are now regarded as core skills for all teachers (Henriksen et al., 2021). If these skills are seen as being fundamental to societal development, they must therefore be nurtured as a key component of professional learning for teachers. Using a mixed methods approach, this study aims to explore ways in which creative and innovative mindsets can be fostered in student teachers as part of their initial teacher education. Questionnaires and focus groups were used to collect data. Firstly, a first-year cohort of Primary and Post Primary student teachers (n=118) attended an introduction to design thinking and creative problem-solving, 3-hour workshop with the objective of enhancing their creative problem-solving and innovative skills in preparation for school placement. Secondly, a collaborative podcast project with students and lecturers was developed to enhance students' learning experiences and foster creativity. Thirdly, following their school placement, further data were collected to address the extent to which the participants implemented some of the workshop initiatives during their placement. Preliminary findings suggest that the revised approach to teaching and learning can encourage creative, critical thinking and increase student confidence as they develop their competence and practice as teachers. In addition, the data suggest that students favour the more andragogical approach employed in the workshops and podcast development as opposed to traditional, pedagogical modes of teaching and learning. The research provides a strong platform to embed a culture of critical thinking, creativity, collaboration and communication, and in doing so, establish and build collaborative partnerships between education, business and community.

Keywords: *Creativity, innovation, critical thinking, pedagogy.*

1. Introduction

The marketisation of education, globalisation, and the requirement for continuous economic growth, have positioned creativity and innovation as essential components of 21st century education. Creative approaches to learning have been shown to support well-being and promote a culture of continuous improvement which in turn, have been shown to support the development of prosperous and sustainable, digital economies (OECD, 2019). In terms of teacher education, creativity and innovation are now regarded as core skills for all teachers (Henriksen et al., 2021). If these skills are seen as being fundamental to societal development, they must therefore be nurtured as a key component of professional learning for teachers.

Despite the significant progress made by the economy of Northern Ireland (NI) in the past few decades, it continues to be economically weaker compared to other regions in the UK. Low productivity remains a major obstacle for the growth of income and economic expansion. Similarly, to the rest of the UK, NI has experienced minimal, if any, productivity growth in recent times. The situation was worsened by the financial crisis of 2008/2009, which affected NI more severely than other parts of the UK and has hindered its recovery. (Department of the Economy NI, 2023).

It is clear that the quality of teachers in any society, plays a significant role in economic development and the imperative to prepare young teachers with the necessary skills and creativity to drive innovation in pupils from an early age is crucial to the prosperity of the future of NI. However, anecdotal evidence shared by teacher educators concerning student teachers themselves, would indicate weakened ability to; think and plan creatively; participate in logical risk-taking; autonomously problem-solve; foster

creativity in their lesson planning and subsequently, own students, has compelled the aspiration for this study – what influence did a design thinking, creative problem-solving workshop have on beginner student teachers?

2. Literature review

There is a growing body of literature that recognises the importance of creativity and innovation in education. According to Andreas Schleicher, Director for Education and Skills (OECD 2019), tomorrow's schools must focus on developing skills such as critical thinking and collaboration in pupils, help pupils to think for themselves and work with others to cultivate their creativity and critical thinking and through meaningful reflection, transform their ideas into purposeful inquiries and innovative solutions. They must also help pupils understand the limitations of individual and collective action and encourage creative problem-solving. This requires nurturing creativity and encouraging pupils to view situations from various perspectives, to help pupils' transform their ideas into innovative solutions and reflect on their progress.

The OECD Learning Framework 2030 discusses the need for updated teaching approaches in education to meet the changing needs of pupils in the 21st century. This framework identifies three transformative competencies pupils need to thrive and shape the future: creating new value, reconciling tensions and dilemmas, and taking responsibility (OECD, 2019, p.16). This report emphasizes the importance of creativity in developing these skills and suggests that pupils need more opportunities to develop their creative abilities. It also highlights the three different types of skills, including cognitive and meta-cognitive; social and emotional; and practical and physical skills that pupils need to succeed in the modern world. Furthermore, the report discusses how traditional teaching methods often focus solely on cognitive skills such as memorization, neglecting the importance of social and emotional skills like communication and teamwork. It recommends that incorporating project-based learning and collaborative assignments can help pupils develop these crucial soft skills. Additionally, the report accentuates the need for pupils to learn practical and physical skills in addition to academic knowledge, such as coding, design thinking, and environmental sustainability, concluding by emphasizing the crucial role of teachers in adopting updated teaching approaches and creating a classroom environment that fosters creativity, collaboration, and innovation. Despite the emphasis placed on teaching skills that enable pupils to excel in an innovation-driven world, there is scant proof that this has resulted in changes in teaching and learning methods within the curriculum, which is a cause for concern (Vincent-Lancrin, Urgel, Kar & Jacotin, 2019).

The UK Innovation and Skills (BEIS, 2021) defines creativity as the ability to create new and potentially valuable ideas in any activity and defines innovation as the process of transforming these ideas into a commercial reality (i.e., testing, measuring, learning & sharing). Therefore, to secure the future of a small, advanced economy such as NI, it is vital that we enhance the education system to align with contemporary demands and adequately resource it to counter the dwindling investment in skills (Department of the Economy, 2021). From a positive perspective, the General Teacher Council of NI (GTCNI, 2007) has suggested that creativity should be at the heart of education and that the ability to think creatively is crucial for modern education systems aiming to increase the opportunities available to children and young people. Consequently, the Council developed a set of professional teaching competencies, designed to promote creative and innovative approaches to teaching, leading to the development of pupils' creative thinking abilities. This competence framework is used as the basis for all teacher education programmes provided in NI.

According to Tough (1985), an andragogical approach to learning recognizes that adult students have different needs and motivations compared to younger students. Andragogy is a teaching philosophy developed by Malcolm S. Knowles (1970), that is centered around facilitating learning for adults, who are self-directed, have a wealth of life experiences, and are motivated by their own goals and interests. This approach places the pupil at the center of the learning process and recognizes their individual needs and abilities. By doing so, it promotes independent thinking, critical reflection, and active engagement in the learning experience. Knowles' six assumptions of andragogy provide a framework for designing effective learning experiences for adults. These include the need for adults to be involved in the planning and evaluation of their learning, the importance of incorporating their life experiences into the learning process, and the need for self-directed and problem-centered learning. Additionally, andragogy recognizes that adult students are motivated by practical and immediate application of new knowledge and skills, rather than theoretical concept that may not have a clear connection to real-world experiences.

Furthermore, the subject of assessment continues to be a highly delicate and political topic within educational systems. According to Serdyukov (2017) some current assessment and testing methods are stifling creativity within the classroom. Particularly in the competitive secondary school culture that focuses on national examination results is making it difficult for teachers who wish to encourage group work and

innovative idea creation. These teachers are required to prioritize pushing students to do well in traditional national exams, which conflicts with more progressive formative assessment strategies such as peer assessment, self-assessment, and extended project work.

3. Methods

Given that the study focusses on the individual experience of beginner student teachers and the development of their thinking in terms of creativity, an interpretative design was employed using a mixed methods approach to the data collection. The study was conducted with Primary and Post Primary students (n=118) in the first year of a four-year Bachelor of Education (BEd) programme leading to qualified teacher status. The first stage of the study set out to consider the influence that a design thinking, creative problem-solving workshop have on beginner student teachers. The purpose of stage 1 was to: understand participants' level of confidence and attitudes to creative design thinking; explore the challenges experienced; understand the extent to which a design thinking, creative problem-solving workshop influences a beginner student teacher. The workshop was a three hour fast paced experiential introduction to design thinking and creative problem-solving processes. It provided the opportunity to rapidly step through the stages of a design thinking process, introducing students to the overall process using a scenario challenge from everyday life. It was team based, and students learned the process and experienced the mindsets required for creative problem solving by running through a full cycle with tight time constraints. Throughout the session students were introduced to several highly interactive, purposeful, quick energizers, which can easily be used in everyday classroom delivery.

The workshop allowed time for students to reflect on their own learning and consider how they might apply this in school. A brief outline of the key learning points were to: gain practical experience in the design thinking process; build curiosity and look past the obvious; build students' confidence in their own creative thinking ability; experiment and get things wrong, learn from mistakes; refine and build actionable solutions; reflection on the process and understand the value of empathy, clarity and creativity in the classroom. Following the workshop, an anonymous semi-structured questionnaire was developed with a range of questions in open, closed and Likert scale formats. The questionnaire was accessible via a QR code, taking the user to a Microsoft Forms survey and was distributed to all who attended the experiential introduction to design thinking and creative problem-solving workshop.

Stage two of the study was intended to explore the extent to which the participants implemented some of the workshop initiatives during their school experience. Following the school placement in February – March 2023, a further questionnaire, similarly designed to the first was sent to all participants. The purpose of this questionnaire was to address the extent to which the students implemented some of the workshop initiatives during school experience. In addition, data were also collected from three focus groups of participants. All students were invited to participate via email communication with 52% response. From this, a random selection was made to create focus groups of six participants each. The key areas for focus group discussion were: participants' level of confidence and attitudes to creative design thinking; challenges experienced; influence of a design thinking, creative problem-solving workshop on a beginner student teacher; impact of implementing some of the workshop initiatives during their school experience, if any. Data were analysed using inductive thematic analysis (Braun and Clarke, 2006; Yin, 2009) to identify the key themes which have resonance to the research question.

4. Findings

The first questionnaire was completed by 60 students, a response rate of 51%. Section one consisted of four questions to ascertain: if the participants were enrolled on primary or post primary programme of study; subject specialism studied; gender identification. Sixty-five % of participants were studying on the primary programme and 35% post primary. Seventy-two % of participants selected Female and 28% selected Male in the gender identity question. In Section two, eight questions were asked. Five were designed using a Likert scale to assess the attitudes and views of the participants; three were open ended; and two were multiple choice. The first and second questions were designed to gauge students' level of confidence in the following criteria: understanding the underlying concepts of how to be more creative; ability to apply creativity to their work; creativity in thinking, before and after the workshop. Comparing the two results, 40% of students felt slightly confident in their understanding of the underlying concepts of how to be more creative, 42% were fairly confident, with 13% completely confident. After the workshop, there was a positive shift in data, to 7% slightly confident, 52% fairly confident and 38% completely confident. Thirty-two % of students felt slightly confident in their ability to apply creativity to their work, 42% fairly confident, with 20% completely confident. After the workshop 5% felt slightly confident, 63% fairly confident and 28% completely confident. The third criteria intended to capture students' level of

confidence on how creative they are in their thinking. The results show a positive increase before and after the workshop: 42% felt slightly confident before the workshop, this decreased to 10% after the workshop; 38% felt fairly confident in their creative thinking before the workshop, rising to 70% after the workshop, with the option of completely confident, rising from 7% before the workshop to 15% after the workshop.

Leading on from this, students were asked to what extent during the workshop, did they agree or disagree: they were absorbed; prompted to generate new and varied ideas; worked easily with others; explore different ideas or outcomes; combine their existing knowledge with new insights; use ideas from the workshop in school experience. 83% of students agreed or strongly agreed that they were engaged and absorbed in the workshop, 90% agreed or strongly agreed that they were prompted to generate new and varied ideas, 80% agreed or strongly agreed that they will be able to use ideas from the workshop on school experience. When asked to give one aspect from the workshop that could be used on school experience, a flat coding frame was created to represent students results. Table 1 below highlights the most popular, responses show a high level of choice for the Energiser aspects of the workshop.

Table 1. One aspect from the workshop you could use on school experience.

Workshop Theme	% Student Response
Hands up technique - getting attention	3%
Energiser - Fail test - counting and clapping	13%
Energiser - Empty bottle	12%
Energiser - Barber Shop - 'Yes and' and 'Yes but' activity	12%
Empathise - Roleplay - Interviewer, interviewee, notetaker	11%
Energiser - Storytelling through picture cards	12%
Ideation- brainstorm - if I could change this I would...	12%
Prototyping - build a version of your concept to share with others - 3d model design	11%
Voting best ideas - using stickers	2%
Groupwork	10%

The most popular aspects of the workshop that students most enjoyed, was building the prototypes (29%), activities (18%) and working with others (15%). When asked which aspects of the workshop the students did not enjoy, the vast majority of students (58%) stated they enjoyed it all or non-applicable, 12% of respondents felt the workshop was too long and 8% felt uncomfortable interviewing/questioning others. 90% of students indicated that they would like to attend more workshops like this.

The focus of Stage 2 of this study was to understand the extent to which the participants implemented some of the workshop initiatives during their school experience and how participation in a collaborative podcast project influences a beginner student teacher's design thinking, problem-solving skills. There was a 49% response rate from Survey 2. The survey and the focus groups showed that 65% of students used some of the ideas from the workshop during school experience, with the most popular activities, energisers (65%) and prototyping (35%). Focus groups highlighted students desire for more of these workshops, the andragogical approach to learning and the challenges presented to students to learn how to be creative in their thinking.

5. Conclusion

The results of this study suggest that the revised approach to teaching and learning can encourage creative critical thinking and increase student confidence as they develop their competence and practice as teachers. In addition, students favor the more andragogical approach employed in the workshops as opposed to traditional, pedagogical modes of teaching and learning, this finding is similar to those reported by Tough (1985). Incorporating andragogical principles into higher education can have numerous benefits for adult students. By recognizing their unique needs and motivations, institutions can create learning experiences that are more relevant, engaging, and effective. Additionally, andragogical approaches to teaching can help adults develop critical thinking and problem-solving skills that can be applied to their personal and professional lives. Incorporating andragogical principles into higher education is an important step toward creating a more inclusive and effective learning environment for adult students. By recognizing their unique needs and motivations, institutions can help these students achieve their goals and aspirations, and ultimately contribute to a more educated and skilled workforce. The most obvious finding to emerge from this study was that a design thinking, creative problem-solving workshop did influence students in their ability to apply creativity and learn design thinking ideas to bring into the classroom, which is encouraging. The majority of students were able to implement ideas from the workshop on their school experience.

The research provides a strong platform to embed a culture of critical thinking, creativity and collaboration and communication to enhance student opportunities of project-based learning experiences, and in doing so, establish and build collaborative partnerships between education, business and community.

Even though GTCNI (2007), emphasises the importance of pupils to think creatively and its centrality in education, focus group findings suggest that the practicalities in the classroom do not seem to be reflecting this. There are several challenges presented, but a good starting point is for teacher educators to consider devoting additional attention to embedding creativity and innovation workshops/initiatives into the curriculum, providing beginner teachers with the skills and competencies to have the confidence to explore creativity and innovation leading to potential improvement in school experience practises, and as graduates. This is a challenging space for Initial Teacher Education providers, but the impact has the potential to be transformative. Teaching creative problem-solving and critical thinking in higher education is essential, but it can be challenging to do so effectively given the varying critical thinking skillsets needed in different disciplines. Nonetheless, all subjects should aim to teach students creativity, innovation and design thinking. Depending on the teaching style and course, different techniques and structures can be utilized in the classroom. Creativity is a key factor that plays a vital role in the development of critical thinking skills, academic achievement, and career readiness. Furthermore, creativity and innovation are critical skills that every beginner student teacher should develop to succeed in embedding a conducive learning environment, encouraging exploration and experimentation, and using teaching methods that support creativity and innovation. By doing so, teachers can prepare students for the challenges of the future and empower them to reach their full potential, it is essential to ensure that beginner student teachers are adequately prepared to become an integral part of the 21st-century workforce, which requires creativity and innovation.

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