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FOREWORD

InScience Press is delighted to publish this book entitled *Education Applications & Developments VI* as part of the Advances in Education and Educational Trends books series. These series comprise the work of authors' and editors' to address global research in the Education area.

In this sixth volume, a dedicated set of authors explore the Education field, contributing to the frontlines of knowledge. Success depends on the participation of those who wish to find creative solutions and believe their potential to change the world, altogether to increase public engagement and cooperation from communities. Part of our mission is to serve society with these initiatives and promote knowledge, therefore it requires the reinforcement of research efforts, education and science and cooperation between the most diverse studies and backgrounds.

The contents of this 6th edition show us how to navigate in the most broadening issues in contemporary education and research. In particular, this book explores four major topics within the broad theme of Education, corresponding to four sections: "Teachers and Students", "Teachers and Learning", "Projects and Trends" and "Organizational Issues". Each section comprises chapters that have emerged from extended and peer reviewed selected papers, originally published last year in the proceedings of the International Conference on Education and New Developments (END) conference series (http://end-educationconference.org/). This meeting occurs annually always with successful outcomes. Original papers have been selected and the authors were invited to extend and to submit them to a new evaluation's process. Afterwards the authors of the accepted chapters were requested to make the necessary corrections and improve the final submitted chapters. This process has resulted in the final publication of 27 high quality chapters organized into 4 sections. The following sections' and chapters' abstracts provide some information on this book's contents.

Section 1, entitled "Teachers and Students", provides studies within educational programs and pedagogy for both teachers and students.

Chapter 1: *The Relationship between Student's Approaches toward Learning and Academic Achievement in the Chinese Context;* by Chuang Wang, Qimeng Liu, Jian Liu, & Tianxue Cui. This study examined the relationship between Chinese high school students' approaches toward learning and their academic achievements. Participants consisted of 14,021 eleventh graders from an eastern province in China. They took the National Standardized Test in three subject areas: Chinese language, mathematics, and English language. The total score was used as an indicator of their academic achievement. Students' approaches toward learning were measured in three aspects: self-confidence in learning, learning interests, and study habits. Questionnaires of self-confidence in learning and learning interests were adapted

from PISA 2006 and PISA 2012. Study habits were measured with the questionnaire adapted from Academic Adjustment Inventory (AAT). The Pearson correlation and hierarchical linear regression results showed that the dimensions of students' approaches toward learning were significantly related to academic achievements. Results of analysis of variance after the control of student gender and socioeconomic status suggested that the top 25% of students in dimensions of approaches toward learning scored significantly higher than the bottom 25% of students with small effect sizes in their performance on the final examinations. This study suggests that helping students build good approaches toward learning may improve their academic achievements. Educators are recommended to put more effort into helping students cultivate learning confidence and developing interests in learning. Classroom teachers are advised to guide students in fostering good study habits and make study plans.

Chapter 2: *Portfolio as a Strategy to Improve Career Adaptability Resources*; by Liliana Faria. This study aimed to determine whether the levels of career adaptability resources could be increased through the use of a portfolio writing strategy. Based on a mixed methods approach, the study used the design quasi-experimental, with two independent groups and with repeated measures, together with a focus group. Forty students (17 from the experimental group; 23 from the control group) in university-work transition completed the Portuguese version of the Career Adaptation Scale. The pre-test survey was administered at the beginning of the semester of the curricular unit of personal and professional development project (PPDP) in both groups. This was followed, in the experimental group, by a fourteen-week portfolio writing intervention, under the PPDP. In the control group, the PPDP followed the traditional expository teaching methodology. After completing the intervention procedure, post-test research was conducted by both groups. Five students from the experimental group also participated in a focus group of feedback on the writing of portfolios under the PPDP. The results revealed that writing the portfolios contributed to a career adaptability resources increase as well as for the confidence, self-knowledge and knowledge of the market opportunities of these students. The use of portfolios in the PPDP unit course is recommended.

Chapter 3: *(Re)Career Scale: Pilot Study for the Validation of a Scale About Career Post-Career Transitions;* by Joana Carneiro Pinto. This article aims to validate the factorial structure of the (Re)Career Scale: Coping Styles, which evaluates how late adults think and feel about career changes, in particular the transition to a career post-career. A career post-career is a development phase that takes place after the formal retirement of a job/ continued work and requires the involvement in a set of developmental tasks related to one's own, the environment, and the decision-making and planning (Pinto, in press). Thirty-six items were developed, considering the literature review of the main career development models. These items were administered to a total of 95 Portuguese late adults (31 (32.6%) men and 64 (67.4%) women; Mage=62.91; SDage=6.901), of which 47 are in an active professional situation and 48 already retired. The Exploratory Factor Analysis (EFA) indicated a three-dimensional career post-career model considering a set of developmental tasks

related to Identity, Opportunity and Adaptation. The final version of 30 items has good psychometric properties, with Cronbach's alphas ranging from .82 to .89. The descriptive study and the correlation between the three dimensions suggest that the scale has potential to be used in research and intervention programs to support the transition to a career post-career.

Chapter 4: *Integrating Core Competencies in Professional Music Training Curriculum—The Tainan University of Technology Experience;* by Hua Hui Tseng. Music curriculum integration in professional music training involves the exploration of how educators can integrate individual competency items developed by Teachout's (1997) three categories of skills/knowledge components, namely, teaching, personal, and musical skills and behaviors, into the music education curriculum. The purpose of this paper is to use Denis's (2017) skills/knowledge competency of university coursework as the enquiry lens. The focus is skills/knowledge competency with the three subsections for personal, teaching, and musical skills and behaviors that need to be shaped in different ways to successfully convey music content to students. Insights into the results of the necessary skills/knowledge components are gained through using the example of the Music Department at the Tainan University of Technology, Taiwan. The findings demonstrate that music curriculum integration with a competency-based approach to practice helps with successfully implementing classroom management strategies.

Chapter 5: *Pre-Service Engineer Educators Learning Mathematics: Mapping the Lived Complexity;* by Katerina Kasimatis, Andreas Moutsios-Rentzos, Nikolaos Matzakos, Varvara Rozou, & Dionisios Kouloumpis. In this paper, we adopt a systemic perspective to investigate the teaching of mathematics in ASPETE, which is a tertiary education institute in Greece that offers a two-faceted degree: an engineer degree and a pedagogical degree as engineer educator. We focus on the complex lived reality of first year Electrical Engineers and Mechanical Engineers students through a multileveled affective mapping of their studying in ASPETE, including: approaches to study, confidence in learning mathematics, conceptions about mathematics and its role in their studies and career, and views about mathematics teaching effectiveness (considering both what they actually experienced and what they would prefer to experience). The students were found to show a lack of preference for the surface approach (though not combined with a preference for a deep approach), a neutral-positive confidence in learning mathematics, and to be satisfied by the teachers' effectiveness. Confidence in learning mathematics appeared to be central in the identified dynamic affect system, whilst their conceptions about mathematics seemed to be related with the desired characteristics of mathematics teaching. The students of the two departments differed in their levels of confidence in learning mathematics, which we posit that is linked with the qualitatively different affective complexity they experience.

Chapter 6: *Coastro: @N Astronomy Condo – Teachers' Attitudes and Epistemological Beliefs Towards Science in a Citizen Science Project*; by Ilídio André Costa, Carla Morais, & Mário João P. F. G. Monteiro. An attitude is seen as a hypothetical construct related to a tendency expressed by evaluating a particular entity with some degree of favour or disfavour. In the case of attitudes toward science, these cannot be isolated from understanding science's processes: the path to produce, refute, and change knowledge. Thus, it is critical to promote public engagement with science-astronomy and technology with the goal of understanding content, but also of understanding what science is and how it is built. In this context, CoAstro: @n Astronomy Condo emerged – a citizen science project starts with the engagement of primary school teachers with the Research Group on the "Origin and Evolution of Stars and Planets" at the Instituto de Astrofísica e Ciências do Espaço (IA). A semi-structured interview was conducted to study teachers' attitudes and epistemological beliefs towards science and the changes promoted by CoAstro. The interview was performed before and after the development of the CoAstro. It involved nine primary school teachers with no degree in science and who volunteered to participate in CoAstro. The results show that there has been an increase of interest in astronomy and the reinforcement of epistemological beliefs.

Chapter 7: *Design Based on ICF - The training courses for in-service teachers*; by Laura Sara Agrati. The International Classification of Functioning, Disability and Health (ICF) allowed to adopt that new of 'functioning', which refers to bodily structures and functions, activity and participation and interaction between these and personal and environmental factors. The model is increasingly becoming the reference for the planning/organization of inclusive interventions, in Europe and in the Italian schools: it has been one of the main topics (l. 107/2015) in the last three-year Italian teacher training plan. The work presents procedures the early results of three professional training courses evaluation (2017-2019). The courses involved 73 in-service teachers and aimed to enhance the design skills of Individualized Education Plan (IEP) on ICF model. According to the Kirkpatrick Model, the evaluation has been conducted on the teachers' 'learnings' and 'transfer' detected through pre-post test and a document analysis of the IEP. The study highlighted few linguistic and semantic difficulties and a better teachers' sensitivity to the environmental component of the functioning. It offers some useful hints for the construction of a possible trans-national platform (as sharing of practices, data-base) about the training of school teachers on ICF bio-psychosocial model, as well as arguments regarding the tools for verifying the effectiveness of teachers training interventions.

Chapter 8: *Evaluation of a Factor that Influences School Failure in a Group of Adolescents in Iasi County - Fatigue*; by Adriana Albu, Mihaela Vlada, & Florin Dima. School activity is characterized by high physical and mental demands. Any failure to adapt these requests to the possibilities of the age group can be associated with school failure. The study was carried out on a group of 208

students from the 9th grade from three high schools in Iasi county. A questionnaire regarding school activity and the causes of the phenomenon of school fatigue was applied. The results were processed using Pearson's chi-squared test. The students are constantly preparing only for certain subjects (72.59%). In most cases (65.86%) adolescents admit that they have been taught how to study only in certain subjects. Fatigue is often present in 58.65% of students. The students attribute the occurrence of this phenomenon to the numerous subjects they have to study (55.76), the large volume of homework (51.92%), insufficient sleep (48.55%), teachers being too strict (25%), or the breaks being too short (25%). Special attention must be paid to nighttime sleep which is insufficient in 66,82% of cases. Many factors that generate school fatigue must be known and carefully assessed in order to reduce the frequency of this phenomenon.

Chapter 9: *Creating an Image of People with Disabilities in Literature Lessons*; by Nikoletta Gulya, & Anikó Fehérvári. Inclusive education provides an opportunity for students with disabilities to learn with their non-disabled peers. However, inclusive classrooms do not guarantee that non-disabled students will accept or form friendships with students with disabilities. Therefore, there is a need for intervention that facilitates the acceptance of students with disabilities. Literary works are a readily available resource in education to help students learn about society's diversity and its cultural contexts, as long as they depict these social groups appropriately. This study aimed to identify the different recurring patterns of the disability conception within the content of youth literature in primary education, employing content analysis. The research results reveal that people with disabilities are extremely underrepresented and depicted stereotypically in the examined literary works. This representation can reinforce students' negative attitudes toward people with disabilities. Therefore, the stereotypical content should be clarified and discussed during the lessons.

Chapter 10: *Subject Teachers and Enhancement of Students' English Proficiency in Selected Senior Six Classrooms in Rwanda*; by Speciose N. Ndimurugero, & Gloriose Mugirase. This study was conducted in Sixth Form schools in Huye District in Rwanda. The researchers' concern was that most secondary school leavers enter university with low proficiency in English, the medium of instruction. The researchers focused on subject teachers because subject-related courses are allotted more hours than English. The study aimed to explore whether subject teachers offered any assistance in boosting students' English proficiency. The research drew on Language across the Curriculum (LAC) and Content and Language Integrated Learning (CLIL) approaches. LAC stipulates that all teachers are language teachers, that subject teachers and language teachers should work jointly, and that language should be taught across the curriculum. CLIL recommends that content be learnt through a second language and that the subject and the language be taught at the same time. For validity and reliability purposes, the current study made use of both qualitative and quantitative data collection and analysis methods. Findings revealed

that only some of the subject teachers used strategies that could help promote their students' English proficiency. Findings also indicated that content and English language teachers did not collaborate and that the students were not proficient in English. In accordance with these findings, recommendations were made.

Chapter 11: *Education Executives Views about the Development of Authentic Learning and Assessment Environments*; by Katerina Kasimatis, & Theodora Papageorgiou. The aim of this study is to investigate how the concept of "authentic learning" and "authentic assessment" is formed in the discourse of education executives with previous teaching experience in primary and secondary education. Authentic learning is based on the theory of social constructivism, according to which the social nature of knowledge is emphasized and the learner builds knowledge by creating meaningful authentic activities. Authentic assessment is described as a dynamic form of assessment which focuses on the skills developed by students during the learning process (Woolfolk, 2007). The design of learning environments is based on the nine features of authentic learning, constructivism and the theory of embedded learning (Herrington, 2006). In this study examples of authentic activities that support authentic learning environments in which a variety of authentic techniques are used and they are related to different subjects are presented. The sample of the study consisted of 114 adults participating in a training program as a qualification for their professional development during the year 2018-2019. Quantitative analysis of the data was conducted. The analysis of the data revealed that an authentic learning environment consists of experientiality, interdisciplinarity, team work, problem solving, self-assessment, peer-assessment, real-world relevance, which are characteristics of authentic learning and assessment. Moreover, the implementation of authentic learning activities can lead to the development of the cognitive, metacognitive, social and communicative skills of the 21st century.

Section 2, entitled "Teaching and Learning", offers research about foundations in the education process itself, in various contexts, both for tutors and students.

Chapter 12: *The Importance of Bilingualism in the Primary Classroom;* by Edina Kulenovic. The main purpose of this study was to give account of the importance of early bilingualism in the primary classroom and to ascertain if being bilingual from an early age is an advantage or a hindrance. In the context researched here (Primary school teachers and Primary trainee teachers in England), the paper seeks to determine how early bilingualism has influenced the respondents' education, career choices and overall learning and teaching experience at school. Action research was used in this study. The key findings concluded that early bilingualism has impacted positively on the respondents' education and life choices and that being bilingual from an early age is an advantage. On the other hand, there are some negative influences, but they are outweighed by the benefits that knowledge of home languages bring. It is hoped that this study will encourage primary teachers, trainee

teachers and parents to look at bilingualism as an opportunity and utilise bilingual learners' linguistic and cultural knowledge in order to create an environment where students and teachers have the opportunity to learn and develop together.

Chapter 13: *Do You Study or Work? - Project based learning as an enriching experience in education;* by Teodomiro Boronat, Luis Quiles-Carrillo, Octavio Fenollar, Juan Ivorra-Martinez, & Néstor Montanes. Project Based Learning (PBL) is a very popular teaching strategy nowadays because it offers a great number of advantages and/or opportunities from a teaching point of view, such as achieving a deeper learning, developing teamwork and leadership skills, or getting the student to take control of what and how to learn. For all these reasons, the authors believe that, in the context of the Master's studies, as the last studies before insertion into working life, the PBL can be a very appropriate teaching methodology, since well thought out it will prepare students for the real situations that they will later experience in their professional lives. The objective of this work is to present the experience of the application of PBL in the development of a common project for four subjects of the University Master in Engineering, Processing and Characterization of Materials, taught at the Polytechnic School of Alcoy, belonging to the Polytechnic University of Valencia (UPV).

Chapter 14: *Enhancing Learners' Intrinsic Motivation Using Student Teams Achievement Divisions (STAD) in Multicultural Classrooms of South Africa;* by Charles Sechaba Masoabi, & Greggory Alexander. This chapter is drawn from a PhD study that employed Student Team's Achievement Divisions as a learning technique to enhance learners' intrinsic motivation in Technology Education within a South African multicultural school. The authors over the years observed learners' actions, and interactions in Technology classes and realised that some of the learners find it difficult to engage in behaviour that arises within themselves - an aspect known as intrinsic motivation. Most learners in the Technology class, registered no concerns in obtaining low scores or failing the subject. However, a minority of the learner population obtained high achievement scores and maintained interest throughout lessons. This study explored the development of the ZPD in a cooperative learning context. The authors used STAD, as a cooperative learning technique, in motivating learners intrinsically to increase their participation in class activities. The study explored STAD in1) closing the gap between pedagogy and content knowledge, and 2) intrinsically motivating learners to develop high levels of achievement in the subject of Technology. This study employed the Bricolage design in gathering data from two Grade eight Technology classes over a six-month period. The findings indicated that the learning environment cultivated learners' development, curiosity, and positive attitude toward Technology.

Chapter 15: *MOOCs for Bridging the School - University Gap*; by Ilaria Merciai, Ruth Kerr, & Gaetana Melchionna. This chapter presents an update of the MOOC orientation strategy implemented by Federica Web Learning, Centre for Innovation, Experimentation and Diffusion of Multimedia learning at the University of Naples, Federico II since January 2019 and already published in the same year. A solid orientation strategy is designed to support students in their university choice and prepare them for the intellectual demands of university life and study. According to OECD, graduate numbers in Italy increased in 2019 from 20% to 28% (25-34 age range), and Italy has high numbers of post-graduate degree holders. However, overall graduate numbers are still relatively low compared to other European member states and dropout rates continue to be high, as do the numbers of students changing degree course after one or two years of study. In line with the updated DEAP, Digital Education Action Plan (2021-2027), and Italian Ministerial recommendations, the Federica MOOC-based orientation strategy explores ways of bridging the gap between school and university in a 3-pronged approach designed to address students' choice of degree subject and university; preparation for university entrance exams and difficult modules; and last but not least, raising student self-awareness to help them adapt to change as they shape their future.

Chapter 16: *Digital Engines at Work: Promoting Research Skills in Students;* by Olga Suleimanova, Marina Fomina, & Albina Vodyanitskaya. The paper focuses on the digital teaching and research practices which make an indispensable integral component of upscale education. The authors compare traditional approaches to education against the much demanded by the society, promising approaches which heavily rely on the digital engines. Most relevant – education-wise – features of centennials / millennials, also referred to as "digital natives", are taken into account. The digital teaching practices and digital research practices that can be used in teaching are outlined; teaching and research potential of some digital engines is examined. Corpus-based experiment along with the analysis of search engine results, cultural-linguistic research through Google and Yandex searching, Tropes Zoom's content analysis and some other methodological novelties that can be used in the classroom as well as facilitate and substantiate the research results are analysed.

Chapter 17: *Nature of Science Interdisciplinary Teaching at Primary School Based on Symmetry and the Search of Invariants*; by Simone Brasili, & Riccardo Piergallini. The project is situated in the field of teaching physics, generally speaking, science education. It aims at studying the interplay between physics and mathematics, introducing an interdisciplinary approach based on the modern concept of symmetry or sameness within change (i.e., invariance). The interdisciplinary methods integrate the process skills common to discovery-based science and problem-based mathematics, typically of Nature of Science (NoS) modelling. We designed a teaching-learning sequence (TLS) and implemented it in an Italian primary school on a sample group (N = 96). Research conforms to pre- and post-test design with a control group. The resulting data were examined through a mixed method. We assess the effectiveness of the TLS by analysing the learning changes in the level of pupils' knowledge of symmetry. The findings show that the pupils were in the regime of competence for grasping the changed view of symmetry. It

also provides ideas that the concepts of symmetry and invariance will allow building the architecture of more extensive scientific knowledge. The study of transformations and invariants facilitates the acquisition of cognitive procedures fitting in many domains, modelling and generalization processes. This research contribution brings important suggestions for designs of successive steps in the learning path on symmetry.

Section 3, entitled "Projects and Trends", presents chapters concerning, as the title indicates, education viewed as the center for innovation, technology and projects, concerning new learning and teaching models.

Chapter 18: *Self-Produced Videos in a Flipped Classroom for Engineering Students and Nursing Students*; by Joar Sande, Ingvild Leite, & Lars Kyte. The study investigates the differences in nursing and engineering students' perceptions of videos made by the teachers as part of a flipped classroom, and whether these videos contribute to a good learning environment. The sample consists of 21 engineering students, 17 nursing students and 17 pre-engineering students. Overall, all three student groups are satisfied with the quality of the videos. The nursing students watched videos more before the learning sessions than the other two groups. All students think videos produced with simple tools are technically satisfactory and make it easier for the students to understand the material, which leads to increased learning outcomes. They express that videos are more motivating, and that they learn more from watching a video than reading course material. Nursing students expressed a higher degree of agreement with replacing traditional lectures in other subjects with videos. All student groups think the learning environment has been good. The results indicate a connection between the learning environment being good and the videos working satisfactorily.

Chapter 19: *Holistic Educational Approach: Cooperative Learning and Mindfulness in the Training of Future Teachers*; by Consolación Gil, & María Dolores Gil-Montoya. Traditional educational instruction is being replaced by new, more holistic paradigms requiring both a methodological change and a new definition of the role of the teacher and students. This study proposes a new education paradigm based on active teamwork methodologies (such as cooperative learning) and mindfulness techniques. Cooperative learning is a well-known strategy that has obtained very positive results in the development of competences and skills. Mindfulness techniques favor the development of attitudes and values as well as increased inner-calm, resulting in lower levels of stress and anxiety among both students and teachers. The proposed paradigm was implemented in a course of the master's degree program for Secondary School Teachers at the University of Almeria (Spain). The results show that students were more engaged with the learning process and developed a greater sense of responsibility and empathy, not only towards their own learning but also to their classmates' learning. The procedure included the application of the Mindful Attention Awareness Scale (MAAS) at the beginning and at the end of the course to measure the evolution of the students in different items related to mindfulness.

Chapter 20: *Interdisciplinary Innovation Camp for Nursing and Engineering Students at WNUAS*; by Eivind Standal Husabø, Dagrun Kyrkjebø, & Joar Sande. Western Norway University of Applied Sciences (WNUAS) in cooperation with Junior Achievement Sogn og Fjordane, organizes interdisciplinary innovation camps for nursing and engineering students. The student assignments are given by local businesses and organizations. This study's objective is to evaluate and develop new programs for innovation camps, as well as to share ideas with educators working with this type of learning activity. A qualitative method was used, and a focus group interview was conducted involving nursing and engineering students (n=8). The students were satisfied with innovation camp as a method for learning, and the learning outcome was good. They regard innovation camp as a diverging learning method. The students are lacking a common understanding of innovation and entrepreneurship before participating at the event, the assignments were too limited, and they were not challenging enough for creative thinking. This study leads to several conclusions to improve upcoming innovation camps at WNUAS. The improvements can be separated into two categories:
1. The students need to be better prepared for the event. 2. The assignments need to be more open.

Chapter 21: *Today's Higher Education at a Crossroads - The critical point and paradigm shift in the educator's role*; by Cezar Scarlat. Observing the different progress rates of the available data, information and knowledge (on one side) and human capacity to process these available data, information and knowledge (on the other side), the author becomes aware of the higher pace of the first – in the midst of impetus of new communication and information technologies – and argues that, at this point in time, we are eye-witnessing a real education paradigm shift. The education system is at a critical point in time (call it critical point in education – CPE) when the educator's role must change from knowledge repository to skilled, expert knowledge explorer and identifier, switching from teaching the subject to teach students how to pick the right and relevant information related to the subject – from the ocean of available data. The current corona-crisis – which started by the time when the ideas for this chapter were put together – made this question more acute, asking for re-thinking the education system and educator's role. This chapter launches the thesis of the education paradigm shift – in that respect of the educator's role in the predictable future, to provoke a discussion, and to open a research path, for higher education strategists, policy makers, scholars and educators.

Chapter 22: *The Educational and Therapeutic Benefits of "Content-Focused Accessible E-Learning Material" for Visually Impaired University Students*; by Chikako Ota. The idea of "educational therapy" is quite different in Japan compared to foreign countries, especially in the US, where educational therapy is quite advanced. Therefore, this study determines the educational therapeutic benefits of the author's "Content-Focused Accessible E-Learning Material" for English self-learning, based on the concept developed in the US, particularly focusing on visually impaired students. These students experience various difficulties in higher

education, such as 1) the absence of learning materials in braille, 2) commercial unavailability of magnification-capable learning materials and digital materials, and 3) lack of text-to-speech function in many learning materials. To study whether the material had any therapeutic benefits for these students, the author obtained feedback from 33 students. The feedback was based on the following questions: (1) technical aspects: Did the material reduce/rid the load/concern they felt; and (2) mental aspects: Did the material increase the willingness/autonomy or decrease anxieties and did they feel accomplished or motivated to improve their longitudinal English self-study? The findings show that the material was beneficial to them in five ways. The goal of this study was accomplished to a considerable degree; the use of this material reduced students' mental burden in learning based on both qualitative and quantitative feedback from visually impaired students.

Chapter 23: *Integrating Students with Refugee and Asylum Seeker Backgrounds into School: Teachers' Perspectives*; by Maura Sellars. The critical aspect of refugee and asylum seeker education has become almost a worldwide phenomenon. The difficulties of language, culture, acceptance and resettlement all impact on a school's capacity to support these students and ensure that they access to best educational opportunities possible in many countries which are dominated by neoliberalized education systems. Neoliberalized education systems are dominated by the five Cs (Competitiveness, Conformity, Conservatism, Convention and Commerce) and are the antithesis of the European educational child- centred traditions conceived by Pestalozzi, Froebel, Steiner and others. This writing draws on a research project designed to establish the perspectives of members of a school community about belonging. It was conducted in a primary school in urban Australia which has a reputation for developing inclusive practices and an ethos of belonging for its diverse homeland population and its refugee and asylum seeker population which comprised 40% of the school enrolment at the time of the investigation. The research indicated the importance of the teacher perspectives, values and beliefs and has implications for teachers of refugee and asylum seeker students everywhere. It also has implications for preservice teacher education and the importance of preparation to specifically support these cohorts of students and their communities in addition to being flexible and open to change.

Chapter 24: *School Principal Leadership in Remote South Africa: A Leadership and Management Challenge*; by Leentjie Van Jaarsveld. To understand the circumstances under which principals in remote areas exercise their leadership and management, an investigation was conducted in the Northern Cape province, South Africa. This province is characterised by small towns with few residents. The infrastructure is not up to par, and in some cases, the socio-economic conditions are extremely poor. Unemployment is a big problem in the villages. The uniqueness of this study lies in the fact that after 1994, with the abolition of apartheid, the farmers withdrew their children from the schools and no longer supported the schools as before. As a result, the principals experienced many more challenges. The study followed a qualitative, phenomenological design from the interpretivist paradigm. The sample consisted of ten principals. Semi-structured interviews were conducted with the principals. The inductive data analysis process was used. The required

ethical clearance was obtained from the Research Ethics Committee of the North-West University and the Department of Education of the province. The results reveal that principals in remote areas, in the absence of technology, infrastructure, and support bases, have to use their skills creatively, and they need the support of the community, teachers, school management, and governing body.

Section 4, entitled "Organizational Issues", gives a glance on tools for implementing organizational learning and change in the education context.

Chapter 25: *The Evolution of China's Private Education Policy: Historical Review and Path Analysis*; by Li Yang. Based on the policy texts of private education since the founding of the People's Republic of China and from the perspective of historical institutionalism, this article draws the following three conclusions. First, being shaped by changing policies from the state, the development process of China's private education could be divided into four main stages: the stage of being eliminated (1949~1978), recovery and preliminary development (1978~1992), thriving continually (1992~2016), and under classified management as well as standardized development (from 2016). Second, the evolution of private education policy has experienced punctuated equilibrium and gradual transformation as two main modes, which is determined by critical junctures and path dependence. Third, government power and market mechanism play the role of dynamic mechanism of institutional change. To conclude, the article suggests that the state should further clarify the respective responsibilities of the government and the market mechanism to realize the positive mutual interaction.

Chapter 26: *Professional Support Measures for Novice Teachers in Latvia*; by Anda Grinfelde, Inga Vanaga, & Liga Paula. Retention of novice teachers in education system is a serious problem in Latvia. Mentoring, in-service training and emotional support are crucial for novice teachers to remain and continue working in school. The aim of this research is to explore opinions of Latvian teachers about professional support measures that are available and needed to be introduced for novice teachers. The research results were obtained during an on-line survey (N=1258) conducted by the Latvian Trade Union of Education and Science Employees in 2018, and document analysis. The questionnaire comprised the statements on methodological, financial, material and technological support which were assessed by using 5-point symmetric Likert scale. The results witness about regional disparities mainly between the capital city Riga and other regions. There are statistically significant ($p<0.05$) differences in opinions of the teachers representing different regions of the country. The respondents agree that there is a lack of well-structured and uniform support system for novice teachers at national level. In general, the teachers are positive about availability of an emotional support and in-service training. The most critical opinions are about material and financial support that novice teachers can access. The authors conclude that policy makers should focus on national teachers' support guidelines.

Chapter 27: *International Short Students Mobility and Transparency: A Dutch – Russian Perspective*; by Florentin Popescu, Tijmen Weber, & Roman Iskandaryan. This paper investigates the importance of transparency of internationalization and various obstacles and barriers that influence international short student mobility within the European Higher Education Area (EHEA) in particular in the Netherlands and in Russia. Having in mind that due to privacy regulations and availability of data regarding international short student mobility, this article is using a framework based on literature review. The authors analyze patterns in international short student mobility, both between countries and over time, not only by using various literature analyses but as well as interviews and panel discussions at HAN University of Applied Sciences, the Netherlands and Plekhanov Russian University of Economics, Russia, to give this research an qualitative dimension and underline how internationalization and what various factors are relevant to international short student mobility This article presents an important contribution to this growing field of literature by doing a comparative analysis about the factors which positively improve the international short students mobility. The three folded impact of this paper is obvious for the stakeholders involved: students, institutions and policy makers are responsible for the smooth cooperation and coordination for a better international mobility.

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May, 2021

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Section 1
Teachers and Students

Chapter #1

THE RELATIONSHIP BETWEEN STUDENT'S APPROACHES TOWARD LEARNING AND ACADEMIC ACHIEVEMENT IN THE CHINESE CONTEXT

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ABSTRACT
This study examined the relationship between Chinese high school students' approaches toward learning and their academic achievements. Participants consisted of 14,021 eleventh graders from an eastern province in China. They took the National Standardized Test in three subject areas: Chinese language, mathematics, and English language. The total score was used as an indicator of their academic achievement. Students' approaches toward learning were measured in three aspects: self-confidence in learning, learning interests, and study habits. Questionnaires of self-confidence in learning and learning interests were adapted from PISA 2006 and PISA 2012. Study habits were measured with the questionnaire adapted from Academic Adjustment Inventory (AAT). The Pearson correlation and hierarchical linear regression results showed that the dimensions of students' approaches toward learning were significantly related to academic achievements. Results of analysis of variance after the control of student gender and socioeconomic status suggested that the top 25% of students in dimensions of approaches toward learning scored significantly higher than the bottom 25% of students with small effect sizes in their performance on the final examinations. This study suggests that helping students build good approaches toward learning may improve their academic achievements. Educators are recommended to put more effort into helping students cultivate learning confidence and developing interests in learning. Classroom teachers are advised to guide students in fostering good study habits and make study plans.

Keywords: self-confidence, interests, strategies, academic achievements.

1. INTRODUCTION

The aim of education is to promote students' comprehensive development (Anzai & Simon, 1979). Not only are learning outcomes important, but the quality of learning taking place during the learning process is equally important. It has been unanimously affirmed in educational research that students' approaches toward learning significantly affect their academic performance (e.g., Hugener et al., 2009; Jin & Si, 2004). For example, McDermott (1984) demonstrated that approaches toward learning could produce larger predictive effects on learning outcomes than intelligence. Most scholars also believe that approaches toward learning such as self-confidence in learning, learning interest, learning motivation, and study habits, are basic qualities that are closely related to and significantly impact learning (e.g., Bai, Chao, & Wang, 2019; Gorges, Maehler, Koch, & Offerhaus, 2016; Shen, Yang, & Fang, 2015).

Education reform in sizeable countries all over the world has shifted from focusing on academic performance to stimulating and cultivating students' approaches toward learning. For example, the United Kingdom, Germany, Switzerland, Australia, and other countries have started to develop new national curriculum standards on students' approaches toward learning. Many influential international organizations have also conducted empirical research on students' approaches toward learning and analyzed the influencing factors of students' approaches toward learning in different grades through large-scale assessment data. For example, the Programme for International Student Assessment (PISA), Trends in International Mathematics and Science Study (TIMSS), Program in International Reading Literacy Study (PIRLS), and National Assessment of Educational Progress (NAEP) have evaluated students' approaches toward learning in specific disciplines.

Chinese education is academic achievement-oriented, where students, schools, and parents focus on academic performance/test scores, which has caused an academic burden (Zhang, 2000). Therefore, under this specific context, teachers and parents are prone to neglecting the cultivation of students' quality of learning, limiting the comprehensive development of students (Zhou, 2016). Based on China's unique context, it is crucial to explore the relationship between students' approaches toward learning and their academic achievements. It is also important to examine approaches toward learning based on empirical, large-scale assessment data and propose relevant suggestions for education policy in China.

2. BACKGROUND

2.1. Theoretical framework

Humanistic Learning Theory provided the theoretical basis for this study (Maslow, 1965; Rogers, 1965). It emphasized that learning is student-oriented, which educators need to promote students' all-round development and self-realization. Rogers (1965) believed that meaningful learning should be encouraged. In this optimal learning atmosphere, students' learning quality can continue to positively affect their academic performance and help them achieve outstanding learning outcomes. This theory highlights the importance of students' approaches toward learning.

2.2. Definition of approaches toward learning

Various definitions of approaches toward learning exist in the literature. Shenzhen Education Bureau (2014) issued guidance on further improving primary and secondary school students' comprehensive literacy. The guidance defined approaches toward learning as the relatively stable psychological characteristics of learners in the learning process, such as learning motivation, interest, habit, and ability. Other definitions of approaches toward learning include essential student characteristics that encourage them to adapt to life-long learning and future development (Lu, 2017). Peng (2004) referred to approaches to learning as "the way for students to establish a connection with the learning content during learning period" (p. 75), which is one of the factors that affect how students achieve academically and obtain study skills (Cutolo & Rochford, 2007; Kassab, Al-Shafei, Salem, & Otoom, 2015). Numerous studies have indicated that approaches toward learning were strongly related to students' academic development and had positive impacts on their learning outcomes (e.g., Angus, 2003; Cutolo & Rochford, 2007; Denton & West, 2002; Li, 2019; McGinnis, 2009).

2.3. Framework of approaches toward learning

Approaches toward learning was considered to be a complex system with multiple levels and aspects (e.g., Ge & Yang, 1997; Lu, 2017). According to Early Learning and Development Benchmarks in Washington State from 2005, there are five dimensions of students' approaches toward learning: curiosity, interest, initiative, persistence and attention, reflection, and interpretation (Kagan & Kauerz, 2012). The High/Scope Educational Research Foundation in Michigan, sorted students' approaches toward learning into the following six aspects: initiative, planning, participation, problem solving, use of resources, and reflection (Schweinhart, Berruetaclement, Barnett, Epstein, & Weikart, 1985; Schweinhart, 1993; Schweinhart & Weikart, 1997).

Studies with Chinese students suggest that approaches toward learning are multidimensional. Zheng (1996) classified approaches toward learning into learning motivation, learning habits, and learning methods. Peng (2004) classified approaches toward learning into learning motivation, learning tendency, learning monitoring, learning strategies, and learning ability. Lu (2017) reported six dimensions of approaches toward learning: (a) learning cognition and experience; (b) learning motivation; (c) learning ability and method; (d) learning persistence; and (e) learning outcomes. After integrating the definition and structure of approaches toward learning from domestic and foreign research, this study measures students' approaches toward learning from three aspects: self-confidence in learning, learning interest, and study habits.

2.3.1. Self-confidence in learning

Self-confidence in learning in the current study is defined as students' positive reactions towards their completion of learning tasks and the achievement of learning goals (Xiu, 2009). Studies showed that students who gained more learning confidence scored higher academically, especially when teachers adopted encouraging teaching strategies (Zhong, 2016).

2.3.2. Learning interest

Learning interest is defined as individuals' conscious tendency to try to know something and engage in a certain learning activity (Renninger, Hidi, & Krapp, 1992). Learning interest is the driving force in the learning process; students who have a higher interest in learning can engage more deeply in learning (Yan, 2015).

2.3.3. Study habits

Study habits can be described as the adopted strategy and manner a student plans in his/her private learning to attain mastery of one or more subjects (Capuno et al., 2019; Memiş & Kandemir, 2019). Having good study habits means using suitable learning strategies, which improves students' learning efficiency, thus helping students obtain success and produce better learning results (Capuno, et al., 2019; Ogbodo, 2010).

2.4. Impacts of social economic status (SES) and gender

Researchers have identified significant differences in learning outcomes related to students' gender and social economic status (SES) (e.g., McNeal, 2012; Sojourner & Kushner, 1997). Many studies indicated that SES may positively or negatively predict parental involvement and learning outcomes (Merola, 2005). Studies also suggest differences between boys and girls in learning performance (e.g., Ma, Du, Hau, & Liu, 2018). As a result, the possible effects of SES and gender on learning outcomes were controlled in this study when examining the relationship between approaches toward learning and academic achievement.

The current study explores the relationship between approaches toward learning and academic achievement and answers the following research questions:

1. Is there a significant relationship between dimensions of approaches toward learning and students' academic achievement?
2. How do dimensions of approaches toward learning predict academic achievement?
3. Are there differences in learning outcomes among students with various levels of self-confidence in learning, learning interest, and study habits when their SES and gender are the same?

3. METHODS

3.1. Participants

A total of 14,021 eleventh graders from an eastern province in Mainland China participated in the current study. A stratified cluster random sampling was employed, through which 100 schools from the 17 cities in the province were randomly selected to represent the student population in the province. All selected schools agreed to participate in the study. Due to the school support, the response rate was 100%. Table 1 shows detailed demographic information of the participants.

Table 1.
Descriptive Statistics of Demographic Information.

Demographic Variables	N	Percentage (%)
Gender		
Males	6794	46.3
Females	7527	53.7
Birthplace		
Rural	6105	44.3
Suburban	4637	33.6
Urban	3048	22.1

3.2. Instruments

3.2.1. Self-confidence in learning

The Self-Confidence in Learning scale was adapted from PISA 2006 (Organization of Economic Co-Operation and Development [OECD], 2009) and is intended to measure students' self-confidence in learning with three items. For example, one item was "I believe I can do well in the exam". Students were asked to respond to three items using a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). The Cronbach's alpha of responses to this scale was .74.

3.2.2. Learning interests

The Learning Interest Scale was developed by PISA 2012 (OECD, 2013) with the purpose of testing students' interest in courses and reading contents. Students were asked to respond to four items in each subject using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The internal consistency of the scales measured by Cronbach's alpha were .94, .96, .96, and .94 for learning interest of Chinese language, mathematics, English language, and overall learning interests, respectively.

3.2.3. Study habits

The Study Habits scale was adapted from Academic Adjustment Inventory (AAT). The scale has 12 items in three dimensions: plan for learning, style of listening, and style of reading. Students responded to the items using a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree), and higher scores represented better study habits in learning activities. Results showed high internal consistency based on Cronbach's alpha for each dimension and the whole scale: .93, .90, .94, and .97, respectively.

3.2.4. Academic achievements

Students' academic achievements were assessed by final examinations. To follow the Chinese National Curriculum Standards, three subject areas (mathematics, Chinese language, and English language) were included in this study. The three subject tests' total score represents students' academic achievements, with a mean of 249.90 and a standard deviation of 27.92.

3.2.5. Social economic status (SES)

We took an example from the method used in PISA 2009 (OECD, 2012) to evaluate SES in the current study. Students were asked to respond to several parental information questions, such as educational level, occupational status, and family possessions. A standardized score was then calculated from the highest degree of parental education, the highest occupational status of parents, and family belongings such as home educational resources.

3.3. Data collection and data analytic procedures

Preliminary analyses included the testing of the reliability of students' responses to the instruments. Descriptive statistics, including means and the standard deviations, are provided for the key variables. Pearson correlations and stepwise linear regressions were adopted to explore the relationship between approaches toward learning and academic achievements. An analysis of variance (ANOVA) was used to examine differences in academic achievements between the students in the top 25th percentile and those in the bottom 25th percentile based on self-reports on self-confidence in learning, learning interests, and study habits, when students' gender and SES were controlled. Effect sizes (η^2) were reported using Cohen's (1988) standards for small (.01), medium (.06), and large (.14) effect sizes.

4. RESULTS

Results of the Pearson correlation among variables are shown in Table 2. Students' dimensions of approaches toward learning were statistically significantly related to each other. Dimensions of approaches toward learning were also statistically significantly correlated with academic achievements. Table 3 describes the relationship between dimensions of approaches toward learning and academic achievements. Results of a stepwise linear regression indicated that self-confidence in learning, learning interests, and study

habits all significantly predicted students' academic achievements. The three variables each significantly contributed to the prediction of students' learning outcomes (Table 3). The change of the R-squared value was statistically significant at each step.

In order to further explore students' academic achievements by different dimensions of approaches toward learning, we classified students into the upper and lower 25% according to the scores of each dimension of approaches toward learning by. The top group represented students who were high in self-confidence in learning, learning interests, or possessed good study habits, and students in the bottom group were those with low self-confidence in learning, learning interest, or poor study habits.

Table 4 shows the results from the ANOVA of students' academic achievements by approaches toward learning (here refers to self-confidence in learning, learning interests and study habits). Significant differences were noted in three domains: students with higher self-confidence in learning (M = 255.25, SD = 26.02) had higher levels of academic achievements than those with lower self-confidence in learning (M = 243.43, SD = 29.78), F (1, 6779) = 226.68, $p < .001$, partial $\eta^2 = .03$ (small effect size). Students who possessed higher learning interests (M = 255.43, SD = 25.89) performed better on standardized tests than those with lower learning interests (M = 243.22, SD = 29.18), F (1, 6980) = 211.83, $p < .001$, partial $\eta^2 = .03$ (small effect size). Meanwhile, students who had better study habits (M = 253.50, SD = 27.15) also had higher academic achievements than those with poorer study habits (M = 245.92, SD = 28.38), F (1, 7643) = 84.74, $p < .001$, partial $\eta^2 = .01$ (small effect size).

Table 2.
Pearson Correlation Coefficients among Self-Confidence in Learning, Learning Interests, Study Habits, and Academic Achievements.

	SCL	LINT	STAB	TTS
SCL	1			
LINT	.63*	1		
STAB	.58*	.70*	1	
TTS	.17*	.18*	.15*	1
M	3.23	4.02	4.23	249.90
SD	0.66	0.85	0.75	27.92

Notes: (a) SCL = Self-confidence in learning; LINT = Learning interest; STAB = Study habit; TTS = Total score in three subjects = Academic achievement; (b) *$p < .001$.

Table 3.
Relationship between Academic Achievements and Self-Confidence in Learning, Learning Interests, Study Habits, and Academic Achievements.

Variable	B	SEB	β	R^2	ΔR^2
Step 1				.03*	
SCL	6.19	.32	.17*		
Step 2				.04*	.01*
SCL	3.11	.42	.09*		
LINT	4.29	.37	.14*		
Step 3				.06*	.02*
SCL	2.83	.43	.08*		
LINT	3.65	.44	.12*		
STAB	1.47	.54	.04*		

Notes. (a) SCL = Self-confidence in learning; LINT = Learning interest; STAB = Study habit; TTS = Total score in three subjects = Academic achievement; (b) *$p < .001$

Table 4.
Relationship between Academic Achievement (TTS) and Approaches to Learning.

	SCL			LINT			STAB		
Indicator	*SS*	*F*	*partial η2*	*SS*	*F*	*partial η2*	*SS*	*F*	*partial η2*
SES	74885.05	100.51*	.02	74734.07	101.40*	.01	82211.30	110.55*	.01
Gender	85990.14	115.42*	.02	103826.24	140.88*	.02	138916.85	186.80*	.02
Approaches	168885.60	226.68*	.03	156121.73	211.83*	.03	63017.75	84.74*	.01

Notes. (a) SCL = Self-confidence in learning; LINT = Learning interest; STAB = Study habit; TTS = Total score in three subjects = Academic achievement; (b) *$p < .001$.

5. CONCLUSION AND DISCUSSION

The study was designed to explore the relationship between approaches toward learning and students' academic achievements for Chinese high school students. Results showed that the dimensions of approaches toward learning (self-confidence in learning, learning interest, and study habits) were all significantly related to students' academic achievements (Research Question One). Our findings are consistent with those from previous studies (Cutolo & Rochford, 2007; Denton & West, 2002; Li, 2019; Kassab et al., 2015) in confirming the positive relationship between approaches toward learning and academic achievement. Our study contributed to the literature by showing evidence that each of the three dimensions of approaches toward learning (i.e., self-confidence in learning, learning interests, and study habits) significantly predicted students' academic achievements (Research Question Two). Moreover, Research Question Three was also answered with statistically significant differences in students' learning outcomes between various levels of self-confidence in learning, learning interests, and study habits, which echoed previous research (Chang, & Cheng, 2008; Kaur & Pathania, 2015; Xiu, 2009; Zhou, 2016).

Approaches toward learning is of great importance to students' academic development (Hugener et al., 2009). It can reflect students' confidence, interest, and other attitudes or behaviors in learning. Lu (2017) demonstrated that approaches toward learning is one of the most profound psychological characteristics that learners should have to contribute to their academic success. Poor learning outcomes are largely related to the absence of learning quality (Peng, 2004). Students with good approaches toward learning tend to show high interests and confidence in the learning process and have relatively viable study habits. They are interested in learning, believe that they are capable of learning, and regard learning as a pleasant behavior.

Attitude and cognition fosters a stable automatic learning behavior through better (Feng, 2002). In order to improve students' academic performance, educators should put more effort into helping students cultivate learning confidence (Li, 2019). Students can learn in a better way when they acquire interesting learning contents (Renninger et al., 1992), so it is also important for educators to help students develop interests in learning. Finally, classroom teachers should guide students in fostering good study habits and establish appropriate plans for learning (including listening to the teachers, reading, and reviewing the contents).

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Chapter #2

PORTFOLIO AS A STRATEGY TO IMPROVE CAREER ADAPTABILITY RESOURCES

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ABSTRACT
This study aimed to determine whether the levels of career adaptability resources could be increased through the use of a portfolio writing strategy. Based on a mixed methods approach, the study used the design quasi-experimental, with two independent groups and with repeated measures, together with a focus group. Forty students (17 from the experimental group; 23 from the control group) in university-work transition completed the Portuguese version of the Career Adaptation Scale. The pre-test survey was administered at the beginning of the semester of the curricular unit of personal and professional development project (PPDP) in both groups. This was followed, in the experimental group, by a fourteen-week portfolio writing intervention, under the PPDP. In the control group, the PPDP followed the traditional expository teaching methodology. After completing the intervention procedure, post-test research was conducted by both groups. Five students from the experimental group also participated in a focus group of feedback on the writing of portfolios under the PPDP. The results revealed that writing the portfolios contributed to a career adaptability resources increase as well as for the confidence, self-knowledge and knowledge of the market opportunities of these students. The use of portfolios in the PPDP unit course is recommended.

Keywords: portfolio, career adaptability, university-to-work transition.

1. INTRODUCTION

In an increasingly unpredictable, changing and dynamic professional world, in which the career transition occurs more and more frequently (Lent & Brown, 2013), continually requiring each individual critical thinking development and the flexibility to deal with various demands, in order to be able to create your own career opportunities and adapt to different contexts (Zacher, 2015), building a successful career is a great challenge (De Vos & Dries, 2013; Savickas et al., 2009).

The challenge may be even greater for students who are in a transition phase between university and work (Koen, Klehe, & Vianen, 2012; Swanson & Fouad, 1999), process that stretches over time, which begins even before the transition itself and it continues until adaptation to the world of work (Swanson & Fouad, 1999; Vieira, Caires & Coimbra, 2011; Vieira, Maia, & Coimbra, 2007).

The university-work transition is a time for the establishment of new professional goals, which implies planning for the future, reassessing past choices and experiences, as well as anticipating what is to come, both professionally and personally (Swanson & Fouad, 1999; Monteiro, & Almeida, 2015; Monteiro, Taveira, & Almeida, 2019). Thus, in order to build a career, students will need to development a set of skills that help them face and adapt to the demands of the increasingly dynamic and borderless world of work (Savickas et al., 2009), namely career adaptability skills (Carvalho, Moreira, & Ambiel, 2017; Yang, Tien, Wu, & Chu, 2015).

1.1. Career adaptability

Career adaptability is a central concept in Career Construction Theory (CCT, Savickas, 2005, 2013). Savickas (2005) assumes the career as the result of a construction, for which individuals must have full responsibility and commitment. The individual must build his career through his life stories, for the reconstruction of his narrative, and for the co-construction of a narrative identity. The individual must build his own narrative and prepare for transitions between projects (Duarte, 2019; Savickas, 2011; Savickas et al., 2009). This construction has as its main determinant the personal meaning that each individual attributes to his personal experiences, but also academic, professional, social and leisure (Savickas, 2005), and the way he deals with the possibility of building a life and deciding how it incorporates work and work life (Duarte, 2019).

Career construction theory and practice (Savickas, 2005, 2013; Savickas et al., 2009) advocate career adaptability as having a primary role in its management and construction. They offer an important structure to enable people to adapt to new scenarios and find ways to guarantee a job that offers them a sense of meaning, purpose and personal direction (Duarte, 2019; Savickas, 2005; Ribeiro & Duarte, 2019).

The adaptability process (Savickas, 2005) comprises the readiness to adapt, the adaptation behavior, the ability to put adaptation resources into action and, results in an adaptation, always transitory (Ribeiro & Duarte, 2019). In this way, career adaptability is considered a psychosocial construct that represents individuals' self-regulatory resources to deal with current and impending career tasks and occupational transitions and personal traumas, and that helps them to implement their identities / self-concepts in occupational roles (Savickas, 1997, 2005; Savickas & Porfeli, 2012; Tolentino et al, 2014). These career adaptability resources comprise four dimensions, at all stages of the career (Savickas, 2005, 2013; Savickas & Porfeli, 2012): (i) concern: when the individual wonders if he has a future - competence to plan; (ii) control: when the individual asks himself who has control over his future - competence of choice and decision-making; (iii) curiosity: when the individual asks about what he will do with his future? - exploration competence and curiosity; and (iv) confidence: when the individual asks if he can do this - problem solving competence (Ribeiro & Duarte, 2019).

1.2. Portfolio as a learning tool in higher education

Based on a constructivist approach to learning focused on teaching-learning processes in the search for active and new knowledge, the portfolio works as an efficient instrument (Barak & Maskit, 2017; García, 2017; Salazar & Arévalo, 2019; Volmer & Sarv, 2018) and effective in terms of teaching, experimental learning and evaluation, in a university environment (e.g., Cevik, Shaban, Zubeir, & Abu-Zidan, 2018; Escalante, Toro, & Mena, 2017; Eskici, 2015; Sartori, 2016; Canalejas, 2010; Maldonado & Portillo, 2013).

Carina (2015) defines the portfolio as an instrument for gathering information, evidence and skills that instruct students in their academic training. It consists of a systematic and organized aggregation of works carried out by the students, reflecting the evolution of their skills, knowledge, attitudes and aptitudes in the domain of a given curricular unit. In this way, it favors the processes of self-reflection on progress, academic processes and student learning outcomes (Arís & Fuentes, 2016; Sartori, 2016), reconstructing and reworking the learning process and the acquisition of skills (Slepcevic-Zach & Stock, 2018), valuing professional learning and academic performance (Barak & Maskit, 2017).

In this context, the portfolio allows, on the one hand, teachers to focus on the process, rather than on students' products, and provide individualized feedback (Atai & Alipour, 2012; Cheng, Cheng, Chang, & Li, 2018) and, on the other hand, that students take responsibility for their learning process, allowing them to continuously measure and evaluate their learning (Mckenna, Baxter, & Hainey, 2017). It therefore plays an important role in improving the teaching-learning process, assessing students and supporting teacher practice (Salazar & Arévalo, 2019).

1.3. Research aims

This investigation seeks to answer the following research question: Does writing career portfolios potentially increase the levels of career adaptability resources?

2. METHOD

This study is framed by a mixed-methods approach, which allows for the combination of both quantitative and qualitative methods (Creswell, 2014).

Within the quantitative methodology, we can fit this study in the quasi-experimental type of research 2X2, since there are two conditions: a situation for the control effect and an experimental group, and use of pre and post intervention measures in both groups. In this way, the groups are evaluated at two different times, before (pre-test) and after (post-test) the manipulation of the independent variable, writing portfolios.

In turn, the qualitative approach is present through a focus group, a research method aimed at obtaining data, which locates the interaction in the group discussion as the source of the data and recognizes the researcher's active role in stimulating group discussion for the purposes of the data presented.

2.1. Participants

A non-probabilistic and convenience sampling procedure was used in this study.

Participated in the experimental group 17 students, of both sexes (15 women; 2 men), aged between 21 and 29 years, students of 3rd year of psychology degree´s program, attending the personal and professional development project (PPDP) curricular unit, with 56 hours of tutorial classes, in the academic year 2019-2020, using the teaching–learning methodology of portfolio writing.

The control group consisted of 23 students of both sexes (19 women; 4 men), aged between 21 and 25 years old, attending the PPDP in the 3rd year of the psychology degree´s program, in the academic year 2018-2019, using the traditional expository teaching–learning methodology.

Five students (4 women and 1 man), aged between 21 and 23 years, participated in the focus group, all belonging to the experimental group.

2.2. Data collection procedure

2.2.1. Quantitative data

For the quantitative data, the pre- and post-test surveys used in this study draws upon the Portuguese version of the Career-Adapt-Abilities Scale for higher education students (CAAS, Monteiro & Almeida, 2015), a self-report instrument, first devised by Porfeli and Savickas (2012), the CAAS International Form.

The original scale has been validated across several countries, with good reliability and validity indicators. The reliability scores (Cronbach α) of the CAAS-International Form ranged from .74 to .85 for the four subscales (Porfeli & Savickas, 2012). The version of the CAAS-Portugal Form, developed by Duarte et al. (2012), obtained scores ranging from .69 to .78. The confirmatory factor analysis of the CAAS Portuguese version for higher education used in this study confirmed a second hierarchical four-factor model (Monteiro & Almeida, 2015).

Participants answered to 24 items on a 5- point Likert type scale (1 = not strong, 5 = strongest) designed to measure four dimensions of career adaptability: concern (item example: “Thinking about what my future will be like”); control (item example “Keeping upbeat”); curiosity (item example: “Exploring my surroundings”); and confidence (item example: “Performing tasks efficiently”). Cronbach's alpha coefficients for this sample was .80 for the control subscale, .81 for the concern subscale and .85 for the confidence and curiosity subscale. As for the total, Cronbach's alpha for the study sample was .93, indicating, as good reliability indicators.

Prior to the survey, each of the participant was given an e-mail of consent that explained the purpose of the study, the importance of their participation, and confidentiality and freedom to volunteer to take the survey or withdraw from the study at any time. The career adaptability measure, before and after the intervention, was administered separately: to the control group in 2018-2019 and to the experimental group in 2019-2020, with all students in the respective group, in a single session, with an average duration 15 minutes.

2.2.2. Qualitative data

In order to capture learners’ thoughts and feelings more thoroughly, a focus group was conducted.

The selection of participants was carried out for convenience, according to availability in terms of day and time for participation in the focus group. Participants was informed about the objectives of the study and the rules for participation, including estimated duration.

The interview script favored a no structured approach, supported by a topic script, about the participants' perceptions and experiences in writing portfolios and about feelings and thoughts about the future life. The focus group discussion was 35 minutes. Following the focus group, students were debriefed about their experience, thanked for their involvement, and told that a summary of the research findings would be sent to them.

The interviewer was a female in her late 40s who had postgraduate qualifications in psychology as well as experience in facilitating focus groups. The focus group was transcribed in full.

The analysis of qualitative data from the focus group interview was carried out through three phases: coding, storage and interpretation. Once the text has been transcribed and (re) read, a process of assigning categories that reflect the themes present in the script, as well as the new ones that emerged from the groups' discussion, proceeded. Finally, all parts of the text in the same category were compiled for comparison and the data was interpreted.

2.3. Writing portfolios intervention

The intervention with the experimental group was focused on writing career portfolios and on how its systematic use could help improve students’ levels of career adaptability resources. To that end, as part of the tasks of the PPDP course unit, during the time period between the pre- and the post-test survey administration, students were required to create a

portfolio that includes reflective narratives of the best artifacts that show their learning in develop a personal and professional project. The students knew the purpose of the surveys and the intervention, so they were willing to participate actively in the writing of their portfolios.

The experimental group had PDPP classes on Tuesdays (90 minutes) and Wednesdays (90 minutes). The contents were presented on Tuesday and practiced on Wednesday. The practice consisted of carrying out activities related to (i) situational analysis: what is the current situation in the main spheres of life and what is the degree of satisfaction with it; (ii) evaluation of values and life purpose, as well as establishing a personal mission and vision; (iii) SWOT matrix: strengths and weaknesses, opportunities and threats, (iv) definition of short, medium and long term objectives and goals; (v) preparation of an action plan, an instrument for monitoring and controlling planned actions. At the end of each activity, students were invited to write a narrative reflection. The narrative had no space limit. As soon as they finished writing, each student received individual feedback from the teacher.

In the control group, the PPDP course unit followed the expository teaching-learning methodology.

The entire process, including the surveys, lasted for a period of fourteen weeks.

3. RESULTS

3.1. Quantitative results

Before proceeding with the testing of the investigation hypotheses, and because the plan of this investigation is quasi-experimental, it is necessary to carry out a pre-intervention assessment. The pre-intervention evaluation allows us to analyze the equivalence of the groups, that is, to evaluate the existence of statistically significant differences, between the experimental and control groups, regarding the CAAS dimensions, which can differentially affect the effectiveness of the intervention.

The results of the intergroup comparative analyzes, by means of a comparison of means (t-Student tests) indicate the absence of statistically significant differences, between the experimental groups and the control group, which allows attesting the equivalence groups at the pretest (Table 1).

Table 1.
Pretest CAAS dimensions in the experimental and control groups.

CAAS Dimensions	Experimental group		Control group		t	p
	Mean	SD	Mean	SD		
Concern	20.18	2.53	20.26	2.46	-0.551	.582
Control	22.76	2.41	22.51	2.38	.825	.410
Curiosity	21.88	3.06	20.98	2.98	1.210	.227
Confidence	22.06	2.46	22.77	2.29	-1.006	.315

As for the significance of the effectiveness of writing portfolios on adaptability and, its evolution in the two sampled moments, with regard to the evolution of the concern, there are high and statistically significant differences between the two evaluation moments, both in the group experimental or control. In turn, with regard to evolution in control, curiosity and confidence, there are high and statistically significant differences between the two moments of evaluation, only in the experimental group (Table 2).

Table 2.
Pretest and posttest CAAS dimensions in the intervention and control groups.

CAAS Dimensions	Group	Pre-test		Post-test		F	p
		Mean	SD	Mean	SD		
Concern	Experimental	20.18	2.53	26.24	2.46	88.846	<.001
	Control	20.26	2.06	23.45	2.34	18.968	<.001
Control	Experimental	22.76	2.41	26.71	2.14	20.564	<.001
	Control	22.51	2.38	22.99	2.56	2.040	.157
Curiosity	Experimental	21.88	3.06	26.12	2.64	44.379	<.001
	Control	20.98	2.98	21.03	2.77	0.015	.904
Confidence	Experimental	22.06	2.46	26.41	2.40	39.525	<.001
	Control	22.77	2.29	23.12	2.33	2.040	.157

We also studied the percentage of change in both groups. The results show that there is clinical improvement (Borkovec & Costello, 1993) in all dimensions of the experimental group: 17%, 19%, 20% and 30% in the dimension of control, curiosity, confidence, and concern, respectively. In the control group, there is only clinical improvement in the dimension of concern (16%).

3.2. Qualitative results

The analysis procedure yielded three categories, namely Confidence, Self-knowledge, and Knowledge of market opportunities, as can be observed in the summary presented in Table 3. These categories showed reflective learning and progress.

Overall, all views that deal with acquired confidence suggest that their interpretations of the process of writing portfolios were quite optimistic and assertive, making them more secure and decisive about the future. Portfolio writing also seems to have enabled students to gain self-knowledge and self-awareness of decisions made in the past and their impact on the person they are today and the decisions made regarding the future. Finally, the writing of portfolios also seems to have allowed students to have explored the academic and work opportunities of the course they attended.

Table 3.
Participants' comments according to categories.

Confidence
"I am much more confident about the direction of "things" and I believe that "everything will go well."
"I feel that I have more opportunities or real chances to evolve, on a personal, academic and professional level, than I thought."
"I improved my confidence with myself and with others, as I often tended to be suspicious of people and to doubt my abilities."
"Today I feel that I am able to do whatever I want, because I know that I have all the tools to achieve success."

Self-knowledge
“It allowed me to realize that I need to be with some regularity to learn something new, whether through postgraduate studies or training. Still, I need my space and I don't like being in a controlled environment where I am constantly told what I have to do, too. ”
“I learned to identify my strengths and weaknesses. I already know how to answer the question "Who are you?"
“I find it easier to name my best and worst decisions (…).”
“I was able to become more aware that the freedom to choose a course is fundamental for us to be happy, something that I realized over time that doesn't happen with my friends.”
"I realized that I need some feedback in order to stimulate and motivate my performance."
Knowledge of market opportunities
“I learned that there are more master's and job opportunities than I imagined.”
"It allowed me to classify all doubts about the different areas of activity of Psychology."
"(...) I had no idea that the psychology course had so many different professional skills."

4. DISCUSSION

The present study was set out to examine writing portfolios as a possible device to improve learners ’levels of career adaptability resources. As in previous studies (e.g., Barak & Maskit, 2017; Slepcevic-Zach & Stock, 2018), this study also allows us to conclude about the positive effects of portfolio writing. As noted in the results, after performing the intervention, students in the experimental group reported a significant increase in career adaptability resources, thus seeming to demonstrate high levels of ability to plan how to achieve career goals and deal with challenges transition, as well as a high capacity to shape yourself and the environment for the achievement of professional goals. In addition, the differences in the pre to the post-test also seem to demonstrate a greater willingness of students to explore themselves and the environment after using the portfolio, as well as a greater curiosity about the career, which can also mean greater self-knowledge, and understanding of opportunities in the labor market that lead to a greater likelihood of finding employment. Finally, students seem to believe much more in their ability to achieve career goals and overcome barriers to the university's transition to work (Savickas, 2013).

The positive results achieved by the control group, especially in the dimension of concern, may be related to some error factors such as the context, that is, external events and concomitant to the study that can influence the dependent variable in addition to the independent variable (e.g., work in the project area on the theme of professions) and; the reactive effect of the pre-test, which indicates that the performance of the pre-test, by itself, can affect the generalization of the results obtained (e.g., learning from one moment to the next).

The general qualitative findings are congruent with the meta-analysis recently presented by Rudolph, Lavigne, Katz, and Zacher (2017) and reinforce the idea that higher levels of confidence are achieved in career-related behaviors and skills that will facilitate the university-work transition, promoting employability (Gedye & Beaumont, 2018; Rudolph et al, 2017). Thus, the results indicates likewise valuing of the portfolio experience as a learning (Cheng et al., 2018; Eskici, 2015). University students valued their portfolio experience and linked it, as indicated in several narrative reflections, to personal, technical, and professional gains.

5. LIMITIONS, FUTURE RESEARCH AND IMPLICATIONS

One of the limitations of this study is the fact that the sample is quite small and the absence of random distribution from the experimental and control groups, which reduces the internal and external validity of the experiment, mainly due to the disability agent related to the selection of the subject. In the future, several variables, such as the selection of groups or different interactions, must be properly controlled.

Another limitation concerns the interval between the two measures. In fact, 14 weeks can be a long time for an accurate assessment of the pattern of career adaptability in the university-work transition situation. It may happen, for example, that in the interval of 14 weeks an increase, followed by a period of decrease in the adaptability resources, has already occurred and is not being captured with this research design. More research with more measurement times is needed to clearly understand the pattern of change in career adaptability. It would also be interesting to see the effects of writing portfolios over a long period of time within an experimental design framework.

With regard to qualitative research, although carrying out just one focus group is not wrong, it is risky. However, the performance of more than one group proved to be impractical, because of the number of potential participants. Thus, the data presented in this study must be interpreted with special care. In the future, it is recommended to create more than one focus group, either with participants in the intervention group or the control group.

Some of the implications arising from this study are that teachers can and should assess learners in different ways other than traditional tests, helping students to be active agents in their learning process, instead of just being recipients of knowledge.

Between-person differences identified in this study suggests that it is possible to indicate which students are more vulnerable in terms of career adaptability resources before a university-to-work transition. Thus, career interventions among undergraduates over several stages of their higher education studies, designed according to individual profiles, might be particularly useful. Studies (e.g., Gedye & Beaumont, 2018) have shown that university students still have a narrow view of employability, limited to the idea of "finding a job", particularly in the first stages after their graduation.

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Chapter #3

(RE)CAREER SCALE: PILOT STUDY FOR THE VALIDATION OF A SCALE ABOUT CAREER POST-CAREER TRANSITIONS

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ABSTRACT
This article aims to validate the factorial structure of the (Re)Career Scale: Coping Styles, which evaluates how late adults think and feel about career changes, in particular the transition to a career post-career. A career post-career is a development phase that takes place after the formal retirement of a job/ continued work and requires the involvement in a set of developmental tasks related to one's own, the environment, and the decision-making and planning (Pinto, in press). Thirty-six items were developed, considering the literature review of the main career development models. These items were administered to a total of 95 Portuguese late adults (31 (32.6%) men and 64 (67.4%) women; M_{age}=62.91; SD_{age}=6.901), of which 47 are in an active professional situation and 48 already retired. The Exploratory Factor Analysis (EFA) indicated a three-dimensional career post-career model considering a set of developmental tasks related to Identity, Opportunity and Adaptation. The final version of 30 items has good psychometric properties, with Cronbach's alphas ranging from .82 to .89. The descriptive study and the correlation between the three dimensions suggest that the scale has potential to be used in research and intervention programs to support the transition to a career post-career.

Keywords: career post-career, late adults, transition, exploratory factor analysis, pilot study.

1. INTRODUCTION

Current economic, political, social, housing and health conditions have greatly contributed to the increase of average life expectancy, particularly in developed countries. In the European Union, life expectancy in 2018 was estimated to increase, at the age of 65, about 20 years, of which approximately 9.8 would be healthy life years (Eurostat/Pordata, 2020). This situation entails new challenges, particularly regarding the experience of aging, since almost 20% of a person's life cycle will be lived within this period (UNECE, 2017).

Transition to retirement has been considered the main milestone that characterizes entering the aging process, being often anticipated (and even experienced) as a negative change in a person's life project, characterized by dissatisfaction and unhappiness (e.g., Kloep & Hendry, 2006; Schlossberg, 2003). The exit from the labor market leads to the need for a (re)conceptualization of the life project, mainly when the person gathers conditions (namely health conditions) that allow him/her to be involved in a diverse set of productive activities (paid or unpaid), that can contribute to his/her well-being at different levels (physical, psychological, social), at the same time that let him/her continue contributing to the community in which he/she lives (Hershenson, 2016).

However, a review of the main theoretical models in the life cycle psychology (e.g, Human Life Course Theory, Buhler, 1964; Psychosocial Development Theory, Erikson, 1959 Career Self-Management Models, Greenhaus, Callanan & Godschalk, 2010; Developmental Task Theory, Havighurst, 1953; Adult Career Development Theory, Levinson, 1978, 1986; Career Development Model, Super, 1953,1980) is indicative of the insufficient importance that has been given to this stage of life. In general, it is observed the homogeneousness of people with 65 or more years as a group that, especially after the formal retirement of a professional activity, enters a spiral of progressive unemployment, decadence and dependence while "waiting for the death" (Wang & Wanberg, 2017).

Also, an analysis of the intervention methodologies and strategies, aimed at supporting this stage of life, in particular, with regard to the transition to retirement, reveals an almost exclusive focus on the financial, legal, and leisure aspects (De Vries, 1979; Denton & Spencer, 2009), wrongly based on the assumptions of linearity, uniformity and predictability of careers, without taking into account the specificity of late adults who, as already mentioned, most of the time have the (physical and psychological) conditions to devote themselves to productive (and inclusive) activities within the scope of a career post-career (e.g., Feldman, 2013; Hutchens, 2010; Wang & Wanberg, 2017).

The identification of these gaps highlights the relevance and urgency of developing, on the one hand, evaluation tools and, on the other hand, empirically sustained intervention methodologies and strategies that support late adults in reformulating their life projects in order to fully experience a career post-career (Beehr & Bowling, 2013). In this sense, Pinto (in press-a; in-press b) and Pinto and Rebelo-Pinto (in press), based on the analysis of the previously mentioned theoretical models, have been presenting a proposal for a new substage of adult career development - the career post-career - which requires the involvement in a set of developmental tasks related to the self (Identity dimension), to the environment (Opportunity dimension), and to decision making and planning (Adaptation dimension). The Identity dimension combines career development tasks associated with the reconstruction of the sense of identity, usefulness and self-esteem, that is, a set of steps, strategies and activities that people must put into practice in order to explore information about themselves, focusing on the past and its relationship with the present (c.f., Buhler, 1964; Erikson, 1959; Havighurst, 1953; Levinson, 1978, 1986; Peck, 1956). The Opportunity dimension gathers career development tasks associated with the active exploration of the environment, that is, a set of steps, strategies and activities that people must put into practice in order to proactively explore information about activities, resources and relationships, focusing on the present and its relationship with the future (c.f., Buhler, 1964; Havighurst, 1953). And, finally, the Adaptation dimension aggregates career development tasks associated to the development of an optimized and future oriented attitude, that is, a set of steps, strategies and activities that people must put into practice in order to plan and implement decision making, focusing on the future (c.f., Buhler, 1964; Greenhaus et al., 2010; Levinson, 1978, 1986; Peck, 1956; Pinto, Taveira, & Ordonez, 2016; Super, 1953, 1980). These developmental tasks served as inspiration for the development of the (Re)Career Scale - Coping Styles, (Pinto & Rebelo-Pinto, in press). This study aims, in an exploratory way, to analyze the psychometric properties of this new self-report instrument that assesses how late adults think and feel their (transition to) career post-career. Specifically, this general objective translates into the following specific goals and procedures: (i) to perform a sensitivity analysis, (ii) to analyze the factorial structure through the development of an exploratory factor analysis, (iii) to study the internal consistency of the scale and its dimensions, and (iv) to explore the correlation between the different dimensions of the scale and between these and the global scale.

2. METHOD

2.1. Participants

Participants in this study were from a non-probabilistic sample, collected by snowball, consisting of 95 Portuguese late adults, 31 (32.6%) men and 64 (67.4%) women, aged between 50 and 87 years (M=62.91; SD=6.901), mostly from the Lisbon region (n=73, 76.8%; North=6, 6.3%; Centre=10, 10.5%; Alentejo=4, 4.2%=; Azores=1, 1.1%[1]). Of these adults, 47 (49.5%) are in an active professional situation, while 48 (50.5%) are retired. Those who are active are mostly specialists in intellectual and scientific activities (n=19, 20%), technicians and intermediate level professionals (n=11, 11.6%) and representatives of the legislative branch, executive bodies, directors and executive managers (n=11, 11. 6%)[2], expecting to retire, on average, within 6.25 years (M=75.10 months; SD=62.378; Min-Max=8-300 months), and being in the current occupation for about 25 years (M=333.04 months; SD=148.831; Min-Max=12-564 months). Those who are retired were mostly specialists in intellectual and scientific activities (n=16, 16.8%), technicians and intermediate level professionals (n=16, 16.8%) and administrative staff (n=10, 10. 5%), having retired on average 7.34 years ago (M=88.06 months SD=65,409; Min-Max=1-252 months), and having performed their professional roles for approximately 32 years (M=389.60 months; PD=118.762; Min-Max=84-600 months).

2.2. Instrument

Re(Career) Coping Styles (Pinto & Rebelo-Pinto, 2020): It is an instrument of self-reporting consisting of a total of 36 questions related to the experience of a career post-career, that is, the way late adults (with 55 or more years) think and feel the transition to this new stage of their career development. For each question, 4 statements were created, which constitute alternative answers. Each alternative represents a distinct way to deal with (transition to) retirement, i.e., a distinct coping style. The participant's task is, for each question, to select the answer that best corresponds to the way he/she thinks or feels his/her current (transition to a) career post-career situation. The 36 questions presented in the original version of the scale derive from the developmental tasks identified in the literature review (previously mentioned), and three questions have been generated for each of the twelve tasks (table 1). At the end of the completion of the instrument frequencies for each coping style are calculated.

[1] Note: Organization according to NUTS II - Territorial Units for Level II Statistical Purposes
[2] Note: Organization according to NCP, 2010 - National Classification of Professions

Table 1.
Organizational structure of the (Re)Career Scale: Coping Styles.

Dimension	Objetive	Development tasks related to self exploration	Items
Identity	Reconstruct the sense of identity, utility and self-esteem	Re-evaluate the self	1, 2, 3
		Re-evaluate life trajectory/history	4, 5,6
		Recognize and explore new interests and skills	7, 8, 9
		Re-evaluate life values	10, 11, 12
Dimension	**Objetive**	**Development tasks related to the environment exploration**	
Oportunity	Proactively explore activities, resources and relationships	Analyze expectations, beliefs, and myths about career post-career and analyze attitudes, needs, and fears in relation to this new stage of life	13, 14, 15
		Identify and recognize resources	16, 17, 18
		Identify and explore possibilities for paid work, volunteering and new leisure activities, and/or re-entry into the education system	19, 20, 21
		Develop warm and affective relationships with others	22, 23, 24
Dimension	**Objetive**	**Development tasks related to planning and decision-making**	
Adaptation	Develop an optimized and future-oriented attitude	Define objectives and develop action plans	25, 26, 27
		Monitor the implementation of the transition and adaptation plan to a career post-career	28, 29, 30
		Reorganize/ reconfigure the life project	31, 32, 33
		Assess the levels of resilience and well-being with this new stage of life	34, 35, 36

2.3. Data collection procedure

This study is part of a broader research project whose main purpose is to develop an empirically validated model about the different ways of dealing with the transition to a career post-career, analyzing coping styles as well as levels of resilience and well-being. The study is being carried out at the Faculty of Human Sciences of the Catholic University of Portugal and is aimed at Portuguese late adults, aged 55 or over, who are in a transition to retirement or already retired.

The assessment protocol was posted on an online data collection platform (Qualtrics) between January and June 2020. This protocol consisted of a brief socio-demographic questionnaire, the (Re)Career Scale-Coping Styles (Pinto & Rebelo-Pinto, 2020), and the Portuguese versions of the Resilience Scale (Cd-Risc-10; Connor & Davidson, 2003) and the Satisfaction with Life Scale (SWLS, Diener, Emmons, Larsen, & Griffin, 1985); adapted by Simões, 1992). Participants were informed about the ethical procedures involved in this research, namely, its objectives, the voluntary nature of their participation, the anonymity and confidentiality of their data, and the possibility of withdrawal at any time. The total time to complete the assessment protocol was, on average, 20 minutes.

2.4. Data analysis procedures

The data collected were entered into a database and analyzed with a statistical analysis software in the field of social sciences (SPSS, version 23 for Windows). First, the sensitivity of the scale was studied through a set of measures of central tendency and dispersion. The global reliability level was also analyzed through the correlation of each item with the total of the scale (higher than .30) and its effect on Cronbach's alpha (higher than .70; Marôco & Garcia-Marques, 2006; Streiner, 2003). To test the hypothesis about the (Re)Career Scale - Coping Styles factor structure, an Exploratory Factor Analysis was performed, with orthogonal Varimax rotation and Kaiser normalization. To test the convenience of the factorial model the Kaiser-Meyer-Olkin (KMO) criterion and the Bartlett Sphericity Test (Dziuban & Shirkey, 1974) were taken into consideration. KMO values were considered adequate if higher than .80 (Pasquali, 2011;), and Bartlett's test values were considered favorable when the significance levels were lower than .005 (Tabachnick & Fidell, 2007). The option for the Varimax rotation was aimed at maximizing the variance of factor loads for each factor through the increase of high loads and the decrease of low loads. Factors with eigenvalues higher than 1 were retained. For the decision about the final factorial structure the following criteria and recommendations pointed out by Loewenthal (2001) were considered: (i) items with factor load ≥.40 in one factor, (ii) items with communality ≥.50; (iii) difference in factor load of items between factors ≥.30; and, (iv) percentage of variance explained of the final factor solution ≥.40). For the assessment of the construct, Pearson's correlations between the dimensions of the (Re)Career scale and between these and the global (sum of items) of the scale were also performed. The results were considered statistically significant when the significance value was below .05 ($p<.05$).

3. RESULTS

The sensitivity analysis indicated adequate results in most items, although there were problems of dispersion, asymmetry and kurtosis in the participants' answers to items 2, 10, 11, 12, 17 and 20. There was also a high correlation between most of the items and the total of the scale, with exception of item 17 (ritc=.284). For the remaining items, the lowest correlation values between the item and the total of the scale were .311 and .357 for items 2 and 20, respectively. The global reliability index of the 36 items was α=.94, not being modified significantly when eliminating any of the items.

An exploratory factor analysis (EFA) was carried out (principal axis factoring), with Varimax rotation and Kaiser normalization. The Kaiser-Meyer-Olkin (KMO) measurement was .841, which suggests a good sample adequacy index for the analysis. The Bartlett sphericity test value was $\chi 2(630)=2075.617$, p=.000, which is also appropriate for further analysis.

In a first approach, defining the extraction of factors with eigenvalues equal to or greater than 1, an eight-factor solution was obtained, which explained 68.67% of the variance. However, this solution presented several problems, namely, the absence of theoretical rationale for the organization of items in such factors, items with very low factor loads, and items that saturated simultaneously in several factors with high loads. Through the analysis of the scree plot a solution with three factors was tested. In this solution the criteria previously mentioned and highlighted by Loewenthal (2001) were considered, i.e. (factor load ≥.40 in one factor, communality ≥.50; factor load difference between factors ≥.30; and, percentage of variance explained in the final factor solution ≥.40). These three factors (dimensions), with eigenvalues greater than 1, explained 47.52% of the total

variance of the scale. However, following the criteria and recommendations previously mentioned (Loewenthal, 2001), and without neglecting the theoretical background and coherence of the final factorial solution of the scale, items 2, 3, 7, 10, 17 and 20 were eliminated. Consequently, the final factorial solution (table 2) was the following (this solution represents 52.03% of the explained variance; KMO=.841; Bartlett's sphericity test: $\chi 2(630)=2075.617$, p=.000):

(i) Factor 1 explains 35.54% of the variance and contains items 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36. All these items had been previously associated with the Adaptation dimension, as they are related to the definition of goals and development of action plans, the monitoring of the implementation of the transition and adaptation plans, the reconfiguration of the life project, and the assessment of the resilience and well-being levels.

(ii) Factor 2 explains 6.70% of the variance with saturation of the items 6, 8, 9, 16, 18, 19, 21, 22, 23 and 24. Items 6 to 9 had been previously associated to the Identity dimension, while items 16 to 24 were initially associated to the Opportunity dimension. In general, it is considered that, theoretically, all items refer to the exploration of the environment, that is, to recognize and explore new interests and skills, to identify and recognize resources, to identify and explore possibilities of paid work, volunteer work and new leisure activities, and/or re-entry into the education system; and, to develop warm and affective relationships with others.

(iii) Factor 3 explains 5.03% of the variance with saturation of the items 1, 4, 5, 11, 12, 13, 14 and 15. Items 1, 4, 5, 11 and 12 had been previously associated with the Identity dimension, while items 13 to 15 were initially associated with the Opportunity dimension. In general, it is considered that, theoretically, all items refer to participants' self-exploration, namely, to reevaluate their life trajectory/history, principles and values, and to analyze expectations, attitudes, needs and fears in relation to this life stage.

Table 2.
Saturation matrix of the 30 items with Varimax solution and Kaiser normalization to three factors (n =95)[3].

Items	Factors			h^2
	1	2	3	
1. How do I see myself, as a person, in this stage of life?	.185	.217	**.464**	.560
4. How do I see the story of my life?	.185	.137	**.577**	.585
5. How does it feel to think about my past?	.233	.144	**.640**	.620
6. How do I relate my past to my future?	.221	**.544**	-.032	.637
8. Am I aware of what I am capable of doing?	.119	**.572**	.129	.649
9. Am I aware of my strengths?	.066	**.780**	.167	.674
11. Do I know what is important to me as a family member?	.266	.241	**.476**	.698
12. Do I know what is important to me as a citizen?	-.061	.072	**.892**	.793
13. What ideas do I have about this stage of life?	.227	.177	**.517**	.563
14. What expectations do I have for this stage of life?	.258	.395	**.691**	.669
15. What fears do I have about this stage of life?	.201	.320	**.647**	.729
16. Do I know what social support I can have at this stage of life?	.021	**.569**	.066	.555

[3] The factor loads are maintained if ≥ to 30.

18. Do I know how to activate my supports at this stage of life?	.033	**.447**	.193	.536
19. What leisure and/or volunteer opportunities have I already explored for this phase of life?	.171	**.600**	.225	.514
21. What family opportunities have I explored for this phase of life?	.037	**.505**	.133	.553
22. How do I feel among other people?	.037	**.780**	.167	.773
23. How do I connect with other people?	.094	**.531**	.231	.693
24. Do I like to build friendships and look for new friends?	.142	**.700**	.189	.749
25. Do I have goals for the future?	**.414**	.127	.074	.505
26. Do I have plans for the future?	**.472**	.027	.144	.610
27. If I can't achieve my plans, what other options do I have?	**.589**	.285	.189	.750
28. What am I doing to accomplish my plans for this stage of life?	**.206**	.605	-.008	.556
29. What am I doing to get what I want at this stage of life?	**.621**	.425	.155	.726
30. How do I respond to obstacles?	**.579**	.219	.066	.578
31. Am I aware of the changes the retirement entails?	**.395**	.181	.160	.559
32. Am I aware of the impact of retirement on my lifestyle?	**.491**	.141	.074	.633
33. Am I aware of the impact of the retirement on the management of my daily life?	**.642**	.259	.105	.578
34. How do I deal with the retirement?	**.558**	.197	.229	.643
35. How do I feel about retirement?	**.816**	.123	.135	.742
36. What is my current a satisfaction with retirement?	**.492**	-.171	.112	.670
% of variance explained	35.54	6.70	5.03	
Cronbach's α	.89	.82	.83	

A new analysis of the internal consistency of these dimensions was developed. Reliability for the total scale was α=.94 (30 items); for factor 3 (Identity dimension - 8 items) was α=.83, for factor 2 (Opportunity dimension - 10 items) was α=.82, and for factor 1 (Adaptation dimension - 12 items), was α=.89.

For each dimension the scores of the respective items were added together and the average score was calculated. Table 3 presents the descriptive statistics for the items of each dimension identified in EFA. There are some trends in the central tendency and dispersion values of the several items. The items 11 and 12 of the Identity dimension, the items 8 and 9 of the Opportunity dimension and the items 27, 28 and 33 of the Adaptation dimension have the higher average values. And items 13 and 14 of the Identity dimension, items 19 and 21 of the Opportunity dimension and item 29 of the Adaptation dimension have the lower average values. Almost all items were answered according to all possible points in the response scale, except for item 12 (Identity dimension), where no participant selected option 2, and items 6, 8 and 9 (Opportunity dimension), and items 27, 28, 30 and 33 (Adaptation dimension) where a very small number of participants chose options 1 and 2 of the response scale.

Table 3.
Descriptive statistics of the items, by (Re)Career Scale dimension (n=95).

Dimension	**Item**	**Scale**				**Mean (SD)**	**Median**	**Min-Max**	**IQ range (P75-P25)**
		1 (Freq, %)	**2 (Freq, %)**	**3 (Freq, %)**	**4 (Freq, %)**				
Identity	**1**	2 (2.1)	3 (3.2)	30 (31.6)	60 (63.2)	3.558 (.664)	4	1-4	1 (4-3)
	4	1 (1.1)	5 (6.4)	47 (49.5)	41 (43.2)	3.362 (.637)	3	1-4	1 (4-3)
	5	2 (2.1)	2 (2.1)	37 (38.9)	54 (56.8)	3.505 (.650)	4	1-4	1 (4-3)

	11	2 (2.1)	1 (1.1)	12 (12.6)	80 (84.2)	3.790 (.563)	4	1-4	0 (4-4)
	12	4 (4.2)	0	7 (7.4)	84 (88.4)	3.800 (.646)	4	1-4	0 (4-4)
	13	3 (3.2)	8 (8.4)	46 (48.4)	38 (40.0)	3.253 (.743)	3	1-4	1 (4-3)
	14	1 (1.1)	11 (11.6)	48 (50.5)	35 (36.8)	3.232 (.692)	4	1-4	0 (4-4)
	15	6 (6.3)	3 (3.2)	52 (54.7)	34 (35.8)	3.200 (.780)	3	1-4	1 (4-3)
Opportunity	**6**	3 (3.2)	2 (2.1)	31 (32.6)	59 (62.1)	3.537 (.697)	4	1-4	1 (4-3)
	8	2 (2.1)	2 (2.1)	15 (15.8)	76 (80.0)	3.737 (.605)	4	1-4	0 (4-4)
	9	3 (3.2)	1 (1.1)	17 (17.9)	74 (77.9)	3.705 (.650)	4	1-4	0 (4-4)
	16	9 (9.5)	5 (5.3)	44 (46.3)	38 (38.9)	3.147 (.899)	3	1-4	1 (4-3)
	18	3 (3.2)	3 (3.2)	44 (46.3)	45 (47.4)	3.379 (.702)	3	1-4	1 (4-3)
	19	12 (12.6)	9 (9.5)	44 (46.3)	30 (31.6)	2.968 (.962)	3	1-4	1 (4-3)
	21	17 (17.9)	6 (6.3)	42 (44.2)	30 (31.6)	2.895 (1.047)	3	1-4	1 (4-3)
	22	7 (7.4)	2 (2.1)	14 (14.7)	72 (75.8)	3.590 (.857)	4	1-4	0 (4-4)
	23	6 (6.3)	4 (4.2)	12 (12.6)	73 (76.8)	3.600 (.843)	4	1-4	0 (4-4)
	24	5 (5.3)	8 (8.4)	13 (13.7)	69 (72.6)	3.537 (.861)	4	1-4	1 (4-3)
Adaptation	**25**	8 (8.4)	0	58 (61.1)	29 (30.5)	3.137 (.794)	3	1-4	1 (4-3)
	26	8 (8.4)	1 (1.1)	61 (64.2)	25 (26.3)	3.084 (.781)	3	1-4	1 (4-3)
	27	7 (7.4)	1 (1.1)	34 (35.8)	53 (55.8)	3.400 (.843)	4	1-4	1 (4-3)
	28	6 (6.3)	2 (2.1)	29 (30.5)	58 (61.1)	3.463 (.822)	4	1-4	1 (4-3)
	29	6 (6.3)	10 (10.5)	61 (64.2)	18 (18.9)	2.958 (.743)	3	1-4	0 (3-3)
	30	3 (3.2)	1 (1.1)	62 (65.3)	29 (30.5)	3.232 (.626)	3	1-4	1 (4-3)
	31	4 (4.2)	3 (3.2)	53 (55.8)	35 (36-.8)	3.253 (.714)	3	1-4	1 (4-3)
	32	6 (6.3)	8 (8.4)	35 (36.8)	46 (48.4)	3.274 (.868)	3	1-4	1 (4-3)
	33	2 (2.1)	1 (1.1)	35 (36.8)	57 (60.0)	3.547 (.632)	4	1-4	1 (4-3)
	34	4 (4.2)	17 (17.9)	30 (31.6)	44 (46.3)	3.200 (.882)	3	1-4	1 (4-3)
	35	7 (7.4)	3 (3.2)	49 (51.6)	36 (37.9)	3.200 (.820)	3	1-4	1 (4-3)
	36	4 (4.2)	8 (8.4)	37 (38.9)	46 (48.4)	3.316 (.802)	3	1-4	1 (4-3)

Next, an analysis of the validity of the construction was also performed. The correlation between the different dimensions of the (Re)Career Scale and between these and the global scale are indicated in table 4. The correlation between dimensions indicate that

the Adaptation factor is the one that explains the greater variance of the global scale result (about 91%). The correlation between dimensions is moderate to strong, and the Adaptation dimension is the one that is most strongly related with the other two dimensions.

Table 4.
Correlation between (Re)Career subscale [4].

	Identity	Oportunity	Adaptation	Total
Identity	**(.83)**			
Oportunity	.643 (.000)	**(.82)**		
Adaptation	.803 (.000)	.751 (.000)	**(.89)**	
Total	.874 (.000)	.887 (.000)	.953 (.000)	**(.94)**

4. DISCUSSION AND CONCLUSION

This study aims to present the results of a preliminary (Re)Career: Coping Styles validation study. From the analyses carried out, 30 of the 36 initial items present very satisfactory psychometric values, pointing out that the scale can be used either as a global measure of evaluation of how late adults think and feel the (transition to a) career post-career, or as an aggregation of three dimensions - Identity, Opportunity and Adaptation. Regarding this aggregation by dimensions, it is important to highlight that the theoretical organization foreseen in three dimensions/factors has been confirmed, although not with exactly the same developmental tasks/items initially foreseen.

Factor 1, concerning the Adaptation dimension, is comprised of four developmental tasks and their respective twelve items, which fully correspond to the underlying theoretical model with 12 items concerning the development of an optimized and future-oriented attitude (Buhler, 1964; Greenhaus et al., 2010; Levinson, 1978, 1986; Peck, 1956; Pinto, 2010; Pinto, Taveira, & Ordonez, 2016; Super, 1953, 1980).

Factor 2, concerning the Opportunity dimension, is consisted of 7 items that previously integrated this dimension (referring to proactively exploring activities, resources and relationships; Buhler, 1964; Havighurst, 1953), but three more items were added, of which one item is related to reassessing the trajectory/history of life, and two items are related to recognizing and exploring new interests and competencies. Regarding this aspect, some authors (e.g., Stumpf, Colarelli & Hartman, 1983) consider that the exploration of oneself and the exploration of the environment, correspond to two interlinked processes, in the sense that the one self's exploration, namely one's interests and competences, will influence the exploration one makes of the environment (the information one seeks about opportunities that interest him/her). In the same way, the exploration one makes of the environment will influence or reinforce the idea one builds upon oneself. It is also important to mention that the items concerning the analysis of expectations, beliefs and myths and the exploration of attitudes, needs and fears in relation to this new stage of life (Buhler, 1964; Havighurst, 1953), initially foreseen in this dimension, did not saturate in this factor.

Factor 3, regarding the Identity dimension, consists of 5 items that previously integrated this dimension, and whose focus is the reconstruction of the sense of identity, utility and self-esteem (Buhler, 1964; Erikson, 1959; Havighurst, 1953; Levinson, 1978, 1986; Peck, 1959), plus three items whose focus is the analysis of expectations, beliefs and

[4] The internal consistency of each subscale and of the total scale is shown in bold, in brackets

fears about this life transition. Possibly, this combination of items is due to its formulation, whose focus was placed on the set of cognitive and affective mechanisms that participants use to see themselves and their current circumstances (e.g., "how do I see", "how do I feel", "what ideas/expectations/fears do I have"; Savickas, 2005; Stumpf et al., 1983).

The correlation between dimensions shows modest to moderate values, which highlights the usefulness of using the scale with the three dimensions identified. However, the value of the Cronbach alpha of the final scale, with 30 items, was .94, which may be an indicator of some redundancy in the items (Pasquali, 2011). In addition, it was also found that some items show some difficulties associated with the dispersion of participants' responses, with mean values above the mean score of the response scale. Considering the reduced sample used in this pilot study, the results obtained should be considered preliminary and stimulate additional studies of the psychometric qualities of this new assessment tool.

In conclusion, the scale shows good psychometric properties, and this study has demonstrated ReCareer Scale as a promising measure to be used in future investigations, particularly at diagnosing late adults' specific career post-career intervention needs. It is important to emphasize that, compared to previous studies, this study is completely innovative, as it goes beyond the reductionist views of retirement as an end of cycle, recognizing the potential for career growth and renewal in this life's stage. In this sense, it presents a new psychological assessment instrument that goes beyond the exclusive focus on variables such as reasons for retirement, retirement planning (e.g., financial, health, lifestyle, and psychosocial planning) retirement stages, satisfaction with retirement, involvement in activities (e.g., Retirement Satisfaction Inventory by Floyd, et al., 1992; e.g., Process of Retirement Planning Scale by Friedman and Scholnick's, 1997), focusing on a new career management model applied to transition and adaptation to retirement, which addresses a set of developmental tasks (self-exploration, environmental exploration, and adaptation) fundamental to problem-solving and career decision-making in this stage of life (Wang & Shi, 2014; Wang & Shultz, 2010). It is anticipated that the further development of this assessment tool may lead to new strategies and methods of support, guidance, and counseling for people in this stage of transition from a productive active life to a healthy, successful, and socially sustainable post-career living situation.

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Chapter #4

INTEGRATING CORE COMPETENCIES IN PROFESSIONAL MUSIC TRAINING CURRICULUM—THE TAINAN UNIVERSITY OF TECHNOLOGY EXPERIENCE

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ABSTRACT
Music curriculum integration in professional music training involves the exploration of how educators can integrate individual competency items developed by Teachout's (1997) three categories of skills/knowledge components, namely, teaching, personal, and musical skills and behaviors, into the music education curriculum. The purpose of this paper is to use Denis's (2017) skills/knowledge competency of university coursework as the enquiry lens. The focus is skills/knowledge competency with the three subsections for personal, teaching, and musical skills and behaviors that need to be shaped in different ways to successfully convey music content to students. Insights into the results of the necessary skills/knowledge components are gained through using the example of the Music Department at the Tainan University of Technology, Taiwan. The findings demonstrate that music curriculum integration with a competency-based approach to practice helps with successfully implementing classroom management strategies.

Keywords: curriculum integration, competencies, professional training.

1. INTRODUCTION

Music curriculum integration is the responsibility of people who legislate, create, teach, and learn music and other school subjects. Music curriculum integration, then, is more than just a technical exercise; it is also always a social and sociological exercise (Bates, 2016). Music curriculum integration requires core competencies (specialized skills, knowledge, and abilities) that may not be part of every musician's portfolio or professional education. For example, not every musician is able to participate in active music-making in their family and social environment (Gande & Kruse-Weber, 2017). Despite the authors of recent music education literature calling for the infusion of the above competencies into a more holistic music education curriculum (e.g., Bates, 2016; Chapmana, Wrighta, & Pascoea, 2018; Jank, 2009), many music education programs and educators still do not offer such curricular experiences with any consistency (Denis, 2017; Catterall, & Waldorf, 1999; Chou, 2015; Teachout, 1997). It is critical that students experience knowing and playing music, not just for its complex scoring and harmonic movement, but also for its powerful emotional expression and development. Music is a wonderful medium for a holistic education (Hendrixson, 2015), which can link the three competencies and the various levels (macro**,** meso, and micro etc.) of education. Studying music puts students in a position in which they are called to grow cognitively, emotionally, and spiritually. Direct engagement with students' environments and intentional interactions with the subject material contribute to meaningful learning. It is important therefore that teachers in music schools and music education programs work together to develop basic musical

competencies for successful integration into the profession, thus linking policy and music education (Jank, 2009).

The smooth progression in a student-centered environment serves to accentuate new skills and knowledge, or competencies, such as professionalism, assessment, and musicianship with respect to coursework and the areas that students feel are open for improvement and prepares students and teachers for practice in and leadership of reformed curriculum delivery (Chapmana et al., 2018). The gap between education and practice can be bridged by competency-based education (Roulston, Legette, & Womack, 2005). To illustrate how holism can be applied, the setting of the rehearsal and performance of one chamber music work, namely Piano Trio Op. 97 "Archduke Trio" by Ludwig van Beethoven will be used as an example. The aim is to demonstrate the integration of the original three categories of skills/knowledge components: Teaching, personal, and musical skills and behaviors. These competencies were listed in 1997 by David James Teachout (Associate Professor and Chair of the Music Education Department, University of North Carolina at Greensboro) for the teacher competency category, the personal competency category, and the musical competency category (Miksza, Roeder, & Biggs, 2010).

The skills/knowledge competencies were recently adopted by Cole (2014) and Rohwer and Henry (2004), and the music teaching found herein continues to be relevant because of (a) the importance of skills/knowledge competencies; (b) the difficulty of acquiring skills/knowledge competencies; (c) the differences between the importance of teaching competency and acquisition ratings; (d) the benefits of university coursework; and (e) the potential improvements to coursework that are encompassed in three categories of skills/knowledge components, namely, teaching, personal, and musical skills and behaviors, each with individual competency items.

Following a review of the literature that briefly explores (a) the challenges/problems of successfully integrating both musical and practical competencies necessary for the profession and (b) the current efforts directed at integrating the necessary competencies, the greater part of this paper is focused on the application of the necessary competencies across the music education curriculum. Practice points are based on student and teachers' opinions of skills and behaviors when the evidence to make a teaching-experienced practice recommendation is insufficient or where the evidence is outside the scope of the literature review. Supporting evidence and information relating to practice points is provided with discussion about the importance of skills/knowledge competencies.

It is essential to restructure music education and traditional curricular decision-making at the university level, either through the reworking of whole courses or through the incorporation of varying competencies into pre-existing courses (Denis, 2017). As Denis (2017) noted, various external factors may limit changes to the curriculum. State and federal financial aid restrictions, institutional degree plans, access to field placements, and the desire to educate well-rounded musicians may all be limiting factors in curriculum adjustment. The TUT, Taiwan, Music Department's seven-year program from high school directly to a bachelor's degree in vocational education serves as an example for incorporating educational interventions based on Teachout's (1997) three categories of skills/knowledge components, namely, teaching, personal, and musical skills and behaviors core competencies, into a seven-year program music curriculum.

Professional music training programs are challenged by major changes in the sociocultural and educational landscape. In response to Taiwan's societal challenges, such as current issues about music education policy, the Ministry of Education, Taiwan (1997), amended the Arts Education Act (AEA) that outlined the curriculum for study in the performing arts in 1997. The AEA of 1997 was related directly to Taiwan's art education

reform (Lau & Li, 2013). This new milestone provided a solid foundation in music education in Taiwan for all students (Ministry of Education, Taiwan, 1997).

Examination of the practice skill is undertaken on three levels. First, on the macro level, Marcuse's (1965) philosophy of tolerance that pervades education in Taiwan and other similar Western countries is identified. Second, is the meso level of "accountability" because policy translation is at the center of this paper. Therefore, the contextual dimensions (inter-cultural dialogue and respect for diversity) that affect professional music learning opportunities are identified. Recognizing their contribution to the ecology of higher education highlights the focus of music curriculum implementation (Mishook & Kornhaber, 2006). Finally, at the micro level, the intended and unintended results of implementation policy and what this has meant for music education in this scenario are identified.

The question of why advocate the holistic instruction of performance and pedagogy into the music education curriculum arises. The reasons are fourfold: (a) modeling, (b) guided thinking, (c) overt instruction of pedagogy, and (d) experience. With the "why" established, the primary challenge to integrating teaching, personal, and musical skills and behaviors core competencies into the curriculum must be addressed with an emphasis on how to deliver information in addition to what information to deliver (Denis, 2017). Jank (2009), Lewis (2014), and Denis (2017) noted a lack of consensus in society about the core content for music education and the ineffectiveness of the argument for the educational benefits of music education with respect to policymaking. These include (a) teaching is impossible to understand unless one actually teaches in the profession (creating budgets, interacting with parents, scheduling, work/life balance, etc.), (b) the failure to recognize the focus of the lesson and what an effective teaching segment looks like, (c) lost opportunities to explore how students' observations can positively influence thought processes, (d) the failure to acknowledge essential aspects of students' concerns, and (e) the possibility that conflicting views of education through music will perpetuate barriers in the professional relationship.

The critical role of competency-based educational goals in the basic Fundamentals (Ear and Mind) of Music is not just about turning students into successful musicians and pedagogues but is also about turning students into thoughtful human beings who recognize the importance of character development, integrity, and having a heart for service. This was highlighted in a recent report from the National Association for Music Education (NAfME) (Nierman, 2017). Nierman (2017) pointed to the discrepancy between music education as a profession and the promotion and guidance of music study as an integral part of the school curriculum; he suggested that information curriculum developers need to be able to access, evaluate, and implement in order to best serve their students. Chief among the recommendations for bridging this gap is a change from required seminar classes to required core curriculum for the degree track grounded in fundamental purposes and principles (National Association of Schools of Music [NASM], 2020). The goal is for musicians and performers with career-specific skills (i.e., educational outreach) who are dedicated to lifelong learning to be able to incorporate deliverable methods into their professional practices (Lewis, 2014). Part of this reform will need to incorporate the values of student-oriented music teaching, academic quality, and resource conservation into music education (Booth, 2009). Competency-based education aims to tailor education to the requirements of practice (Miksza et al., 2010), and this process begins with integrating professional music training curricula across disciplines and emphasizes the basic Fundamentals (Ear and Mind) of Music that underpin subsequent pedagogical training (Nierman, 2017).

Recent curricular redesign at the TUT music department presented the opportunity to place greater emphasis on the three core competencies in the first two years of the music curriculum and transition basic Fundamentals (Ear and Mind) of Music courses to outcomes-based models. Introductory Ear-Training is one of several basic Fundamentals (Ear and Mind) of Music courses from the "old" curriculum that was completely revised. The Taiwan's Ministry of Education 2014 Curriculum Guidelines for the 12-Year Basic Education (covering elementary, junior high, and upper secondary school stages) core competencies drove the process of integrating first-year Theory, Harmony, Counterpoint, Sight Singing, Ear Training, Dictation, Form and Analysis Orchestration, Instrumentation, Keyboard Harmony, Composition, and related Theoretical/Aural skills into one course (Ministry of Education, Taiwan, 2014). As a result, an 18-week (720-contact-hour) hybrid didactic block given the title "Music Theory" was implemented. The course is comprised of more than 40 educational interventions that each target one or more core competencies.

The fundamentals at the core of music theory are melody, harmony, and rhythm. What these concepts (melody, harmony, and rhythm) mean in a music theory context is that melody is used in songs, harmony in songwriting, and time, beat and meter (rhythm) in performing music. As Hendrixson (2015) noted, *Divertimento for Band* (cognitive), *Salvation is Created* (spiritual), and Irish Tunes from County Derry (emotional) are examples of how music performance through bands can be used as a medium to holistically develop students. Because holism is not a fixed ideology, there are many ways an educator, specifically a band director, can approach holistic development in his or her classroom. There is no one best way to accomplish a holistic education. Hendrixson (2015) also mentioned that Dr. Miller defines, "The art of holistic education lies in its responsiveness to the diverse learning styles and needs of evolving human beings" (p. 4). Educating students holistically implies educating students cognitively, emotionally, and spiritually.

2. BACKGROUND

2.1. Music education and practice in the Taiwan's context

Two main channels of higher education exist in Taiwan: Academic and vocational technology. Tainan, Taiwan, hosts 11 universities: Four are academic, and the remaining seven are vocational technology institutions (Ministry of Education, Taiwan, 2008). Only three of the universities have music departments: Two are academic universities, the National University of Tainan (NUTN) and Tainan National University of the Arts (TNNUA), and one is a vocational technology university, namely, Tainan University of Technology (TUT). NUTN, located in the southern metropolitan area of Taiwan, is an historic university with a distinguished academic legacy (National University of Tainan, 2007). TNNUA is the only professional school of the arts located outside of the Taipei metropolitan area. TUT, founded in August 1964, places its emphasis on home economics and arts and is located in Yongkang City, Tainan County's geographic center. There are 30 fulltime faculty in the music department of TUT; 19 faculty are piano majors, which is 63% of the staff in the music department. In 2020, 9,474 daytime program students were registered in 5 colleges, 6 graduate institutes, 21 departments, and 4 bachelor's degree programs; 497 students are music majors, which is 5.2%. of the students in at the school. The Music Department's seven-year program from high school directly to a bachelor's degree offers five foci: Piano Performance, Vocal Performance, String Instruments, Wind Instruments and Percussion, and Traditional Chinese Musical Instruments. The mission of the Bachelor of Fine Arts program is to train music professionals and cultivate music teachers for private lessons. The master's program offers two foci: Instrumental and Vocal Performance, and Conducting.

2.2. Integration

The curriculum falls into three main categories in the TUT's music department: Musicianship, Applied Studies and Ensembles, and Major Requirements. The primary focus of an integrated or holistic curriculum is not on the disciplines themselves but on the themes, the issues, or the phenomena (American Association for the Advancement of Science, 2000). The thematic approach is used to integrate curricular content by common topical areas or themes into interdisciplinary and multidisciplinary units of study (Merritt, 2019). In the 1930s, American educator and composer Randall Thompson, supported by the Carnegie Foundation, ran a study to determine the extent to which musical education was an essential component of education as a whole (Nelson, 2005). Nelson (2005) concluded by discussing the significance of a critical, holistic approach for processes of acquired expertise to policy. The study was influential across the country in encouraging the integration of musical studies with other disciplines.

Whereas there has been some work conducted on integrating a new interdisciplinary subject called "Men, Nature, and Culture" (Jank, 2009, p. 17) into the music education curriculum, there remains a lack of how-to or practical applications specific to the three categories of skills/knowledge components: Teaching, personal, and musical skills and behaviors, or the competencies developed by Teachout (Denis, 2017). Given that individuals are more likely to implement those exercises, activities, and assignments that are both effective and based on reliable sources, the TUT sought experts who could provide such experiences. These exercises are presented in the following section.

In an integrated classroom environment, courses, studies, learning activities, and experiences are combined to emphasize all academic areas and integrate objectives from multiple curriculum and instructional areas (Ediger, 1996). The emphasis is on broader educational goals. Although there are varying degrees and amounts of integration that are possible, an integrated curriculum can be applied to all content areas and grade levels. The strategies related to and the terminology associated with integrated curricula, instruction or teaching, and learning are presented in Table 1.

As an example, with respect to Integration in a chamber music class, the teacher might take time in class to dissect "Archduke Trio" as students rehearse the piece. For example, the teacher can alert students to what was going on in music history at the time that Beethoven composed this piece and discuss how it is similar or different to anything that audiences had heard before. Much like a college music theory lecture, the teacher can discuss with the students and raise awareness about how Beethoven uses triadic tonality and sonata-form in inventive ways. The teacher might also focus on stage presence and reflect on what worked and what did not work. The purpose of learning this piece goes beyond just playing good music well. It might incorporate an intentional introduction to new musical discourses and tools for students to add to their cognitive understanding of how music works (Table 1).

Table 1.
Integrated curriculum, instruction/teaching, learning, related strategies, and the associated terminology.

Curriculum	Instruction/Teaching
Chamber Music, for example, using Beethoven's - Piano Trio Op. 97 "Archduke Trio"	The Chamber Music requirements that are integrated into the performance degree programs.
Integrated	Integrated Curriculum
Incorporate Chamber Music into students' degree curricula ("ensemble participation").	These include Sonata Classes, String & Piano Chamber Music, and The Intensive Quartet Seminar.
Integration	Learning
Regarding musicianship, instructors need to help their students develop a confident, respectful, and expressive stage presence.	A certain level of body awareness is key as this will assist in the students' expressive ability and to use their physiology to support their musicality and technical prowess.
Strategies	Strategies
The didactic skills that can be cultivated specifically through the study of Chamber Music include (a) the ability to constructively self-assess both as an individual and as a group, and (b) the development of coaching, rehearsal, and basic time management strategies and skills.	The holistic instruction of performance and pedagogy appeared as (a) modeling, (b) guided thinking, (c) overt instruction of pedagogy, and (d) experience.

3. APPLICATION OF SKILLS/KNOWLEDGE COMPETENCIES IN THE MUSICc THEORY BLOCK

The *2020 National Association of Schools of Music (NASM) Handbook* provides access to the NASM standards and guidelines that include proposed revisions to NASM standards currently open for comment, including the Association's helpful Basic Competency Index by Discipline and Specialization for Undergraduate Degrees in Music (NASM, 2020). The *NASM Handbook* indicates standards applicable to all professional undergraduate music degrees. Expert status is established by these criteria: (a) common body of knowledge and skills, including performance, musicianship skills and analysis, composition/improvisation, history and repertory, and synthesis, (b) general studies competencies, and (c) recommendations for professional studies.

Each of the NASM core competencies is addressed below with descriptions of some of the specific educational interventions currently employed in the music theory block at the TUT Music department. This study's intent is not to evaluate the effectiveness of individual interventions but to create awareness about the variety of options for incorporating core competencies into the basic Fundamentals (Ear and Mind) of Music portion of undergraduate music curricula. For example, the ears perceive only what the knowing mind can understand. Thus, critical listening skills come from both knowing what is heard and what to listen for (Wang, 2017). For example, a teacher might encourage her

students to listen to great performances that provide aural models that foster the cursory mind-ear connection (cognitive). Next, she could invite students to engage the ear to critically discriminate what is heard in performances and practice rooms in search of differing subtleties to help students gain clarity and form aesthetic concepts and opinions (emotional). Furthermore, the teacher may urge students to listen to the orchestral, chamber, vocal and solo instrumental works of composers they study (spiritual). Table 2 at the end of the article lists the educational interventions possible.

> Competency 1: Personal
> Students must demonstrate the achievement of professional, entry-level competence in the major area, including significant technical mastery, the capability to produce work and solve professional problems independently, and a coherent set of artistic/intellectual goals that are evident in their work. A senior project or presentation in the major area is required in many concentrations, or clusters of courses that focus on the subfield of study, and strongly recommended the same for all others (NASM, 2020).

A functional awareness of the differences and commonalities with respect to work in artistic, scientific, and humanistic domains of the music theory block is typically one to two semesters, and success in the course depends on dictation (melodic and harmonic) exercises integrated to complement aural, written, and analytical concepts and skills. In addition, Personal Progress Checks measure knowledge and skills through multiple-choice questions with rationales to explain correct and incorrect answers and free-response questions with scoring information. Students use this ability to identify possibilities and locate information in other fields that have bearing on musical questions and endeavors. For example, like the beginning music theory class, the teacher can take time in class to dissect Archduke Trio as the piano trio rehearses it. For example, the teacher might focus on what was going on in music history at the time that Beethoven composed this piece and discuss how it similar or different to anything heard before. The teacher can discuss with the students how Beethoven uses harmonic rhythm and classical forms in inventive ways. The teacher might also give a test of definitions and chord changes (or progressions) to his or her classes.

> Competency 2: Teaching
> Provide lesson planning skills and maximize time on task lesson planning (Ballantyne & Packer, 2004; Millican, 2009), professionalism (Kelly, 2010), and displaying confidence (Davis, 2006; Teachout, 1997) and organization (Davis, 2006; Millican, 2009).

Although central in a musician’s profession, introduction to music (basic concepts of listening) is often disregarded or inadequately emphasized in the early years of undergraduate music education. This may be attributed to the traditional curricular separation of basic skill courses from educational experiences. Because a basic conversation about obvious symbols with the sounds' relevance is essential, the music theory block is potentially an excellent framework within which different kinds of musical notation, melodic systems, harmonies, meters, and rhythmic techniques can be introduced with the goal of attaining basic competence in the performance and creation of music.

Competency 3: Musical
Demonstrate knowledge of established and evolving unique expressions of social ties and the strengthening of relational connectedness, as well as the application of this knowledge to the musical competency category (Schulkin & Raglan, 2014).

The music theory curriculum typically includes courses such as diatonic harmony, chromatic harmony, counterpoint, form and analysis, contemporary theory, analytical techniques, composition, arranging, musicianship, aural skills, and keyboard harmony (Johnson, 2014). In the music theory block, advanced capabilities in musical analysis are made to produce and discuss analytical work from an independent perspective. This includes the ability to compare and evaluate the results of various analytical procedures. Much of this integration is achieved by demonstrating the achievement of professional, entry-level competence in the major area, including significant technical mastery, capability to produce work and solve professional problems independently, and a coherent set of artistic/intellectual goals that are evident in students' work.

Table 2.
Educational interventions in the music theory block targeting MOE core competencies.

Personal	**Musical knowledge**
Students might be given comparative listening projects; after being given the score, students would evaluate two different performances of the same short work or section of a piece.	Three categories of skills/knowledge components comprised of teaching, personal, and musical skills and behaviors are included each with individual competency items.
Faculty deal with Sight Singing in a number of ways, including allowing students to choose a method that seems comfortable for them (either fixed Do, moveable Do, numbers, note names, etc.) or using syllables for some exercises but not for others.	All undergraduate music majors must satisfy both the written music theory and aural skills requirements, which are team taught by theory/composition teachers.
Emphasizing musical expression more and giving students additional "hands-on" experiences; Ear Training and Sight Singing classes (and music theory) may more effectively awaken and develop students' musicality and musicianship.	Philosophical approaches are introduced by using different musical tools to teach musical skills (e.g., fixed or movable Do, La, or Do-based minor) as corresponding to the purpose and need for music theory instruction.
Teaching	An electronic audience response system is used for daily formative feedback addressing individual and group questions.
Music theory block runs concurrently with the placement examination curriculum.	A skills assessment (dictation, sight-singing, and keyboard reading) and written theory assessment (analysis, figured bass realization, etc.) are evaluated by taking placement examinations in both music theory and aural skills.

All undergraduate music majors must satisfy both the written music theory and aural skills requirements.	Written theory may be better addressed primarily by ear (e.g., meter, when to raise scale degree 7 in minor keys, harmonic rhythm, resolving tendency tones). Aural skills include: • hearing and adjusting intonation while playing • hearing the quality of a chord • hearing and recognizing pitches in a melody or the chords of a progression • tapping a rhythm that you have heard • singing a melody at sight from written music without the aid of a piano or other instrument
Introduction to music has students work backwards using different kinds of musical notation, melodic systems, harmonies, meters, and rhythmic techniques with the goal of attaining basic competence in the performance and creating music to explore scale, mode, rhythm, meter, texture, and form, with reference to a diverse range of music.	• Musical skills include chord analysis and modulation. • Chord analysis includes how a chord is related to the key and to the other chords in a piece of music. • *Modulation* occurs when a longer succession of chords emphasizes a new tonic, leading to the perception of a new key.
Students develop their listening skills in the areas that make music.	How well can student scrutinize and analyze a song?

4. MACRO FORCES: POLITICAL ENGAGEMENT BY MUSIC EDUCATION PRACTITIONERS

As a macro force influencing education across the globe, political engagement by music education practitioners is considerable. The current politicized curriculum in music education has resulted in what Chapmana et al. (2018) and Chen and Huang (2017) suggested is a rescaling of educational accountability. This rescaling shifts the focus of performance from a predefined false consciousness towards specific political ends, namely, the transformation of capitalist societies and the development of an "authentic" consciousness (Perrine, 2017) that is being experienced most in Western post-industrialized countries such as the United Kingdom, United States, Canada, Australia, and Taiwan (Chapmana et al., 2018; Chen & Huang, 2017). Cross-disciplinary work includes sources from political science, sociology, law, and economics that can help shed light on both alternative and traditional approaches within the discipline of music education (Perrine, 2017). This is important because these political perspectives inform policy and its enactment (Chapmana et al., 2018; Chen & Huang, 2017).

5. MESO FORCES: "ACCOUNTABILITY" AS POLICY

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6. MICRO FORCES: UNDERSTANDING OF THE "ACCOUNTABILITY" MESSAGE

The "accountability" message has been a powerful tool for higher education institutes (HEIs) in outlining their plans for governance change to increase efficiency in Taiwan's schools. Market-oriented higher education is becoming primarily focused on structures and actions tailored to "competition and deregulation" (Chou, 2015, p.11). Students are expected see connections and walk away with bigger ideas. Policy activities in music education are required to be rooted in a theoretical basis of aims and strategies. Music teachers need to be encouraged to develop their abilities to participate in music education policymaking (Jank, 2009). In addition, Scripp, Ulibarri, and Flax (2013) noted administrators have the power to require accountability measures to show that all the music programs in their schools employ a deep and deliberate practice model for music development. Understanding the "accountability" purpose, to make curriculum more accessible to students, is one component of this paper and highlights the intended outcomes of the "accountability" message.

7. CONCLUSION

In this paper, the way various ideas have been re-contextualized within the Taiwan education policy context is traced for the purpose of identifying both global and local influences on policy development. That there has been a shift in the balance between knowledge and skills/competencies in both the curriculum itself and in discussions of the kind of educational outcomes thought to be necessary in the current Taiwan context is clear. The contemporary model for professional music training is increasingly based on outcomes and competencies (Denis, 2017). This trend is likely to continue as music and music-related disciplines evolve. Although mastery of the NASM competencies developed over 96 years (since 1924) of practice (NASM, 2020), it is also clear that targeted exposure to institutions and individuals engaged in artistic, scholarly, educational, and other music-related endeavors can initiate the process. Professional music training curricula traditionally emphasize music theory in the first 2 years, and exposure to basic competencies can be achieved in this context. A competency-driven music theory block that integrates aural skills can include educational interventions targeting all core competencies (see Table 2).

Among the basic competencies by discipline and specialization in the TUT Music Department curriculum, Music Theory was the logical starting point for implementing competency-based education because the "often" or "always" included musical competencies (Robinson, 2019) already included essential standards; in addition, activities

with those musical competencies and theory-based strategies were in place. It is possible that music theory is unique among the core music curriculum traditionally included in university coursework with its many opportunities to help students toward all three NASM core competencies. Future work is needed to integrate all essential competencies, experiences, and opportunities across disciplines to further connect them to professional practices and make them outcomes-based so that every learner develops the skills, expertise, and knowledge to survive and thrive in the twenty-first century.

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Chapter #5

PRE-SERVICE ENGINEER EDUCATORS LEARNING MATHEMATICS: MAPPING THE LIVED COMPLEXITY

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ABSTRACT
In this paper, we adopt a systemic perspective to investigate the teaching of mathematics in ASPETE, which is a tertiary education institute in Greece that offers a two-faceted degree: an engineer degree and a pedagogical degree as engineer educator. We focus on the complex lived reality of first year Electrical Engineers and Mechanical Engineers students through a multileveled affective mapping of their studying in ASPETE, including: approaches to study, confidence in learning mathematics, conceptions about mathematics and its role in their studies and career, and views about mathematics teaching effectiveness (considering both what they actually experienced and what they would prefer to experience). The students were found to show a lack of preference for the surface approach (though not combined with a preference for a deep approach), a neutral-positive confidence in learning mathematics, and to be satisfied by the teachers' effectiveness. Confidence in learning mathematics appeared to be central in the identified dynamic affect system, whilst their conceptions about mathematics seemed to be related with the desired characteristics of mathematics teaching. The students of the two departments differed in their levels of confidence in learning mathematics, which we posit that is linked with the qualitatively different affective complexity they experience.

Keywords: system, approaches to study, mathematics teaching effectiveness, mathematics conceptions, mathematics confidence.

1. INTRODUCTION

The modern sociocultural interactions appear to entail a continuously increasing level of quantitative and logical reasoning skills. Moreover, mathematics is at the crux of the contemporary curricula and the broader educational systems, whilst mathematics is also the language of communicating and producing scientific results. In this study, we focus on the role of mathematics in ASPETE, a Greek tertiary education institute, which offers its graduates both an engineer degree and a pedagogical degree as engineer educator (who may teach in vocational high schools in Greece). This inherently two-faceted degree constitutes a complex, interdisciplinary educational environment, within which complex professional identities are formed (Garner, & Kaplan, 2019; Nersessian, & Newstetter, 2014; Osbeck, & Nersessian, 2017). In a broader research project (Mathematics education and Technological Education; MATHETE), we adopted a systemic perspective (Moutsios-Rentzos, & Kalavasis, 2016) and built upon previous studies (Moutsios-Rentzos, & Kasimati, 2014) to investigate mathematics teaching and learning in ASPETE. In this paper, we report aspects of that broader project focusing on the lived complexity of first year Electrical Engineers and Mechanical Engineer students of ASPETE.

2. LEARNING MATHEMATICS IN ASPETE: A MULTILEVELED AFFECTIVE MAPPING OF THE LIVED COMPLEXITY

A system is defined as a complex whole, the parts of which are interrelated towards specific goals, thus significantly differing from a mere "heap" of parts (Bertalanffy, 1968). A system is characterised by its objective, its structure and behaviour (including, its elements, subsystems, boundary, connectivity, functions etc), thus being identified and differentiated by its environment. It should be noted that systems "vary in their openness (referring to their level of interaction with its environment and other systems), complexity (referring to the number of parts and their links) and dynamic (referring to the volume and speed of systems' input and output)" (Moutsios-Rentzos, & Kalavasis, 2016, p. 100). Following these, the educational units may be viewed as systems that function within the broader educational system and, subsequently, researchers approach the mathematics education phenomena through a systemic approach (see, for example, Begg, 2003; Chen, & Stroup, 1993; Davis, 2018; Davis, & Simmt, 2003; Wittmann, 2001, 2021). Within the educational system the various protagonists act and interact in diverse and multiple roles, as well as within and across their various subsystems (such as the school class; Cobb, & Jackson, 2008).

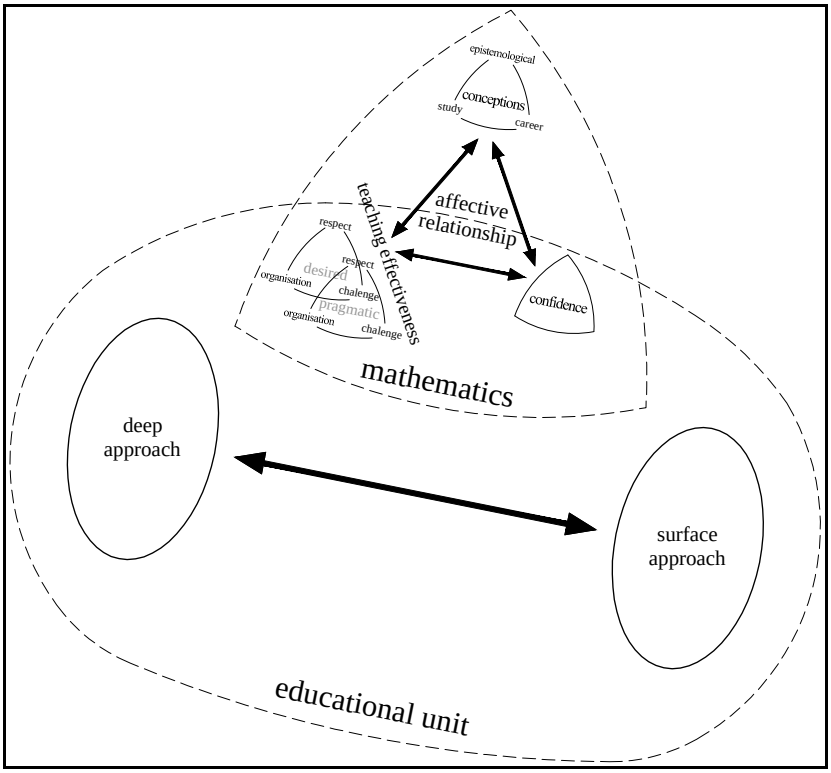
Hence, in this study, ASPETE may be conceptualised as an open learning system, being at the same time a subsystem of the broader educational system and the social system (cf. Kalavasis, & Kazadi, 2015). We drew upon Moutsios-Rentzos and Kalavasis (2016) to include in our investigations about mathematics the broader experience with studying in ASPETE. Furthermore, the students' (including pre-service teachers) broader studying experience in an educational unit is intertwined with their narrower experience with teaching and learning mathematics (Engelbrecht, Bergsten, & Kågesten, 2012), as well as with their affective relationship with mathematics is crucially linked with the students' educational outcomes (Beswick, 2012; Lo, 2021; Pepin, & Roesken-Winter, 2014). The latter is also linked with the perceived relationships amongst mathematics and the future workplace and its tools (Fitzsimons, 2001, 2013; Triantafillou, & Potari, 2010). Thus, we map the students' relationship with studying in ASPETE, their affective relationship with learning mathematics in ASPETE, as well as their interlinkings. Our approach is diagrammatically summarised in Figure 1 (drawing upon Moutsios-Rentzos, & Kalavasis, in preparation) and is discussed in the following paragraphs.

The students' broader studying experience in ASPETE is investigated through their *approaches to study* (Marton, & Säljö, 1976), referring to the specific manner in which students respond to a study situation. Two main approaches have been identified: a *deep approach* refers to focusing on the meaning and the ideas contained in a task, whilst a *surface approach* refers to focussing on the superficial characteristics and requirements of a task (see, also, Biggs, 2001; Entwistle, McCune, & Walker, 2001). In an educational unit, approaches to study may be conceptualised as the result of the constant negotiation between the students' learning characteristics and the requirements of the specific learning environment, as reflected on the students' academic outcomes.

In our approach, the students' affective relationship with learning mathematics, conceptualised as a *dynamic affect system* (Pepin, & Roesken-Winter, 2014), constitutes of three interacting components: a) *conceptions about mathematics*, b) *confidence about coping with mathematics*, and c) *views about mathematics teaching effectiveness*. Considering conceptions about mathematics, we drew upon our systemic perspective to consider mathematics within diverse systems: within the system of scientific disciplines, within the educational system, and within the occupational system. The work of Wood,

Petocz and Reid (2012) fits with this, as they investigated the conceptions of undergraduate students about their epistemological conceptions of mathematics, their conceptions about the role of mathematics in their future studies and in their future career. Their findings suggest that the epistemological conceptions about mathematics may be classified as: a) 'numbers/components' (individual and isolated components, techniques and calculations), b) 'abstract/models' (models of the real-world phenomena), and c) 'life' (a way of thinking and interpreting the world). The conceptions about the role of mathematics in their future studies and career, appeared to be: a) practical (focused on calculations, problem solving, and logical thinking), b) generic (referring to a generic mathematical way of thinking and of its importance in studies and career), and c) (lack of) knowledge (referring to the lack of knowing of the exact role of mathematics in studies and career).

Figure 1.
Learning mathematics in the educational unit: a mapping of the lived complexity (drawing upon Moutsios-Rentzos & Kalavasis, in preparation).



Furthermore, we included in our mapping the students' confidence about learning mathematics, as well as their views about effective mathematics teaching. Fennema and Sherman (1976) developed the widely cited Fennema-Sherman Mathematics Attitude Scales, which included a scale that identifies the degree of confidence that an individual experiences with respect to his/her "ability to learn and to perform well on mathematical tasks" (p. 326). Considering mathematics teaching effectiveness, we chose to consider the

broader educational literature to obtain a broader perspective to teaching effectiveness (Creemers, & Kyriakides, 2008; Muijs, & Reynolds, 2017). Furthermore, in our systemic investigations, we drew upon Moutsios-Rentzos and Kalavasis (2016) to differentiate the *pragmatic representation* of mathematics teaching effectiveness (referring to the perceived phenomenon as actually occurring in the educational unit) from the *desired/intentioned representation* (referring to the desired state of the phenomenon). Following these, for the purposes of this study, we adapted the research of Patrick and Smart (1998) about teaching effectiveness. They conceptualised teaching effectiveness to consists of three dimensions, namely: *respect for students*, *ability to challenge students*, *organisation and presentation skills*. In this project, in line with our dynamic affect system approach, the tri-faceted conceptualisation of teaching effectiveness was conceptualised to include both a pragmatic representation and a desired/intentioned representation (see Figure 1).

Consequently, in this study, we attempt to obtain a mapping of the *lived complexity* of learning mathematics in ASPETE, through a *multileveled affective mapping*. First, we investigated the *narrower* affective relationship with mathematics; a dynamic affect system including: the students' conceptions (epistemological, studies, career), their confidence about coping with mathematics, their views about mathematics teaching effectiveness (pragmatic, desired/intentioned) and their links. Moreover, we explored the *broader* relationship with studying in ASPETE through the students' approaches to study. Furthermore, we focussed on the links between the broader and the narrower relationship. Finally, considering that a different lecturer was teaching mathematics the prospective Electrical Engineers from the one teaching the prospective Mechanical Engineers, that the departmental affiliation (Bingolbali, Monaghan, & Roper, 2007) and the related professional identity differ, and that their mathematics teaching experiences may be different (since different lecturers were teaching in the two departments) and may be also linked with different broader studying experiences, we investigated whether the affective relationships are differentiated between the students of the two departments.

3. METHODS AND PROCEDURES

The study was conducted with 91 first-year of ASPETE (N=91; 17 females) in the end of the first semester of the academic year 2018-2019: 48 of them were following an Electrical Engineer degree and 43 were following a Mechanical Engineer degree. A five-section questionnaire was employed, including a section about demographic details (Section A) and four sections about approaches to study, mathematics conceptions, confidence about mathematics and mathematics teaching effectiveness. In particular:

- Section B. Approaches to study were identified by Revised Two-Factor Study Process Questionnaire (R-SPQ-2F; Biggs, Kember, & Leung, 2001), as employed by Kasimati, Moutsios-Rentzos and Matzakos (2016) with ASPETE students, showing good cross-cultural validity and reliability. R-SPQ-2F consists of twenty (10 for each approach) 5-point Likert-type items.
- Section C. The students' conceptions about mathematics were identified through the questionnaire of Wood et al. (2012) as employed by Moutsios-Rentzos and Kassimati (2014) with ASPETE students, showing its good cross-cultural psychometrics. The questionnaire consists of forty-six 5-point Likert type items organised in three parts, in accordance with the three dimensions it identifies: epistemological (16 items), studies (14 items), career (16 items).
- Section D. The students' confidence about mathematics was identified through the Confidence in Learning Mathematics Scale (Fennema, & Sherman, 1976), consisting of twelve 5-point Likert type items.

Section E. The students' views about mathematics teaching effectiveness were identified through a *modified* version of Patrick and Smart's (1998) instrument. Each of the twenty-four, 5-point Likert type items of the original questionnaire was transformed to a dyad (in line with our aforementioned theoretical approach; see also Figure 1): the first part asking the students to reflect upon the actual teaching (*pragmatic*) and the second part upon their desired teaching reality (*desired*).

The descriptive and non-parametric inferential analyses were conducted with SPSS 25, including: One-sample Wilcoxon signed rank tests, Mann-Whitney *U* tests, and Kendall's tau correlations.

4. RESULTS

The results of our analyses concerning the students of both Departments together are summarised in Table 1. Considering the students' broader experience with studying in ASPETE, though they appear not to statistically significantly prefer a deep approach, they seem to statistically significantly move away from a surface approach. First, we focussed on the students' affective relationship with mathematics. All the measured aspects statistically significantly differed from the conceptual neutral (see Table 1). Nevertheless, the differences identified in confidence, the desired/intentioned reality of teaching effectiveness, an epistemological conception (life) and a career conceptions (knowledge) were not large enough to be assigned to a different characterisation from the conceptual neutral. Considering the remaining differences, the students' pragmatic representations about teaching effectiveness were on the positive ("agree"), suggesting their being satisfied by the experienced mathematics teaching in ASPETE. Regarding the pragmatic representation of teaching effectiveness, the students expressed their statistically significantly positive experiences in respect, organisation and challenge. Furthermore, they conceptualised mathematics as being abstract models, about techniques and calculations. Regarding the role of mathematics in their future studies, the noted the practical and generic aspect of mathematics, as well as their knowledge about its role. Considering their future career, they also seem to identify the practical aspect of mathematics, but they appear to be neutral ("neither agree, nor disagree") with respect to the generic aspect of mathematics and their knowledge of its role in their future career.

Furthermore, we investigated the links *within* the dynamic affect system about mathematics. Confidence in learning mathematics was found to be statistically significantly positively correlated with the pragmatic representation of respect and of challenge. Moreover, confidence was found be to statistically significantly positively correlated with seven of the nine measured conceptions (except for with mathematics being numbers/components and with the generic role of mathematics in their studies). Thus, it appears that confidence in mathematics is positively linked with multiple aspects of the mathematics affect system. Furthermore, regarding the links between teaching effectiveness and conceptions about mathematics, the students' conceptions about the generic aspect of mathematics in their future studies had a statistically significant negative correlation with their desire for more respect. Overall, it seems that within the dynamic affect system about mathematics, confidence in learning mathematics plays a central role by having immediate relationships with other affective aspects.

Table 1.
Learning mathematics and studying in ASPETE: a mapping of the lived complexity.

		M	*Mdn*	*P*		*Deep*[8]	*Surface*[8]	*Confidence*
Deep approach		3.0[1]	3.0	0.815[4]				
Surface approach		2.6[1]	2.6	<0.001[4]				
Confidence in learning mathematics		3.3[2]	3.3	0.001[5]	τ[7]	0.207	-0.197	
					P	0.013	0.018	
Respect	Pragmatic	4.2[2]	4.3	<0.001[5]	τ	0.222	-0.128	0.184
					P	0.005	0.102	0.034
	Desired/Intentioned	3.3[3]	3.0	<0.001[6]	τ	0.057	-0.087	-0.099
					P	0.503	0.308	0.297
Organisation	Pragmatic	3.9[2]	4.0	<0.001[5]	τ	0.101	0.021	0.144
					P	0.226	0.803	0.126
	Desired/Intentioned	3.7[3]	3.0	<0.001[6]	τ	0.026	-0.097	-0.057
					P	0.748	0.235	0.530
Challenge	Pragmatic	3.9[2]	3.9	<0.001[5]	τ	0.264	-0.159	.0251
					P	0.001	0.043	0.004
	Desired/Intentioned	3.3[3]	3.0	<0.001[6]	τ	0.133	-0.056	-0.015
					P	0.115	0.504	0.874
Conceptions	Number/Components	3.7[2]	3.7	<0.001[5]	τ	0.100	0.098	0.124
					P	0.226	0.237	0.142
	Modelling/Abstract	4.0[2]	4.0	<0.001[5]	τ	0.207	-0.163	0.289
					P	0.014	0.054	0.001
	Life	3.3[2]	3.3	<0.001[5]	τ	0.151	-0.196	0.173
					P	0.067	0.018	0.041
Studies	Practical	3.9[2]	4.0	<0.001[1]	τ	0.092	-0.034	0.212
					P	0.267	0.688	0.013
	Generic	3.5[2]	3.5	<0.001[1]	τ	0.061	-0.074	0.204
					P	0.462	0.372	0.015
	(lack of) Knowledge	3.8[2]	4.0	<0.001[1]	τ	0.241	-0.008	0.302
					P	0.004	0.928	<0.001
Career	Practical	3.7[2]	3.8	<0.001[1]	τ	0.155	-0.069	0.290
					P	0.063	0.414	0.001
	Generic	3.2[2]	3.3	0.001[1]	τ	0.187	-0.073	0.229
					P	0.023	0.379	0.007
	(lack of) Knowledge	3.4[2]	3.4	<0.001[1]	τ	0.221	-0.084	0.249
					P	0.007	0.311	0.003

[1] '1': never or rarely true of me, '2': sometimes true of me, '3': this item is true of me about half the time, '4': frequently true of me. '5': almost always true of me. [2] '1': strongly disagree, '2': disagree, '3': neither agree, nor disagree, '4': agree. '5': strongly agree. [3] '1': considerably less frequently, '2': less frequently, '3': as frequently as it did, '4': more frequently. '5': much more frequently. [4] One-sample Wilcoxon signed rank test to the hypothesised median "3": "this item is true of me about half the time". [5] One-sample Wilcoxon signed rank test to the hypothesised median "3": "neither agree, nor disagree". [6] One-sample Wilcoxon signed rank test to the hypothesised median "3": "as frequently as it did". [7] Kendall's tau τ non-parametric correlation. [8] 'Deep': Deep approach, 'Surface': Surface approach, 'Confidence': Confidence in learning mathematics.

Subsequently, we considered in our investigations, the educational unit and the broader experience of studying in ASPETE. First, it was revealed that the students showed a lack of preference for the surface approach, though not combined with a preference for a deep approach.

Moreover, we investigated the links between the broader experience with studying in ASPETE and their narrower experience of learning mathematics in ASPETE. Confidence was statistically significantly positively correlated with the deep approach and negatively correlated with the surface approach. Thus, it appears that the students who in general prefer to learn about ideas and meaning are also more confident with learning mathematics. Moreover, regarding teaching effectiveness, surface approach was statistically significantly negatively correlated with a preference for challenge in teaching (pragmatic representation), whilst deep approach was statistically significantly positively correlated with challenge and respect in teaching (pragmatic representation). These findings may be related to the fact that respect in teaching is not clearly related to the subject matter of the teaching itself and, therefore, is conceptually incompatible with the surface approach. At the same time, the qualitative characteristics of deep approach are conceptually compatible with both respect and challenge in teaching. Finally, regarding the links amongst approaches to study and conceptions about mathematics, conceiving mathematics as being abstract and about models was statistically significantly positively correlated with deep approach and negatively with surface approach. Moreover, deep approach was statistically significantly positively correlated with the knowledge about the role of mathematics in their future studies and career, as well as with the generic aspect of mathematics in their future career. Overall, statistically significant links were found between the broader experience of studying in ASPETE and the narrow experience of learning mathematics, which suggest that learning mathematics is affected by the way that the students experience and relate themselves with ASPETE.

Following these, it is reasonable to assume that the aforementioned relationships may be linked with the Department of study, since their departmental affiliation (Bingolbali et al, 2007) is different and their mathematics teaching experiences may be different (since different lecturers were teaching in the two departments). Hence, we investigated whether there were any differences between the students of the two departments with respect of the aspects of learning mathematics and studying in ASPETE (see Table 2).

Considering the dynamic affect system about mathematics, the students following the Electrical Engineering degree were statistically significantly more confident in learning mathematics and more satisfied by the organisation aspect of the mathematics teaching, than those following the Mechanical Engineering degree. At the same time, the latter appeared to statistically significantly desire more organisation in the mathematics teaching. It should be stressed that the identified difference in the students' confidence is borderline a conceptual difference, in the sense that the Mechanical Engineers report "neutral;" confidence and the Electrical Engineers report a borderline positive confidence ('3.5'; see Table 2). The statistical significantly differences are clear in teaching effectiveness, as the Mechanical Engineers are "neutral" about the teaching organisation and strongly positive about their desire for more organisation. Moreover, the students of the two departments did not statistically significantly differ in their conceptions about mathematics. Finally, considering the broader experience about studying in ASPETE, no statistically significant differences were found in the students' approaches to study, suggesting that departmental affiliation and other aspects that may be linked with the different departments did not affect the students' experiencing and being related with ASPETE.

Table 2.
Aspects of learning mathematics and studying in ASPETE: Mechanical Engineers and Electrical Engineers.

		Electrical Engineers		*Mechanical Engineers*		*Mann-Whitney U*
		M	*Mdn*	*M*	*Mdn*	*P*
Deep approach		3.0[1]	3.0	3.0	3.1	0.891
Surface approach		2.5[1]	2.5	2.6	2.6	0.582
Confidence in learning mathematics		3.5[2]	3.5	3.1	3.1	0.018
Respect	Pragmatic	4.1[2]	4.3	4.2	4.4	0.711
	Desired/Intentioned	3.3[3]	3.0	3.3[3]	3.1	0.679
Organisation	Pragmatic	4.2[2]	4.4	3.4	3.1	<0.001
	Desired/Intentioned	3.3[3]	3.0	4.4	4.6	<0.001
Challenge	Pragmatic	3.9[2]	3.9	3.9	3.9	0.994
	Desired/Intentioned	3.3[3]	3.0	3.4	3.7	0.342
Conceptions	Number/Components	3.8[2]	3.8	3.6	4.0	0.154
	Modelling/Abstract	3.9[2]	4.3	4.0	4.0	0.893
	Life	3.3[2]	3.3	3.3	3.2	0.696
Studies	Practical	3.9[2]	4.0	3.8	3.8	0.423
	Generic	3.6[2]	3.5	3.4	3.5	0.300
	(lack of) Knowledge	4.0[2]	4.0	3.6	3.7	0.074
Career	Practical	3.8[2]	4.0	3.7	3.6	0.273
	Generic	3.3[2]	3.3	3.2	3.3	0.416
	(lack of) Knowledge	3.6[2]	3.4	3.3	3.4	0.113

[1] '1': never or rarely true of me, '2': sometimes true of me, '3': this item is true of me about half the time, '4': frequently true of me. '5': almost always true of me. [2] '1': strongly disagree, '2': disagree, '3': neither agree, nor disagree, '4': agree. '5': strongly agree. [3] '1': considerably less frequently, '2': less frequently, '3': as frequently as it did, '4': more frequently. '5': much more frequently.

Following these results, we explored the potential variances that may be also identified in the mapping of the lived complexity as experienced by the students of the two departments, in comparison with the one found for the whole population. The results of the analyses are summarised in Table 3 and Table 4.

With respect to the dynamic affect system about mathematics, in comparison to the whole population only one differences was found: the Mechanical Engineers' pragmatic representation of respect did not statistically differ from the conceptual neutral. However, the results radically differ when focusing on the identified interlinking of the aspects of the affect system. In particular, the Mechanical Engineers seem to converge with the whole population, whilst the Electrical Engineers appear to experience a qualitatively different reality. For the Electrical Engineers, the interlinkings within the affect system appear to almost disappear.

Table 3.
Learning mathematics and studying in ASPETE: a mapping of the lived complexity as experienced by the Mechanical Engineers.

		M	*Mdn*	*P*		*Deep*[8]	*Surface*[8]	*Confidence*
Deep approach		3.0[1]	3.1	0.948[4]				
Surface approach		2.6[1]	2.6	<0.001[4]				
Confidence in learning mathematics		3.1[2]	3.1	0.216[5]	τ[7]	0.281	-0.334	
					P	0.027	0.008	
Respect	Pragmatic	4.2[2]	4.4	0.216[5]	τ	0.119	-0.003	0.284
					P	0.256	0.979	0.022
	Desired/Intentioned	3.3[3]	3.1	0.002[6]	τ	0.146	-0.231	-0.118
					P	0.181	0.034	0.406
Organisation	Pragmatic	3.4[2]	3.1	0.002[5]	τ	0.170	-0.057	-0.155
					P	0.109	0.589	0.300
	Desired/Intentioned	4.4[3]	4.6	<0.001[6]	τ	-0.034	-0.129	0.278
					P	0.762	0.249	0.035
Challenge	Pragmatic	3.9[2]	3.9	<0.001[5]	τ	0.147	-0.069	0.379
					P	0.162	0.513	0.002
	Desired/Intentioned	3.4[3]	3.7	0.001[6]	τ	0.168	-0.107	-0.128
					P	0.127	0.329	0.357
Conceptions	Number/Components	3.6[2]	4.0	<0.001[5]	τ	0.131	-0.008	-0.004
					P	0.309	0.950	0.971
	Modelling/Abstract	4.0[2]	4.0	<0.001[5]	τ	0.165	0.191	0.338
					P	0.210	0.145	0.004
	Life	3.3[2]	3.2	0.009[5]	τ	0.033	-0.155	0.289
					P	0.800	0.230	0.013
Studies	Practical	3.8[2]	3.8	<0.001[1]	τ	0.035	0.099	0.299
					P	0.789	0.442	0.011
	Generic	3.4[2]	3.5	0.001[1]	τ	0.004	0.096	0.259
					P	0.975	0.460	0.025
	(lack of) Knowledge	3.6[2]	3.7	<0.001[1]	τ	0.152	0.181	0.277
					P	0.251	0.171	0.019
Career	Practical	3.7[2]	3.6	<0.001[1]	τ	0.013	0.130	0.309
					P	0.923	0.321	0.009
	Generic	3.2[2]	3.3	0.065[1]	τ	0.034	0.104	0.331
					P	0.790	0.416	0.004
	(lack of) Knowledge	3.3[2]	3.4	<0.001[1]	τ	0.075	0.183	0.207
					P	0.561	0.154	0.077

[1] '1': never or rarely true of me, '2': sometimes true of me, '3': this item is true of me about half the time, '4': frequently true of me. '5': almost always true of me. [2] '1': strongly disagree, '2': disagree, '3': neither agree, nor disagree, '4': agree. '5': strongly agree. [3] '1': considerably less frequently, '2': less frequently, '3': as frequently as it did, '4': more frequently. '5': much more frequently. [4] One-sample Wilcoxon signed rank test to the hypothesised median "3": "this item is true of me about half the time". [5] One-sample Wilcoxon signed rank test to the hypothesised median "3": "neither agree, nor disagree". [6] One-sample Wilcoxon signed rank test to the hypothesised median "3": "as frequently as it did". [7] Kendall's tau τ non-parametric correlation. [8] 'Deep': Deep approach, 'Surface': Surface approach, 'Confidence': Confidence in learning mathematics.

Table 4.
Learning mathematics and studying in ASPETE: a mapping of the lived complexity of as experienced by the Electrical Engineers.

		M	*Mdn*	*P*	*Deep*[8]	*Surface*[8]	*Confidence*
Deep approach		3.0[1]	3.0	0.837[4]			
Surface approach		2.5[1]	2.5	<0.001[4]			
Confidence in learning mathematics		3.5[2]	3.5	0.002[5]	0.281	-0.334	
					0.027	0.008	
Respect	Pragmatic	4.1[2]	4.3	<0.001[5]	0.119	-0.003	0.133
					0.256	0.979	0.295
	Desired/Intentioned	3.3[3]	3.0	<0.001[6]	0.146	-0.231	-0.036
					0.181	0.034	0.791
Organisation	Pragmatic	4.2[2]	4.4	<0.001[5]	0.170	-0.057	0.167
					0.109	0.589	0.193
	Desired/Intentioned	3.3[3]	3.0	<0.001[6]	-0.034	-0.129	-0.028
					0.762	0.249	0.838
Challenge	Pragmatic	3.9[2]	3.9	<0.001[5]	0.147	-0.069	0.163
					0.162	0.513	0.204
	Desired/Intentioned	3.3[3]	3.0	<0.001[6]	0.168	-0.107	0.117
					0.127	0.329	0.383
Conceptions	Number/Components	3.8[2]	3.8	<0.001[5]	0.131	-0.008	0.138
					0.309	0.950	0.281
	Modelling/Abstract	3.9[2]	4.3	<0.001[5]	0.165	0.191	0.210
					0.210	0.145	0.110
	Life	3.3[2]	3.3	0.008[5]	0.033	-0.155	0.041
					0.800	0.230	0.752
Studies	Practical	3.9[2]	4.0	<0.001[1]	0.035	0.099	0.085
					0.789	0.442	0.510
	Generic	3.6[2]	3.5	<0.001[1]	0.004	0.096	0.069
					0.975	0.460	0.593
	(lack of) Knowledge	4.0[2]	4.0	<0.001[1]	0.152	0.181	0.198
					0.251	0.171	0.134
Career	Practical	3.8[2]	4.0	<0.001[1]	0.013	0.130	0.175
					0.923	0.321	0.184
	Generic	3.3[2]	3.3	0.002[1]	0.034	0.104	0.078
					0.790	0.416	0.542
	(lack of) Knowledge	3.6[2]	3.4	<0.001[1]	0.075	0.183	0.195
					0.561	0.154	0.128

[1] '1': never or rarely true of me, '2': sometimes true of me, '3': this item is true of me about half the time, '4': frequently true of me. '5': almost always true of me. [2] '1': strongly disagree, '2': disagree, '3': neither agree, nor disagree, '4': agree. '5': strongly agree. [3] '1': considerably less frequently, '2': less frequently, '3': as frequently as it did, '4': more frequently. '5': much more frequently. [4] One-sample Wilcoxon signed rank test to the hypothesised median "3": "this item is true of me about half the time". [5] One-sample Wilcoxon signed rank test to the hypothesised median "3": "neither agree, nor disagree". [6] One-sample Wilcoxon signed rank test to the hypothesised median "3": "as frequently as it did". [7] Kendall's tau τ non-parametric correlation. [8] 'Deep': Deep approach, 'Surface': Surface approach, 'Confidence': Confidence in learning mathematics

The main cause of this difference seems to be the fact that confidence was not statistically significantly correlated with any other aspects of the system. Moreover, these students were found to be borderline positive about their confidence in learning mathematics and strongly positive about their desire for organisation. It is posited that being on the positive of the confidence spectrum allows for the students to experience differently the diverse aspects of the dynamic affect system about mathematics. However, non-positive confidence seems to act as a crucial attractor within the dynamic affect system about mathematics, in the sense that it is positively correlated with multiple aspects of the system. Recall (see Table 2) that the Mechanical Engineers, in comparison with the Electrical Engineers, were statistically significantly less satisfied by their pragmatic representation of the experienced mathematics teaching and statistically significantly desiring more organisation, whilst no statistically significant differences between the two departments were identified in the broader experience in ASPETE. Consequently, since different lecturers were teaching in the two Departments, it is hypothesised that the diverse mathematics teaching practices may also be linked with the identified differences.

5. DISCUSSION AND CONCLUDING REMARKS

In this paper, we discussed a multileveled affective mapping of the complex lived reality that the first year Electrical Engineers and Mechanical Engineers of ASPETE experience with respect to mathematics. We adopted a systemic approach to include in our investigations the broader experience about studying in ASPETE. We proposed a dynamic affect system, including confidence in learning mathematics, their conceptions about mathematics and its role in their studies and career, and their views about mathematics teaching effectiveness (considering both what they actually experienced and what they would prefer to experience).

The results of the conducted analyses in general accorded with and, at the same time, enriched previous studies. First, in line with previous studies, the ASPETE students showed a lack of preference for the surface approach (though not combined with a preference for a deep approach) and they considered mathematics as being mainly about models and techniques (Moutsios-Rentzos, & Kasimati, 2014; Kasimati et al, 2016). Moreover, we added to previous results (Maass, & Engeln, 2019; Wood et al, 2012) the fact that the ASPETE engineering students expressed a neutral-positive confidence in learning mathematics, and they appeared to be satisfied with the actual mathematics teaching, identifying area for improvement.

Furthermore, our systemic approach allowed for investigations both within the mathematics dynamic affect system (cf. Pepin, & Roesken-Winter, 2014) and, importantly, between the mathematics-specific and the broader ASPETE experience. Considering the mathematics affective relationships, the students' conceptions about mathematics seemed to be related with the desired characteristics of mathematics teaching. However, it was the students' confidence in learning mathematics that appeared to be the crucial element of our dynamic affect system, as it was linked with most of the other aspects. In addition, confidence appeared to be also the main link between the broader and the narrower level of experience, as it was statistically significantly negatively correlated with a surface approach.

Our further systemic explorations acknowledged the existence of two distinct, yet inter-related, subsystems within the ASPETE system, with respect to the degree that the students followed: Electrical or Mechanical Engineering. Our analyses revealed a more complex reality. On the one hand, the students shared a similar experience of ASPETE as

an educational unit, thus suggesting their belonging to a common educational system. On the other hand, they differed only in their degree of confidence in learning mathematics and in their representations about mathematics teaching, signifying their sub-system differentiation. Our systemic approach focusses on affective relationships that form the dynamic affect system, which revealed that the students of the two departments experienced a qualitatively different affective complexity. Notably, the role of confidence appeared to be crucial in the characteristics of the affective system. Moreover, mathematics as a subject taught has a diverse presence in the ASPETE system and its subsystems, as the acting and interacting protagonists assuming their dynamic roles are engaged in the teaching and learning of mathematics. For example, it is hypothesised that mathematics may be a subject taught with a similar content taught in both departments, but the nature of departmental affiliation (Bingolbali et al., 2007) and/or the students' complex, interdisciplinary professional identity (including potentially both practicing engineers and teachers; Garner, & Kaplan, 2019) may crucially affect the way that mathematics teaching effectiveness is conceptualised and experienced. Moreover, potential links of confidence with organisation of teaching appeared to render further investigations to be conducted.

Following these, it is argued that the proposed approach accords with the existing findings, allowing at the same time to *meaningfully* extend these investigations to include further relationships and inter-relationships. Consequently, within the broader research project (MATHETE) we focus on systemic investigation about teaching and learning mathematics in ASPETE, including investigations about the role of teaching practices, departmental affiliation, as well as about the potential temporal developments in the aforementioned phenomena.

Though our approach has been implemented only in the ASPETE educational system, we argue that our approach may pragmatically and substantially contribute to the improvement of mathematics teaching in ASPETE, but also in other engineering education systems. This approach may be implemented in other tertiary educational units complementing other efforts for modern mathematics education in engineering education (Aditya, & Olds, 2014; Pohjolainen, Myllykoski, Mercat, & Sosnovsky, 2018), by explicitly acknowledging the importance of the identification and incorporation in the educational planning, the peculiarities of the specific educational system, its subsystems and its environment.

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Chapter #6

COASTRO: @N ASTRONOMY CONDO – TEACHERS' ATTITUDES AND EPISTEMOLOGICAL BELIEFS TOWARDS SCIENCE IN A CITIZEN SCIENCE PROJECT

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ABSTRACT
An attitude is seen as a hypothetical construct related to a tendency expressed by evaluating a particular entity with some degree of favour or disfavour. In the case of attitudes toward science, these cannot be isolated from understanding science's processes: the path to produce, refute, and change knowledge. Thus, it is critical to promote public engagement with science-astronomy and technology with the goal of understanding content, but also of understanding what science is and how it is built. In this context, CoAstro: @n Astronomy Condo emerged – a citizen science project starts with the engagement of primary school teachers with the Research Group on the "Origin and Evolution of Stars and Planets" at the Instituto de Astrofísica e Ciências do Espaço (IA). A semi-structured interview was conducted to study teachers' attitudes and epistemological beliefs towards science and the changes promoted by CoAstro. The interview was performed before and after the development of the CoAstro. It involved nine primary school teachers with no degree in science and who volunteered to participate in CoAstro. The results show that there has been an increase of interest in astronomy and the reinforcement of epistemological beliefs.

Keywords: citizen science, science communication, epistemological belief, attitudes towards science.

1. INTRODUCTION

Although not all research has as its primary intention science communication to lay public (Burns, O'Connor, & Stocklmayer, 2003), its social relevance should be one of the starting points to decide the pertinence of its dissemination to this type of audience. For them, neither understanding the results nor understanding the processes that led to these constitute trivial tasks.

Therefore, it is urgent to associate the increase of scientific production (Bretones, 2018; Bretones, Jafelice, & Horvath, 2016; GGS, 2021; Lelliott & Rollnick, 2010; Pordata, 2021) with the strategies that enable the dissemination of scientific methods. The process will be relevant to promote attitudes and beliefs towards science because they enhance understanding and engagement with science.

In this context emerged the idea of the citizen science project "CoAstro: @n Astronomy Condo". It brought together astronomers, science communicators, and primary school teachers. This project had three main goals: i) to structure, implement and evaluate a citizen science project; ii) perceive the importance of the project for the participants; iii) evaluate scientific knowledge, attitudes, and beliefs. It is precisely from this last goal that emanates the present work.

2. BACKGROUND

Science communication can be understood as any act that aims to promote one or more of the following paradigms (Burns et al., 2003; Oliveira & Carvalho, 2015): i) public awareness of science (PAS) - predominantly about attitudes toward science; ii) public understanding of science (PUS) - understanding of science content, methods of inquiry and science as a social enterprise; iii) public engagement with science and technology (PEST) - the engagement will correspond to the involvement of non-specialists in scientific-technological subjects, under a philosophy of reciprocal learning. Such desiderate to be most easily attainable if citizens can be directly involved in scientific production – citizen science – to understand contents and what science is and how it is built. That was done in "CoAstro: @n Astronomy Condo".

2.1. CoAstro – A citizen science project

The term citizen science refers to public engagement in different stages of scientific processes (Bultitude, 2011; Marshall, Lintott, & Fletcher, 2015; Roy et al., 2012). This collaborative concept, between astronomers and volunteers, is becoming increasingly popular in non-formal science education (Price & Lee, 2013). Indeed, citizen science can easily create a win-win context: it attracts more researchers to science communication and, on the other hand, allows the public to participate directly in scientific processes (Riesch & Potter, 2014).

Thus, CoAstro defines itself as a citizen science project which, during one school year (2018/2019), had the participation of: four astronomers from the Instituto de Astrofísica e Ciências do Espaço (IA) in Portugal, nine primary school teachers, four science communicators, and one mediator (these belonging to the Porto Planetarium – Ciência Viva Center – PP-CCV). Under this project, the public engagement with science-astronomy and technology (PESaT) was made with the goal of understanding contents, but also to promote "positive" attitudes and epistemological beliefs towards science.

CoAstro was organized into eight main work packages. One took a central role in the process: the involvement of primary school teachers and the Research Group on the "Origin and Evolution of Stars and Planets" at IA. That followed a collaborative model of citizen science (Bonney et al., 2009): their analysis accompanied data collection. This feature allowed the project to be extended to the school community by engaging approximately one thousand persons.

To engage teachers in astronomy research, two subprojects were developed in CoAstro: "Stars" (aiming the analysis of standard stellar spectra to allow the determination of the composition of 57000 stars and the characterization of their brightness, using *Data Release 2* from the European Space Agency – ESA – *GAIA Mission*) and "Planets" (aiming the production of a planetary transit video, using *Python* program and the analysis of light curves to signal the presence of potential exoplanets).

CoAstro assumed, from its conception, that one of its objectives would be to work attitudes and epistemological beliefs towards science. Thus, it would be necessary to analyse the teachers' attitudes at the beginning and end of the project to understand CoAstro's contributions to this process. It is in this context that we will now present the process that led to that assessment.

2.2. Attitudes and epistemological beliefs towards science

The individual science conceptions may be one of the primary conditioning sources of attitudes towards science and visions about building it (Tytler, 2014). The interest for this attitudinal domain starts within reach of education in science when this is assumed as a means to reach two goals: the promotion of scientific literacy and the preparation of new generations of scientists (Millar & Osborne, 1998; Tytler, 2014).

Attitudes towards science are defined by Osborne, Simon, & Collins (2003, p. 1053) as "the feelings, beliefs, and values held about an object that may be the enterprise of science, school science, the impact of science on society or scientists themselves". These authors assume that the concept established is no more than the synthesis of the set of affective behaviours previously listed by Klopfer (1971): the presence of favourable attitudes towards science and scientists; the acceptance of scientific methods as a way of thinking; the adoption of scientific attitudes; the pleasure associated with scientific learning opportunities; interest in science and related activities; and the interest in pursuing scientific careers. However, these days, as noted by Rutjens, Heine, Sutton, & van Harreveld (2018, p. 125), "as science continues to progress, attitudes towards science seem to become ever more polarized. Whereas some put their faith in science, others routinely reject and dismiss scientific evidence".

Miller (1983) considers attitudes towards science as an element of scientific literacy: attitudes towards science and knowledge (towards science) – the social impact of science on the individual and society itself. However, Miller does not isolate this domain from the understanding of scientific processes: the nature of science (Osborne, Simon & Tytler , 2009). For Ozgelen (2012, p. 104), this refers to "epistemology and values and beliefs for scientific knowledge and how that knowledge is developed, refuted, and changed". Thus, Price and Lee (2013, pp. 780-781) prefer to designate this domain as epistemological beliefs about science:

> We feel it is flexible enough to reflect that attitudes, feelings, and understanding change and is somewhat subjective. Other words such as "knowledge" or "awareness" imply a hard reality the participant is being judged against and oversimplifies what constitutes the "nature of science", a term that stirs strong emotions in many academics.

That seemed to us to be the understanding that best represents what we are trying to measure in the present work. Thus, we will designate the two attitudinal components analysed using the following terminology: i) attitudes towards science; ii) epistemological beliefs.

Brossard, Lewenstein, & Bonney (2005) analyzed the impact of a citizen science project on knowledge and changing participants' attitudes. Their conclusions reveal that:

> The project had an impact on participants' knowledge of bird biology. No statistically significant change in participants' attitudes toward science or the environment or participants' understanding of the scientific process could be detected. The results suggest that projects must make explicit to participants the issues that they are experiencing (Brossard et al., 2005, p. 1099).

These authors even compared a group of participants, in a citizen science project, with a control group: they found no differences between them in understanding scientific processes. That also occurs in previous work (Trumbull, Bonney, Bascom, & Cabral, 2000) that verified the existence of strong epistemological beliefs in the participants, but could not

attribute them to the participation in the project: "we cannot state that participation in a citizen-science project caused this thinking" (Trumbull et al., 2000, p. 265). Years later, Jordan, Gray, Howe, Brooks, & Ehrenfeld (2011) demonstrated that citizen science projects seem to affect increasing participants' knowledge, but not in terms of their scientific attitudes:

> Knowledge of invasive plants increased, on average, 24%, but participation was insufficient to increase understanding of how scientific research is conducted. Participants reported increased ability to recognize invasive plants and increased awareness of invasive plants' effects on the environment, but this translated into little change in behaviour (Jordan et al., 2011, p. 1148).

Price and Lee (2013) looked at scientific attitudes and epistemological beliefs changes in the participants of an astronomy citizen science project. This study led to our interview script, and it is presented in the next section of the present work.

3. METHODOLOGY

This section will present the attitudes instruments and the process that led to the interviews' script.

3.1. Attitudes instruments for CoAstro

To study teachers´ attitudes and epistemological beliefs towards science, as well as to analyse any changes promoted by CoAstro, a semi-structured interview (with the Portuguese acronym EAC), based on the Scientific Attitude Instrument (SAI) and the Shortened Nature of Scientific Knowledge Scale (SNSKS) was prepared.

The Scientific Attitude Instrument (SAI) is an instrument presented by Price and Lee (2013), built due to the lack of attitude instruments properly developed outside the educational context. That was our motivation to build EAC based in SAI: SAI is an attitude instrument assembled to match an older citizen science audience's characteristics. It is "constrained in length, focus on the use of science in everyday life, and include questions that would measure behaviour unique to a citizen science audience" (Price & Lee, 2013, p. 780).

SNSKS was based on the Nature of Scientific Knowledge Scale (NSKS) established by Rubba and Andersen (1978). The items in the original NSKS included 48 items grouped into six categories of the nature of science (amoral, creative, developmental, parsimonious, testable, and unified). Each category included four positively stated items and four negatively stated items. The SNSKS kept the number of categories but reduced to four the number of items per category. That was made in response to the pilot study: the authors omitted all negative items. This shortening was necessary due to Price & Lee's citizen science participants' resistance: they rebelled on the project's public discussion forums. That is a common problem in citizen science (Price & Lee, 2013). SNSKS was chosen over other attitudes instruments because: i) it is based on a survey instrument with extensive pedigree (NSKS); ii) it was experimented in citizens science projects; iii) its application, simultaneously with SAI, was already tested (Price & Lee, 2013).

SAI has nine items, and SNSKS twenty-four items answered with a 5-point Likert scale consisting of Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree categories. SAI´s reliability ($\alpha = 0.95$) and SNSKS´ reliability ($\alpha = 0.94$) were high.

SNSKS agreed, in general, with previous validation work on the original NSKS instrument, despite its shortened length.

A total of 3180 participants completed the pre-test (with SAI and SNSKS simultaneously) made by Price & Lee (2013). They were invited to take the post-test after six months: 365 participants complete that task.

The above description justifies the choice of the SAI and SNSKS as the basis for our interview about attitudes and epistemological beliefs (EAC) done to teachers involved in CoAstro. Therefore, in this section, we will characterize the EAC respondents and the whole process that, starting from SAI and SNSKS, led to the EAC's adaptation and application in the CoAstro project.

The option for a semi-structured interview was made due to the number of CoAstro teachers: nine. Therefore, we decided to adapt SAI and SNSKS and built an interview script based on them.

To produce the EAC´s interview script, we started by translating SAI and SNSKS from English into Portuguese. This first translation was the subject of scientific analysis by a Science Education and Communication expert. In this analysis, the expert verified the need to make some adjustments to avoid changing the meaning of the SAI/SNSKS.

Subsequently, a graduate person, working in the United Kingdom for seven years, made the retroversion of that translation. This process did not reveal any important difference between the translation and the original SAI/SNSKS.

This whole process of translation, analysis, and retroversion led to a first stabilized version of the EAC that allowed us to proceed to the next phase: the interview script. The same Science Teaching and Dissemination expert also analysed it. With minor changes needed, we had the final version of the EAC script. This script has the same number of questions as to its predecessors (SAI/SNSKS): we only translated them and validated that translation.

3.2. EAC's participants

EAC´s and EDD´s participants were 45 years old, on average. Eight respondents were female, and one male. Four teachers completed high school in urban areas, two in suburban areas, and three in rural areas. However, at the time of the first interview, five worked in suburban schools, three in urban schools, and only one in a rural school. All teachers stated that they had never taken any specific astronomy course or participated in any astronomy initiative. For three of these teachers, CoAstro provided the first contact with the Porto Planetarium – Ciência Viva Center (PP-CCV).

3.3. EAC's application

The first moment of the interview (EI) ran between the 23rd of January and the 18th of February. They took place in a "familiar" context for the teachers (school, coffee shop, home…). At that point, teachers were aware solely of CoAstro objectives. The interview was recorded with the interviewee's authorization. All nine interviews followed a familiar dynamic: the interviewer read each statement of the interview script; the interviewee positioned himself according to a level on the Likert scale and justified when he deemed it was necessary for his answer. The interviewer, also when necessary, asked for clarification of any idea presented by the interviewee. Thus, nine interviews were completed.

With the same procedure and in the same application context, the second moment of the interview (EII) ran between the 20th of September and the 8th of October. All the nine teachers completed EII by two months after the end of the project.

4. RESULTS

We start by recalling that the data collected through the EAC had as objectives: i) to know what are the attitudes towards science and the epistemological beliefs of the primary school teachers involved in CoAstro; ii) verify if their participation in CoAstro has modified those same attitudes and beliefs.

Based on the interview script and its objectives, an analysis framework was produced with categories (A and B) and subcategories (A1 and A2; B1 to B6), from which the content analysis of the interviews was made: A. Attitudes towards science (A1. Interest and proactivity; A2. Understanding and use of scientific knowledge); B. Epistemological beliefs (B1. The amorality of scientific knowledge and its application; B2. Creativity in science; B3. Knowledge construction process; B4. Parsimony in science; B5. Validation of knowledge; B6. The interdisciplinarity of science). The following summarizes some of the main results, supported by excerpts from the interviews, which we translated from Portuguese to English.

Regarding category A, the results showed that from EI to EII, there was an increase in science interest, in citizen science projects, more specifically in those astronomy based; "I occasionally find myself going to TESS [Transiting Exoplanet Survey Satellite], something I never did before, (Teacher 3)". However, that was made without high levels of proactivity when looking for news: "I don't make it my banner to go to the newspaper…, but if it has [some about astronomy], I see, I read, and I'm interested, something that didn't happen before" (Teacher 6). Teachers said that they were more knowledgeable about science (although little familiar), which allows them to make greater use of that knowledge to evaluate claims made about science and to place it in their daily lives (mainly in terms of their teaching practice): "In terms of astronomy yes [changed], ... because it was very little what I knew [to be able to assess scientific knowledge] ..., but today I already operate in another way" (Teacher 8).

The elapsed period between EI and EII helped reinforce the conviction that it is possible to judge scientific knowledge applications, but not knowledge itself (B1 category). The reinforcement of the pre-existing belief regarding creativity in science (B2 category) was also found from EI to EII. However, for most of the interviewers, creativity in science exists only at the beginning of the scientific process: "In scientific theory, we can perceive the creative way in which the scientist got there, but the concept itself, the law and theory, for me, does not have creativity" (Teacher 2). There was no change in most participants regarding the understanding of how scientific knowledge is constructed (B3 category). The interviewers already considered at EI that scientific knowledge results from past knowledge, valid in the historical context in which was produced; it is provisional because even at the time of its acceptance, it can include errors. The concept of parsimony (B4 category) was unknown to teachers. At EII, the concept was already evident for teachers, but the tendency to associate it with scientific knowledge is not univocal. Even so, in the period between EI and EII, this issue was pondered by teachers.

It is possible to establish a direct relationship between participation in CoAstro and the reinforcing of the belief that repeatability and consistency of results are conditions for the validation of scientific knowledge (B5 category): "In different parts of the world… [the] scientists will have to reach equivalent results again" (Teacher 8). In the EII, there is an almost generalized idea that observations allow the laws, theories, and scientific concepts to be tested.

Most teachers, already in EI, had an interdisciplinary view of science (B6 category), although only between some specific sciences (such as Physics and Chemistry). That interdisciplinary understanding of science was unanimous, reinforced, and universalized at the time of the EIIs and already among all sciences (biology, chemistry, and physics): "Biology also has chemistry, and it also has physics… I think they are interconnected with each other" (Teacher 7).

5. FUTURE RESEARCH DIRECTIONS

Based on the work carried out, we aim, in the future, to learn about the attitudes and epistemological beliefs of the other participants in CoAstro: astronomers and science communicators. It would also be our intention to obtain data from students, their families, and other members of the school communities involved in CoAstro's astronomy outreach activities.

It would also be relevant: i) set variables to establish control groups that would allow us to understand the effective gains of CoAstro´s work model; ii) to compare the effects of CoAstro in different groups of teachers (primary, middle, and high school teachers) and between children of different grades; iii) migrate to a model of combining data collection and data analysis methods that allow a more holistic view of the object of study.

6. CONCLUSION/DISCUSSION

For the defined content analysis categories, the influence of CoAstro in B3 was not seen only in B3 (knowledge building process) and in B5 (parsimony in science). Although this last concept became known to teachers (after CoAstro), it was not uniquely associated with scientific processes. There is a reinforcement of beliefs in all other categories, an increase in science interest, and the understanding and use of scientific knowledge. The rise in proactivity was not significant, perhaps due to the subscription of new resources (such as newsletters) between EI and EII, or because teachers started to resort to means (such as content suggestions from online services and software companies) in which the news is presented, according to their research interests.

A comparison with Price and Lee's results (2013), although it may be done, requires some caution, because: i) the data were treated in a quantitative way; ii) SAI/SNSKS were provided when participants first registered via the web site of the project – interest in astronomy and science was, already, very high; iii) the nature of the Citizen Sky Project – a web-based project aiming the report, by volunteers, of visual brightness estimates for a multiple star system (ε Aurigae) – is very different from CoAstro´s nature.

Thus, as Price and Lee's results, we detected a significant change in the scientific attitude. Other citizen science projects have not reported any change in scientific attitude (Brossard et al., 2005; Jordan et al., 2011; Trumbull et al., 2000). Also, as Price and Lee, our results suggest that epistemological beliefs were reinforced, rather than restructured. This alignment with Price and Lee's results is essential because they were the firsts in the literature to show a change in epistemological beliefs through a citizen science project.

Therefore, our results reveal that a citizen science project, built on a model such as CoAstro's, supported by a collaborative view of citizen science and aligned with a PEST paradigm, can effectively contribute to the increase of interest, understanding, and use of scientific knowledge and the reinforcement of correct epistemological beliefs. For this purpose, the key elements appear to be teachers' involvement in astronomy research.

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Chapter #7

DESIGN BASED ON ICF
The training courses for in-service teachers

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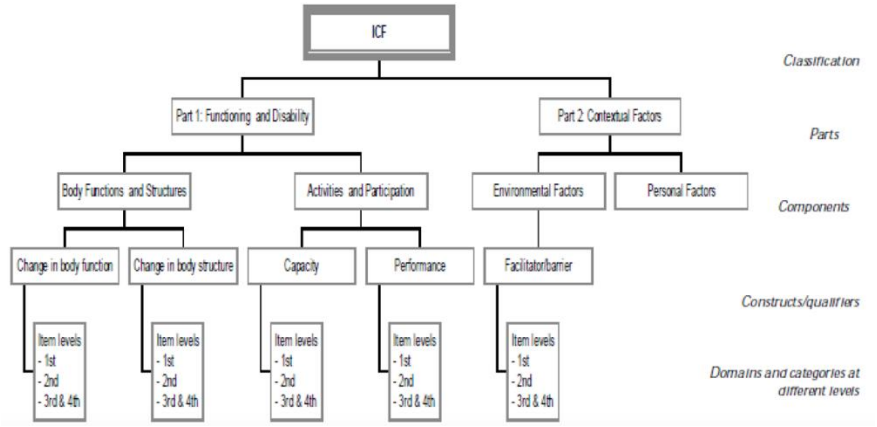
ABSTRACT
The International Classification of Functioning, Disability and Health (ICF) allowed to adopt that new of 'functioning', which refers to bodily structures and functions, activity and participation and interaction between these and personal and environmental factors.
The model is increasingly becoming the reference for the planning/organization of inclusive interventions, in Europe and in the Italian schools: it has been one of the main topics (l. 107/2015) in the last three-year Italian teacher training plan.
The work presents procedures the early results of three professional training courses evaluation (2017-2019). The courses involved 73 in-service teachers and aimed to enhance the design skills of Individualized Education Plan (IEP) on ICF model. According to the Kirkpatrick Model, the evaluation has been conducted on the teachers' 'learnings' and 'transfer' detected through pre-post test and a document analysis of the IEP.
The study highlighted few linguistic and semantic difficulties and a better teachers' sensitivity to the environmental component of the functioning. It offers some useful hints for the construction of a possible trans-national platform (as sharing of practices, data-base) about the training of school teachers on ICF bio-psychosocial model, as well as arguments regarding the tools for verifying the effectiveness of teachers training interventions.

Keywords: international classification of functioning disability and health, special education, individual educational plan, in-service teachers' training.

1. INTRODUCTION – ICF: SEMANTIC NOVELTIES AND TRAINING NEEDS FOR TEACHERS

The 'International Classification of Functioning, Disability and Health' (ICF) is a framework for describing the people health. Exceeding the traditional concept of 'disability' as 'deficit', the framework applies a bio-psychosocial model (WHO, 2001), also for children and youth (WHO, 2007). The used term 'functioning' refers to the *neutral* interaction between individual (with a given health condition) and contextual factors (environmental and personal). Thanks to a dynamic relation between four components - Body Functions (BF) and Structures (BS), Activities and Participation (A&P), Environmental and Personal factors (EF)[i] (v. Figure 1, UNESCO, 1994) the framework offers a 'new paradigm and taxonomy of human functioning and disability, which can be used to guide holistic and interdisciplinary approaches to assessment and intervention' (Simeonsson, 2009, p. 70). The ICF introduces a series of lexical and semantic novelties: 4 levels for qualifying each component; alphanumeric codes for summarizing dimensions, chapters, qualifiers[ii]; two important distinctions - between *performance* (in the current environment) and *capacity* (in a standard environment) into 'Activity and Participation' and between *barriers* and *facilitators* into 'Environmental factors' component (WHO, 2013; Chiappetta Cajola, Chiaro, & Rizzo, 2016).

Figure 1.
Structure of ICF (WHO, 2013, p. 18).



Given the complexity of the model and the need for disambiguate the terms, the WHO has elaborated numerous explanatory tools useful for creating a common knowledge base for professionals in the medical, psycho-social and educational area involved as trainers and users (Tokunaga, 2008) - checklist, short list, e-learning platform with tools and quizzes for verify (WHO, 2018). Despite the ICF bio-psychosocial model is increasingly becoming the reference for the planning/organization of inclusive interventions, its implementation differs in Europe (Sanches-Ferreira, Silveira-Maia, Alves, & Simeonsson, 2018; Moretti, Alves, and Maxwell, 2012). Regards educational settings, England and Switzerland are implementing procedures and materials also for decision-making (Hollenweger, 2014; Norwich, 2016), Portugal and Italy are struggling to spread it (Norwich, 2016, p. 10) – also due to the difficulty of connecting Functioning profile and individualized plans (Pasqualotto & Lascioli, 2020; Ianes, Cramerotti, & Scapin, 2019).

Researches show the ICF usefulness for in-depth description of individual (Riva & Antonietti, 2010) and student's needs, the development of individualized programs (Sanches-Ferreira, Simeonsson, Silveira-Maia, & Alves, 2015), the wide decision-making (Fulcher, Purcell, Baker, & Munro , 2015), a better comparison of specific cases (Gray, Msall, & Msal, 2008) but also the need to better train teachers on specific skills such as a. to read the objectives form a more global perspective and on multiple domains (Sanches-Ferreira, Lopes-dos-Santos, Alves, Santos, & Silveira-Maia , 2013); b. to assume environment as an indispensable aspect of intervention (Castro, Pinto, & Simeonsson , 2014). One of the early experiences of professional development in Italy, aimed at design the IEP though the services, parents and school collaboration (De Polo, Pradal, Bortolot, Buffoni, & Martinuzzi, 2009; Francescutti et al., 2009), found a satisfactory adhesion to the new ICF-based protocols but also difficulties in distinguish roles and responsibilities as well as in assume 'environment' as a category for procedures and materials. Some recent researches on the elaboration of IEP reported teachers' difficulties in using constructs as 'bodily impairments', *capacity* and *participation* and in full understanding distinction between *barriers* and *facilitators.* The Italian study by Raggi et al. (2013), in particular, made use of a questionnaire based on ICF-CY for teachers engaged in the elaboration of Individual Educational Plans; it highlighted the difficulty in using the capacity qualifier for the description of activities and participation items.

As noted by Norwich (2016, p. 10; Ibragimova, Granlund, & Bjorck-Akesson, 2009) ‘these results suggest (...) that there is a gap between the ICF theory and IEP development practice that raises questions about how the ICF policy innovation has been implemented and adopted’ (p. 8) and how teacher training should be enhanced.

2. DESIGN AND OBJECTIVES – TRAINING ON ICF KNOWLEDGE AND SKILLS

2.1. Context

In Italy ICF was introduced as descriptive model and inclusive procedure in 2012 (Minister Decree December 27th 2012; European Commission, 2013) and officially adopted for the development of IEPs in 2017 (D.Lgs. n. 66). After that, Ministry of Education started a sweeping three-year in-service training (l. 107/2015 – 2016-2019) for teachers and support teachers, which integrates contextual and systemic skills - as well as that of the design (Agrati, 2017) - within the whole competence framework.

Design competence could be considered a 'hybrid' (Davey, 2013) - ability to effectively connect learning objectives and outcomes and to adapt these to specific needs and context resources - and a 'peculiar' feature (Laurillard, 2012) of teaching as profession. Educational research aimed at the paradigm of complexity (Gero, & Kannengiesser, 2002) provides explanatory frameworks (‘Conversational Framework’, Laurillard, 2012) which offer solutions for teacher training: *situated* and *collaborative* context, through production, elaboration and transformation of mental (‘habits’) and material (‘tools’) models[iii].

Three training courses were held for in-service teachers - two 'training units' organized by an institutional Training Centers in the Bari district (years 2017/2018, 2018/19; a training course, organized by a professional association (ANGSA Puglia) in the Brindisi district (year 2019/20). They aimed at enhance the teachers’ design skill of IEP-ICF and profiles on specific contents and skills (Tab. 1) in four phases of development (Table 2):

Table 1.
Main contents and learning objectives of IEP-ICF training courses.

Contents:	**Learning objectives:**
Legislation on inclusion, up to the news of Legislative Decree n. 66/2017	Use technical language and procedures of ICF model
Language and articulation of the ICF bio-psychosocial model (WHO, 2007)	Read a Functional Profile and a IEP-ICF as documents for school inclusion
Procedures to elaborate Functional Profile and IEP-ICF	Develop a IEP-ICF in a group based on Functional Profiles and *case studies* provided

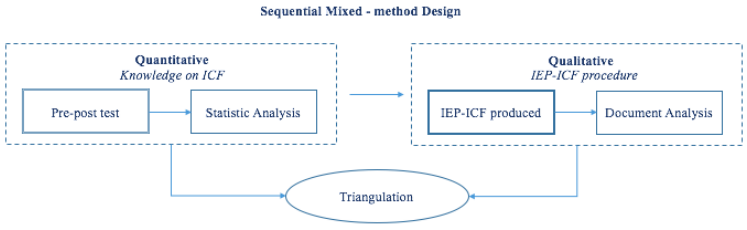
Table 2.
Phases of IEP-ICF training courses.

Learning objectives	**Training tool**	**Focus**
Phase I - *Information*		
Knowledge of the ICF model and language (alphanumeric codes, technical terms)	Official documents (WHO, 2007; 2018) Case-studies	4-domain model: body functions / structures; activity and participation; environmental factors; personal factors
Phase II - *Deconstruction*		
Analysis of traditional IEP models/document 'by axes' (ICD-10)	Traditional IEP document Functional diagnosis and dynamic profile	Difference between IEP by 'axes' and by 'function'
Phase III - *Reconstruction*		
In a group elaboration of IEP-ICF, based on *case studies* and document example	Document example of IEP-ICF, Functional Profile, Class programs	Integration between Functional profile, Individual project, IEP-ICF, Class programs
Phase IV - *Construction*		
Individual elaboration of IEP-ICF, based on personal experience and teaching practice		Document's adaptation to specific cases

2.2. Design and objectives

A more extensive exploratory survey was carried out, based on a sequential mixed-method design (Creswell, & Plano Clark, 2007; Cameron, 2009) (Figure 2), embedded the training course. This paper presents the outcome of the qualitative analysis regarding the knowledge on the ICF.

Figure 2.
Sequential mixed-method design.



The study aimed to infer the effectiveness of the training intervention carried out on *learnings*, which according to the model of Kirkpatrick (1994, 1996) correspond to the increase in knowledge, skills, attitudes in participants. Specifically, the objective of survey was to find out on which ICF topics there was greater / lesser effectiveness of intervention. This work focuses attention on the relationship between *performance*, environmental factors and *capacity*.

3. METHODS – *LEARNINGS* THOUGH PRE-POST TEST

According to the Kirkpatrick Model, the results of training intervention has been focused on the teachers':

- *learnings* - increase in knowledge, skills, attitudes in participants - detected through an *ad-hoc* pre-post test on content and knowledge;

- *transfer* - if participants utilize learnings at work, every-day live etc.[iv] – document-comparative analysis (Bowen, 2009) of the IEP-ICF produced during training and adopted at school.

For learnings, it has resorted to an 'ad hoc' questionnaire, articulated in n. 10 questions - four closed ended item; it is the adaptation of a validated tool (Francescutti et al., 2009) which detects knowledge on the general function of the ICF (Q.1, Q.2), on qualifiers in alphanumeric codes (Q.3, Q.9, Q.10), on performance and capacity in 'Activities and participation' (Q.5, Q.6, Q.8), on 'Environmental factors' (Q.4, Q.7). The questionnaire was administered on the occasion of three training courses on the same topic, at the end of Information (*pre*) and Reconstruction (*post*) phases (see Table 2). The participating teachers, not statistically representative (n. 73), worked mainly in primary school, had an average of 4.7 years of service, was mainly made up of support teachers (n. 60 – 82,2%) - see Table 3.

Table 3.
Characteristics of participants.

Course	**ICF1**	**ICF2**	**ICF3**	**Tot.**
n. participant	17	14	42	73
*School grade**	I/P	I/P	I/P/M	P
Seniority average	3	3,5	7,5	4,7
n. support teachers	13	10	37	60
(%)	(76,50%)	(71,4%)	(88,1%)	(82,2%)

*I = Infant school; P = Primary school; M = Middle school

3.1. Analysis - quantitative and semantic analysis of questions

The quantitative-semantic procedure conducted for the analysis of the answers to questions n. 5 and n. 6 is presented below.

Q.5. Text – '*If a pupil has slight difficulties in reading and is supported by the teacher who merely provides simple help in keeping the attention alive, the qualifiers to be used should be*':

Q.6. Text - *It is known that a child has severe difficulty walking, but he uses a walker'.*

The interest in these questions lies in their typology (multiple-choice questions, MCQ) and in the formulation of the alternative answers: four non-defining alternatives for Q.5 and three non-excluding alternatives for Q.6. Question nn. 5 and 6 are both focused on relation between *performance*, environmental factors (as *facilitator*) and *capacity*.

For the quantitative analysis of both questions, we proceeded by obtaining the absolute pre-post data of the types of response and inferring their redistribution - see Figures 3 and 4.

Two methods were followed for the semantic analysis: analysis of the terms for Q. 5 and analysis of the structure for Q. 6.

Q. 5 describes a hypothetical situation and focuses interest on the linguistic aspect of the qualifier. The alternatives for answering question Q.5 allow to identify at least three possible misunderstandings by the teachers involved in the training: related to the *meaning* of the terms (exchanging performance with skills), regarding the *levels* of severity ('slight difficulties' not identifiable with 0 *capacity*), referring to the general *logic* (criterion that links *capacity* / facilitators / *performance*) – see Table 4.

Table 4.
Alternative answers and types of misunderstandings – Q. 5.

Answer	*Texts of alternative answers*	*Types of misunderstandings*
1	'1 in *performance* and 2 in *capacity*; support is to be scored as a mild facilitator (+1)'	*R = right answer*
2	'1 in *capacity* and 2 in *performance*; support is to be scored as a mild facilitator (+1)'	*Meanings* – inversion of meaning between 'performance' and 'capacity' *WM = wrong answer for meanings*
3	'0 in *capacity* and 1 in *performance*; support is to be scored as a mild facilitator (+1)'	*Levels* – failure in recognizing qualifier levels *WQ = wrong answer for qualifiers*
4	'no support can be scored'	*Logic* – failure in recognizing link between 'performance' / facilitators / 'capacity' *WL = wrong answer for general logic*

Question n. 6 is also on relation between *performance*, environmental factors (as *facilitator*) and *capacity* but focuses attention on the deductive reasoning that leads a teacher to express a conclusion starting from known facts. Q. 6 presents for this a structured syllogistic with three propositions: major premise, minor premise and conclusion (if A, B, then C) – Table 5. This question is not directly focused on the topic and must be completed with an answer.

Table 5.
Logical structure of Q. 6.

Syllogistic arguments forms	*Text of Q. 6*	*Logical value*
major premise	'child has severe difficulty walking'	known fact
minor premise	'(*same child*) uses a walker'	known fact
conclusion	answer to choose	logical consequence to be inferred

Table 6 illustrates the three alternative answers to Q 6 with the respective types of misunderstandings.

Table 6.
Alternative answers and types of misunderstandings – Q6.

Answer	*Texts of alternative answers*	*Types of misunderstandings*
1	'It is possible to obtain the information that is missing (*capacity*) by evaluating how the environmental factor is useful for the child and observing how difficulty he has in carrying out the activity in his daily life at school (*performance*)'	*R = right answer*
2	'It is not possible to give any indication of the *capacity*, but only of the *performance*'	*Meanings* – inversion of meaning between 'performance' and 'capacity' *WM = wrong answer for meanings*
3	'It is only possible to indicate the presence of the environmental factor'	*Logic* – failure in recognizing link between 'performance' / facilitators / 'capacity' *WL = wrong answer for general logic*

Alternative n. 1, corresponding to the correct answer - tab. 6 - deserves a specific focus. It illustrates, indeed, the correct reasoning procedure that should be done since, on the one hand, it expresses aspects not directly evident to an in-training teacher ('information that is missing' is in fact the *capacity*), on the other, it describes how to operationally relate information relating to *capacity*, environmental factor and *performance* - note the reference to the observation of an action within a specific context (i.e., school).

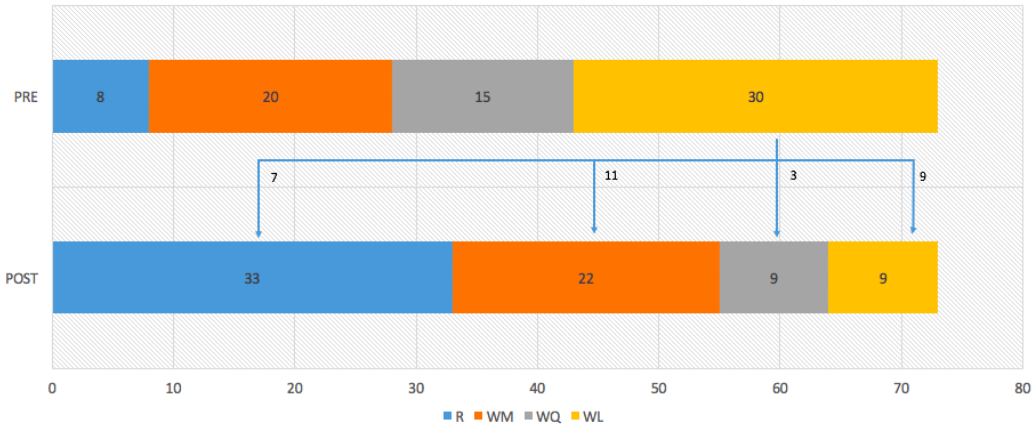
4. RESULTS - INCREASED AND CLEARER KNOWLEDGE

As for the answers to Q. 5, Table 7 shows the absolute references; Figure 3 specifically describes the redistribution of wrong answers at a logical level (WL).

Table 7.
Distribution of answers Q. 5, absolute references.

	R = right answer	*WM = wrong answer 'meanings'*	*WQ = wrong answer 'qualifiers'*	*WL = wrong answer 'logic'*
PRE	8	20	15	30
POST	33	22	9	9
POST-PRE	+25	+2	-6	-21

Figure 3.
Redistribution of WL answers Q. 5, pre-post.



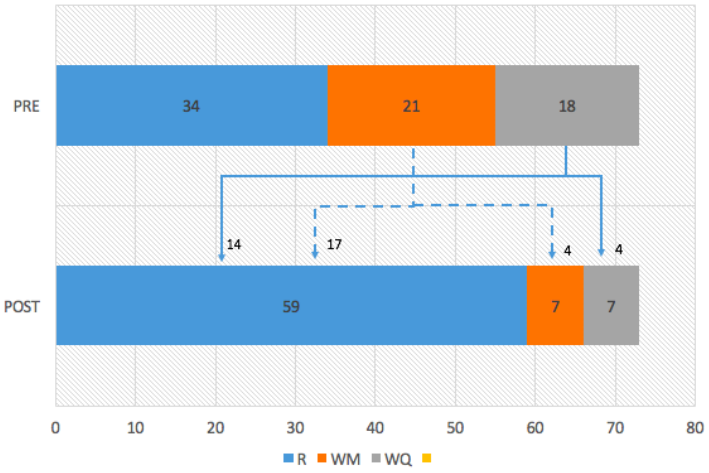
It is found that training had a general positive impact on *learning* (Kirkpatrick, 1996), understood as increased knowledge. It is possible to discover, however, specific difficulties in refers the qualifiers to use – see Q. 5. The pre-post comparison shows that right answers increase (R*post* - R*pre* = + 25), wrong answers on the *meaning* level increase, even if slightly (WM*post* - WM*pre* = +2), wrong answers on *qualifiers* level decrease (WQ*post* - WQ*pre* = -6), wrong answers about *logic* decreases (WLpost - WL*pre* = -21). With regard to this last aspect, it is noted that after the intervention 7 wrong-logical answers became correct, 11 wrong-meanings, 3 wrong-qualifiers, 9 remained so (Figure 3).

As for the answers to Q. 6, Table 8 shows the absolute references, while Figure 4 specifically describes the redistribution of wrong answers at logical and meaning level (WL, ML).

Table 8.
Distribution of answers Q. 6, absolute references.

	R = right answer	*WM = wrong answer 'meanings'*	*WL = wrong answer 'logic'*
PRE	34	21	18
POST	59	7	7
POST-PRE	+25	-14	-11

Figure 4.
Redistribution of WM and WL answers Q. 6, pre-post.



Also for Q. 6, it is possible to discover specific difficulties and misunderstandings. Although the impact was generally positive, given the increase in the number of correct answers (R*post* - R*pre* = + 25), the pre-post comparison (Fig. 4) notes that the right answers increase (R*post* - R*pre* = + 25), wrong answers on the *meaning* level decrease (WM*post* - WM*pre* = -14), wrong answers about *logic* also decreases (WL*post* - WL*pre* = -11). As regards the redistributions of the two types of wrong answers: after the intervention, only 4 wrong-meaning and 4 wrong-logical answers remained (Figure 4).

The results of the answers to question 5 were related to the characteristics of seniority, the most divergent within the target group.

Table 9.
Increase of right answers Q.5, absolute and % references.

Seniority years	**N.**	**R (post-pre)**	**% R (post-pre)**
1-3	23	+9	+39,1
4-7	27	+10	+37,0
8+	23	+6	+26,1

Table 9 shows that the greatest increase in right answers, as pre-post difference, concerns the class with the fewest years of service, while the smallest increase concerns the class with the most years of service.

5. DISCUSSION - EFFECTIVE INTERVENTION AND INFLUENTIAL QUESTIONING

From a descriptive point of view, the participants understand the difference between *barrier* and *facilitator*, starting from the case provided, however at the operational level they expressed two types of difficulties: a. *logical-semantic* - the difference between *capacity*

('standard' environment) and *performance* ('current' environment) and the function performed by environmental factors within this relationship are difficult to grasp; b. *graphic-linguistic* - in coding the environmental factors, participants easily distinguish facilitators (with graphic notation '+') not barriers (graphic notation '.'), confused with the *performance* and *capacity* qualifiers.

It is appropriate to highlight also the aspect related the structure of the course. In phase I 'Information' (Tab. 2), environmental factors were presented as 'attitudes or physical-social environment in which people live and lead their existence' (WHO, 2007) that influence the functioning and disabilities from the outside and in the form of facilitating (+) or impeding (-) impact on *performance* and *capacity*. Given that clarity, compared to Q.5 and Q.6, a high number of correct answers in the pre-test would have been expected in both, at the end of phase I; instead this only happened for Q. 6 (R*pre* = 34) not for Q. 5 (R*pre* = 8). In addition, for both the increase (R = +25) occurred in the post-test, at the end of phase III.

It would be worth asking what caused this difference already in the pre-test. In refers to the questionnaire used as tool, data highlight a peculiar aspect. The clear difference between Q. 5 and Q. 6 was found in the number of correct answers within the same first administration (Q. 6. R*pre* = 34; Q. 5, R*pre* = 8). It has been clarified that both Q. 5 and Q. 6 focused on relation between *performance*, environmental factors (as facilitator) and *capacity* but that they differed in structure (Q. 5 describes a 'case'; Q. 6 is a syllogism) and formulation of the alternative answers (4 non-defining alternatives for Q. 5, 3 non-excluding alternatives for Q. 6).

As suggested by research (Haladyna & Downing, 1989; Marsh & Canton, 2014), in a well-designed MCQ a. stems needs to express full problem, to contain all the information and to avoid too specialized language, b. alternatives contain distractors appealing and plausible and needs to be logically and grammatically consistent with the stem. According to the criteria, the formulation of Q. 5 would be formally appropriate as the case is described within the stem, while Q. 6 would be adequate since the alternatives logically correspond to the stem. It would then be appropriate to ask whether the form in which the question is formulated – the short description of a 'case' (Q. 5), the formalization of a thought procedure (Q. 6) - affects the ability of teachers to retrieve information in memory concerning the same theme and the possibility of managing and overcoming possible misunderstandings on their own.

6. FUTURE PERSPECTIVES – COMMON DIFFICULTIES AND SOLUTIONS

The sharing of a common language between professionals from different areas is key aspect related to the application of the ICF model (WHO, 2007), both in the health and pedagogical-didactic fields; which however also represents a limitation in the absence of adequate training (Norwich, 2016; Moretti et al., 2012). However, in addition to special teachers, every school operator should also be trained in the bio-psychosocial model that underlies the ICF, since this would favor the analysis of context needs and decision making, more generally (Norwich, 2016). Implementation of ICF model, especially in the related ability to grasp the environmental factors affecting on learning processes of students with and without special needs - such as *barriers* and/or *facilitators* -, would indeed act as a lever for the development of inclusive schools, globally (Castro et al., 2014; Meucci et al., 2014).

The study found that the training intervention had an effect: it increased the knowledge of the participating teachers also it helped to resolve some misconceptions that teachers had, especially regarding the meaning and graphic notation of some main concepts of ICF - such as *barriers* and *facilitators*. On this aspect, therefore, it confirms previous researches according to which teachers should be supported in better distinguishing *barriers*/*facilitators* (Meucci et al., 2014; Raggi et al., 2013) in order to elaborate IEP.

It leads us to reflect on the effectiveness of the mediators used in teacher training.

In general, the well-known graphic model used in phase I (Table 2) - presenting 'Activity and Participation' and 'Environmental factors' (Figure 1) -, is functional for understanding meanings (declarative knowledge) but not relationships (procedural knowledge). The exemplary IEP-ICF used in phase III Reconstruction (Table 2) - which directly describe this relationship seem more useful for the *learnings* of teachers, in terms of knowledge and skills. Specifically, the way in which the questions are formulated within the pre-post questionnaire seem to have an effect on the teacher's ability to retrieve personal information on the topic - the relationship of significance *performance*-environmental factors-*capacity* - and, for this, on the verification of the effectiveness of a training intervention. If the hypothesis were verified, this would be an interesting topic to discuss at a scientific level about the tools for verifying the effectiveness of training interventions with adults and with trainees in particular. There would be the conditions to work on a questionnaire to be used as a refined and effective tools for gathering knowledge and investigation.

The study has also as a limit the small number of participants, although the group involved has homogeneous characteristics, with the exception of length of service which, as has been pointed out, seems to be an influencing factor on the increase in knowledge, based on the data available.

The conclusion of this study supports Norwich (2016, p. 10) which, referring to the gap between ICF theory and IEP development practice, suggests working on the innovation of an ICF policy that would also improve teacher education, even through the development of a transnational platform. This platform would encourage sharing practices, difficulties and solution hypotheses and develop a common knowledge on teacher training on the bio-psychosocial ICF model.

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[i] *Participation* as involvement in a life situation and *environmental factors* as 'attitudes or physical-social environment in which people live and lead their existence'.

[ii] 'The letters b, s, d, and e represent the different components and are followed by a numeric code that starts with the chapter number (one digit), followed by the second level (two digits), as well as third and fourth levels (one extra digit each). For example, the following codes indicate a 'mild' problem in each case' - b2.1 Sensory functions and pain; b210.1 Seeing functions; b2102.1 Quality of vision; b21022.1 Contrast sensitivity – WHO, 2013, p. 17.

[iii] The 'designer' socially builds a design model, negotiating his/her own individual knowledge (past experiences, even implicit mental habits - Polanyi, 1967; Perla, 2010) with shared culture (experiences of colleagues and families, school organization procedures etc.) and sharing a controlled vocabulary/glossary, a specific taxonomy/thesaurus (Rossi & Toppano, 2009).

[iv] Other levels are: 1. *Reaction* - how participants react to the training (e.g., satisfaction, feelings); 4. *Results* if there is a positive impact on the participants' organization (Kirkpatrick, 1996).

Chapter #8

EVALUATION OF A FACTOR THAT INFLUENCES SCHOOL FAILURE IN A GROUP OF ADOLESCENTS IN IASI COUNTY - FATIGUE

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ABSTRACT
School activity is characterized by high physical and mental demands. Any failure to adapt these requests to the possibilities of the age group can be associated with school failure. The study was carried out on a group of 208 students from the 9th grade from three high schools in Iasi county. A questionnaire regarding school activity and the causes of the phenomenon of school fatigue was applied. The results were processed using Pearson's chi-squared test. The students are constantly preparing only for certain subjects (72.59%). In most cases (65.86%) adolescents admit that they have been taught how to study only in certain subjects. Fatigue is often present in 58.65% of students. The students attribute the occurrence of this phenomenon to the numerous subjects they have to study (55.76), the large volume of homework (51.92%), insufficient sleep (48.55%), teachers being too strict (25%), or the breaks being too short (25%). Special attention must be paid to nighttime sleep which is insufficient in 66,82% of cases. Many factors that generate school fatigue must be known and carefully assessed in order to reduce the frequency of this phenomenon.

Keywords: school failure, fatigue, demanding activity.

1. INTRODUCTION

In Romania, in the past few years, we have witnessed a drastic decrease in the number of young people graduating high school and passing the baccalaureate exam. It is a school failure situation that is becoming worrying. The indicators used to assess this phenomenon are represented by the early abandonment of studies, the gap between the student's potential and their results, abandoning school without a qualification, and failing the final exams. The appearance of the phenomenon of school failure is favored by several factors related to the student, school, family, or educational environment (Cosmovici & Iacob, 2008).

Of the factors that regard the student, health must be given special attention. We must be aware of certain organic diseases, physical or sensory deficiencies, and some individual psychological factors. In adolescents, the aspects related to nutrition and physical exercise become essential due to the current beauty ideal represented by the thin young woman and the muscular young man (Nagata, Ferguson, & Ross, 2016; Salam, Das, Lassi, & Bhutta, 2016). Particular attention should be paid to overweight students who will be the target of their colleagues' jokes. This will make them focus too much on their own body and isolate themselves (Abălașei & Trofin, 2016).

The second factor which should be closely analyzed is the school environment. The school environment must ensure lasting social development, to practically guarantee the progress of society. In this sense, it is necessary to find the answers to the following

questions: what are the characteristics that need to be structured to ensure the adaptation of young people to the new requirements; what kind of education do students need to contribute to the progress of society in the future; which are the skills, information, and attitudes that are needed to ensure a better future (Xie, 2018).

The school has many roles; it also decisively contributes to promoting healthy eating, physical exercise, ensuring the physical and mental health of students, developing social relationships, and avoiding the tendency of isolation (Sabinsky et al., 2018).

Particular attention should be paid to the school syllabus and the teaching method of the teachers. The teaching method must be oriented towards the student, in the direction of obtaining the expected results – understanding the presented topics and integrating the particular information within the student's general knowledge.

Teachers must focus on the issues related to the best teaching methods, methodologies, and techniques. They must ask themselves the question (and find the answer) "How to teach?" and not the one related to the curriculum, "What to teach?" (Sousa, 2019).

The family plays an important role in the life and evolution of young people. At present, it is also necessary to assess the relationship that exists between family and school. The traditional school is an institution with certain rules and characteristics; it is an isolated and rigid structure. In the traditional model, the teachers carry out their activity in isolation, in their own style. Lately, we are witnessing some changes related to the structure of a close relationship with the family, the interaction between school and family. In many schools parents are invited to be part of the school program, to have a feeling of belonging (Palmieri & Palma, 2017).

Special attention must be paid when considering poor families, the disadvantaged social environment because these students can easily give up on education. When looking at the educational environment, major attention must be paid to the social context in which education takes place (Cosmovici & Iacob, 2008).

1.1. Purpose of the study

Knowing the factors that generate fatigue; it is important to assess these because they can easily lead to failure and dropping out of school.

2. OBJECTIVES OF THE STUDY

Assessing the students' learning methods and how teachers are involved in guiding students in this regard; assessment of the phenomenon of school fatigue and of the clinical signs that appear in this case; students' own evaluation in connection with the causes of school fatigue; objective identification of causes such as insufficient sleep recognized by students.

3. METHOD

The studied group consists of 208 students from the 9th grade from a National College in Iasi (54 teenagers), a National College in Pascani (80 young people), and from an Economic High School (74 students) in Iasi. Pascani is a small town located 60 km from Iasi. The city of Iasi has a large number of inhabitants, while also being the county capital. The National College in Iasi is an elite high school for Iasi County and even for the entire country.

The students completed a questionnaire with questions regarding the school activity and the causes of the phenomenon of school fatigue.

School activity was assessed with the help of three questions.

-"Do you study continuously, without losing a lesson?" – yes, in all subjects; only in certain subjects; I am not constantly preparing in any subject.

-"Did the teachers explain how to learn and solve the problems in the studied discipline?" – yes, in all subjects; only in certain subjects; no, in none of the studied subjects.

-"Do you study for pleasure?" – yes, in all subjects; only in certain subjects; no, in none of the studied subjects.

Fatigue was assessed with the help of three questions.

-"Do you feel tired?" – often; rarely; never.

-"When I am tired:" I have a headache, my eyes hurt, I have insomnia, I feel anxious, it's difficult to fall asleep.

-"What causes your fatigue?" (choose the answers that you think are most important) - subjects are too difficult; the classes are too numerous (every day or during the week); the large volume of homework; teachers are too demanding; I don't get enough sleep; breaks are too short; I have to walk a long distance from home to school; parents pay too much attention to my school activity.

Also related to school fatigue, we will insist upon such factors as sleeping during the night and during the day, breaks, the distance between home and school, and the parents' level of interest for preparing homework, these being aspects that were recorded by students as generating problems.

Sleep (passive rest) can take place during the night and during the day:

-"How many hours do you sleep per night, on average?" under 8 hours; 8-9 hours; over 9 hours.

-"Do you sleep in the afternoon?"– every day; often; rarely; never.

The problem of short breaks appears because teachers do not respect the schedule.

-"Do teachers respect the break schedule"? always; often; rarely; never.

The distance between home and school can be a source of fatigue (Official standards mention that the trip should take a maximum of 30 minutes using transportation):

-"How long does it take you to get to school (in minutes)?" fewer than 15 minutes; 15-30 minutes; 30-45 minutes; 45-60 minutes; over 60 minutes"

Family can be a fatigue generating factor if they are too strict:

-"Do parents have time to help you with your homework?: always; often; rarely; never.

The results were processed using the Pearson CHI square test.

4. RESULTS

We will address two basic aspects related to school activity and the presence of fatigue.

Sustained school activity strains the student from a neuropsychological and physical point of view. Obtaining meritorious school results can be achieved only under the conditions of systematic study in all subjects. Unfortunately, such a situation is present in only 16.82% of young people. In most cases, students pay attention only in certain subjects (72.59%) (Table 1).

Table 1.
The learning method of students.
("Do you study continuously, without losing a lesson?").

School	Pascani College	Iasi College	Iasi High School	Total
yes, in all subjects	14	7	14	35 (16.82%)
only in certain subjects	61	34	56	151 (72.59%)
I am not constantly preparing for any subject	5	13	4	22 (10.57%)

Our attention is drawn to the 10.57% of students who are not constantly preparing for any subject. Such answers are more frequent at the Iasi College, so the calculated differences are statistically significant ($p<0.01$ $f=4$, $\chi^2=14.254$). It is a surprising result given that the college in Iasi is an elite school.

Students receive explanations on learning methods only in certain studied disciplines (65.86%), so only from certain teachers (Table 2).

Table 2.
Frequency of explanations received by students on learning methods.
("Did the teachers explain how to learn and solve the problems in the studied discipline?").

School	Pascani College	Iasi College	Iasi High School	Total
yes, in all subjects	29	4	27	60 (28.84%)
only in certain subjects	50	45	42	137 (65.86%)
no, in none of the studied subjects	1	5	5	11 (5.28%)

We can observe that 28.84% of teenagers chose the “yes, in all subjects” answer. Such answers are less frequent in those from the college in Iasi, so the calculated differences are statistically significant ($p<0.001$ $f=4$, $\chi^2=19,465$).

Most of the students study for pleasure only on certain subjects (86.53%), with only 3.84% studying seriously in all subjects (Table 3).

Table 3.
The number of students who study for pleasure.
("Do you study for pleasure?")

School	Pascani College	Iasi College	Iasi High School	Total
yes, in all subjects	2	0	6	8 (3.84%)
only in certain subjects	75	45	60	180 (86.53%)
no, in none of the studied subjects	3	9	8	20 (9.61%)

Some young people do not study for pleasure in any discipline, which is an alarming situation. Such a response occurs more frequently in students from the Iasi college, the differences calculated being significant ($p<0.05$ $f=4$, $\chi^2=11.072$).

Intense school demands lead to certain responses from the body and fatigue, and this is “often” felt by 58.65% of young people (Table 4).

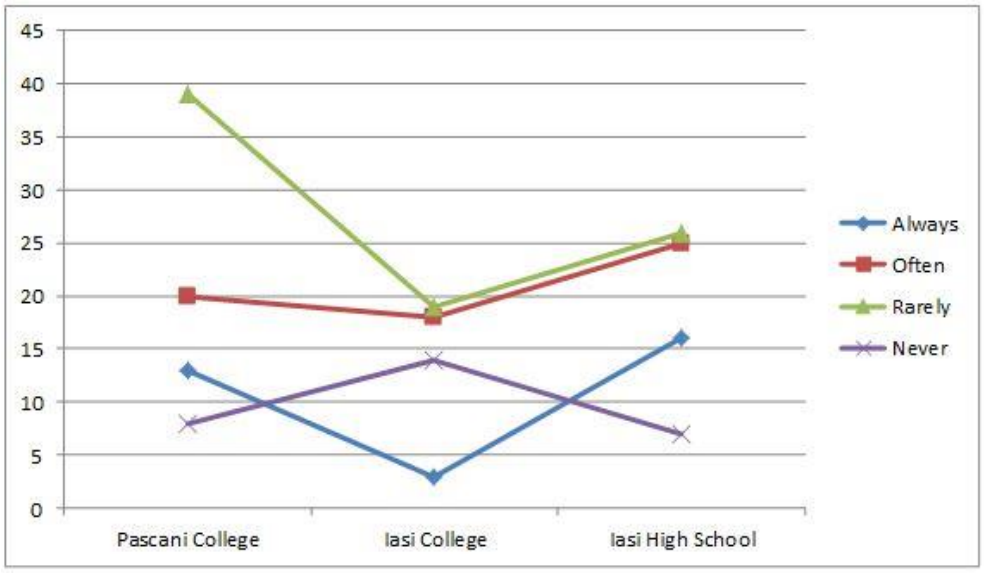
Table 4.
Frequency of fatigue.
("Do you feel tired”).

School	Often	Rarely	Never
Pascani College	43	36	1
Iasi College	42	11	1
Iasi High School	37	35	2
Total	122	82	4
%	58.65%	39.42	1.92

For students from the college in Iasi, the dominant answers are "often", so the calculated differences are statistically significant ($p<0.05$ $f=4$, $\chi^2=11,807$). It is easy to understand this result considering the high level of school performance of the students from this high school.

High school requirements are linked to clinical signs that students associate with the appearance of fatigue. We can observe the presence of headaches (36.05%) and ocular reactions (22.59%) that are not specific to a young person who does not have health problems. We also witness the presence of anxiety (17.30%), insomnia (12.01%), and difficulty falling asleep (10.09%). These are phenomena that let us know that the students' capacity for physical and intellectual effort has been exceeded.

Figure 1.
Clinical signs associated with fatigue.



The calculated differences are statistically insignificant ($p>0.05$, $f=10$, $\chi^2=3.971$), a result that is easy to understand considering the similar set of school rigors among the three schools. Obviously, the physiological reactions that appear in the context of fatigue are also similar.

Students attribute fatigue to a large number of hours in the school program (55.76% - with insignificant differences among schools $p>0.05$, $f=2$, $\chi^2=1.330$), to the high volume of homework (51.92% - significant differences $p<0.05$, $f=2$, $\chi^2=6,900$) and the reduced number of hours of sleep per night (48.55% - insignificant differences $p>0.05$, $f=2$, $\chi^2=3.353$) (Table 5).

There are other causes of fatigue, but they are reported by a lower percentage of students, such as: subjects are too difficult (29.80% - insignificant differences $p>0.05$, $f=2$, $\chi^2=0.375$), teachers are too demanding (25.00% - insignificant differences $p>0.05$, $f=2$, $\chi^2=2.715$), breaks are too short (21.15% - insignificant differences $p>0.05$, $f=2$, $\chi^2=3.405$), I have to walk a long distance from home to school (10.09% - significant differences $p<0.01$, $f=2$, $\chi^2=9.840$), parents pay too much attention to my school activity (5.28% - insignificant differences $p>0.05$, $f=2$, $\chi^2=1.591$).

Table 5.
Causes attributed by students to the occurrence of fatigue.
("What causes your fatigue?").

School	Pascani College	Iasi College	Iasi High School	Total
subjects are too difficult	23	15	24	62 (29.80%)
the classes are too numerous	48	27	41	116 (55.76%)
the large volume of homework	34	27	47	108 (51.92%)
teachers are too demanding	18	18	16	52 (25.00%)
I don't get enough sleep	36	32	33	101 (48.55%)
breaks are too short	21	7	16	44 (21.15%)
I have to walk a long distance from home to school	4	3	14	21 (10.09%)
parents pay too much attention to my school activity	5	4	2	11 (5.28%)

Insufficient sleep is one of the factors that cause fatigue. In students, the normal number of hours of sleep per night is 8-9 hours, an answer which is present only in 29.80% of situations. In most cases (66.82%) students sleep fewer than 8 hours per night, which is not physiological and explains the onset of fatigue (Table 6).

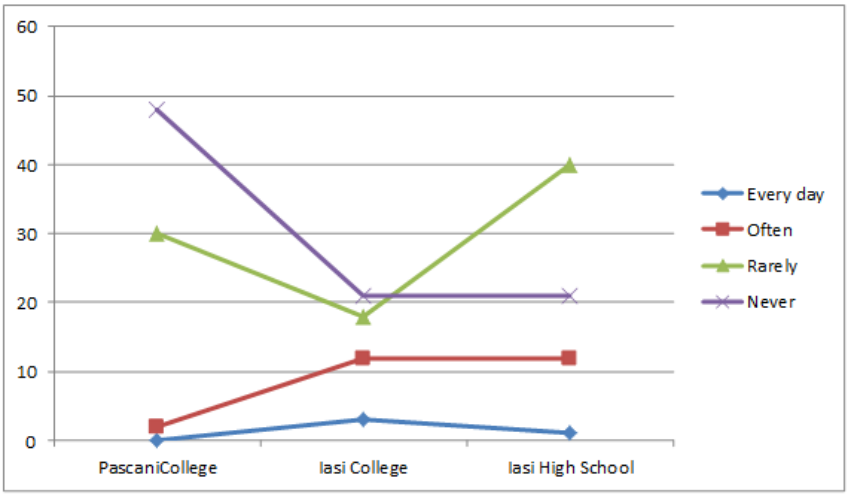
Table 6.
Hours of nighttime sleep.
("How many hours do you sleep per night, on average?").

School	Pascani College	Iasi College	Iasi High School	Total
Under 8 hours	44	37	58	139 (66.82%)
8-9 hours	32	17	13	62 (29.80%)
Over 9 hours	4	0	3	7 (3.36%)

Most students from the Iasi College sleep fewer than 8 hours per night, the differences calculated being statistically significant ($p<0.01$ $f=4$, $\chi^2=12.334$).

The reduced time allocated to nighttime sleep can be compensated by daytime sleep. Unfortunately, most students are too preoccupied with school or leisure activities to "waste time" sleeping. In most cases, students never sleep during the day (43.26%) or rarely sleep during the day (42.30%).

Figure 2.
Daily daytime sleep.

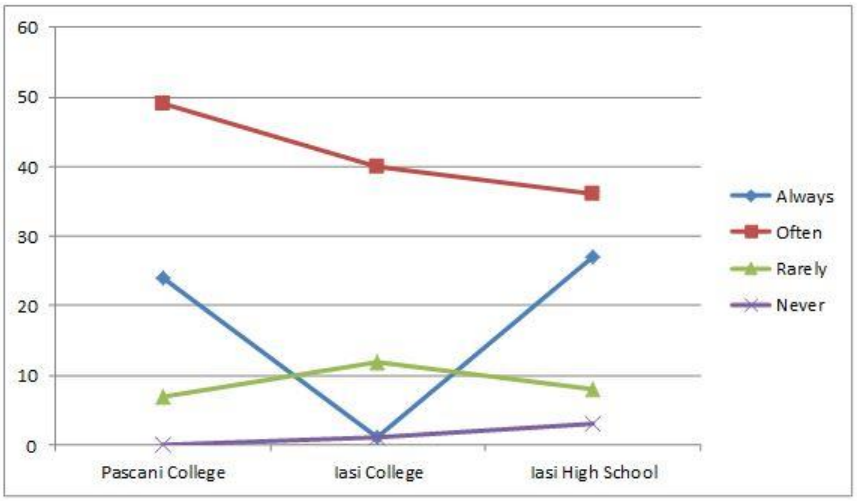


The calculated differences are statistically significant ($p<0.001$, $f = 6$, $\chi^2 = 29.888$) a fact which is surprising and highlights the situation at the college in Pascani where we notice a lack of the "every day" and "often" answers.

We will also insist upon some aspects less often highlighted by the students, but which can be objectified with the help of the answer to other questions. These are the breaks which may be too short, the long trips to school, and the exaggerated interest of parents in school activities.

The breaks between classes are “often” observed by most teachers (60.09%) or even “always” (25.00%) so there are no reasons to worry from this point of view.

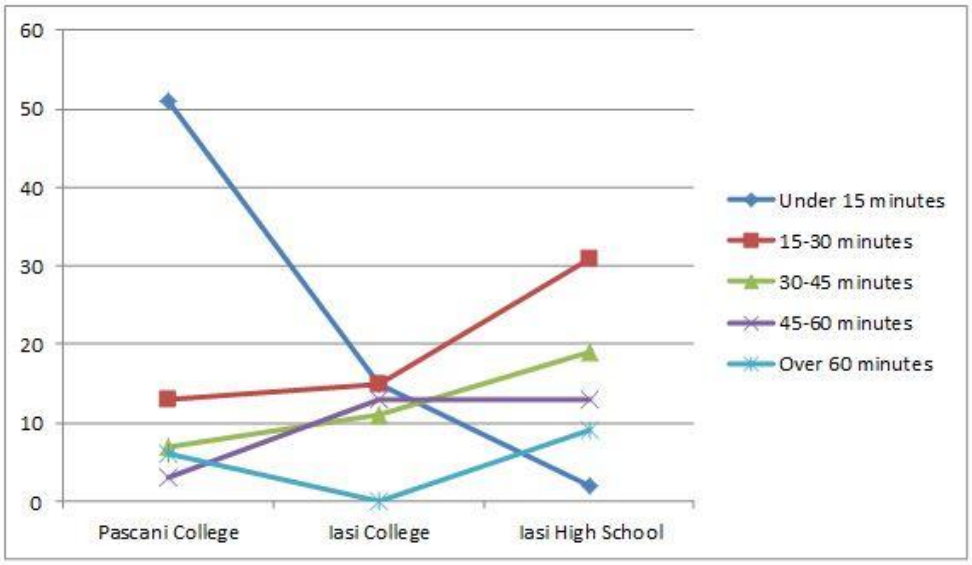
Figure 3.
Teachers respecting break time.



Unfortunately, there are significant differences ($p<0.001$, $f=6$, $\chi^2=27.962$) which highlight the situation at the high school in Iasi where there are few "always" answers.

Another factor that generates fatigue is the long distance between home and school. According to the norms, this time must not exceed 30 minutes while using transportation. In the studied group, the results are adequate only in 61.05% of situations where the trip takes fewer than 15 minutes (32.69%) or between 15 and 30 minutes (28.36%). Unfortunately, some students need 30-45 minutes to travel to school (17.78%) and even over 60 minutes (7.21%). It is an aspect that must be known and taken into account when studying the causes of fatigue and even school failure.

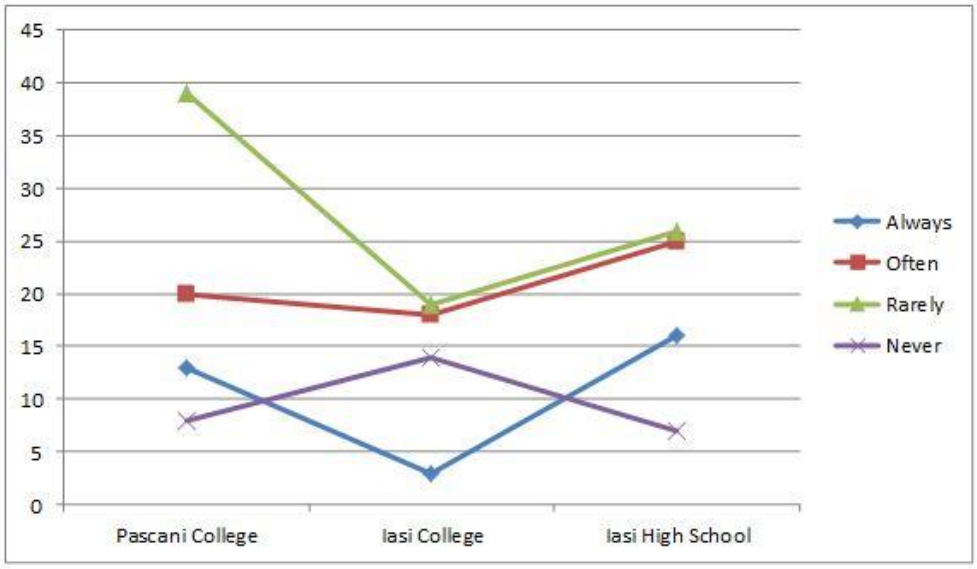
Figure 4.
The time needed to travel to school.



We notice significant differences ($p<0.0000$, $f=8$, $\chi^2=72.883$) which draw our attention towards the high school in Iasi, where the students live in different areas of the city or even in the suburbs. Therefore, it takes quite a long time to get to school.

A final aspect is represented by the parents' level of involvement in the school activity of their children, especially homework. Parents are "rarely" (40.38%) or "often" (30.28%) involved with how their child prepares their homework. There are only 15.38% of parents who are "always" involved. This is a situation where the parent might be too exacting, thus becoming a source of stress.

Figure 5.
Parents' involvement in school activity.



We can see significant differences ($p<0.05$, $f=6$, $\chi^2=16.324$) which highlights the situation for the students in the Iasi College where parents' involvement with school activity is modest even though their children go to a renowned school where the level of competitiveness is very high.

5. DISCUSSION

Concerning school activity, the work style of each student is very important. In the studied group, many students systematically study only certain subjects (72.59%) and who enjoy studying certain subjects. There are numerous differences between students in a class that have to do with the characteristics of physical development, intelligence, interest, perception, abilities, learning style, and personality. Starting from these aspects it would be necessary to adapt the lesson plan to the students' learning style and speed, and not focus on collective education. Each teacher should adapt their teaching methods to the characteristics of the students, which would allow them to make full use of their skills and knowledge. (Kubat, 2018). If these aspects are not taken into account, we may reach a situation similar to that of the students in the studied group where in 9.61% of cases they do not study for pleasure any subject in the school syllabus.

Learning style is influenced by several psychological, physiological, emotional, social and environmental factors, so the talent of the teachers is essential in solving these problems and in finding the best methods of teaching and stimulating the students (Ozdemir, Alaybeyoglu, Mulayim, & Uysal, 2018). In the studied group, there are 20% of students who associate the appearance of fatigue with the increased demands of teachers, an aspect that must be taken into account because it may be a case of teachers not adapting their demands to the real capabilities of students and their learning style.

In solving these problems, an essential role rests with the teachers who can instruct the students on learning methods in each discipline of study. Unfortunately, in the studied group, most of the answers (65.86%) are for explanations "only in certain subjects". This is where the experience of the teachers comes in, as well as their working environment represented by job satisfaction, the recognition of efforts, their well-being (De Stasio, Boldrini, Ragni & Bacile, 2019).

School activity is inherently associated with the occurrence of fatigue of greater or lesser intensity. Fatigue is a physiological phenomenon that occurs when the body's capacity for effort is exceeded. The frequent fatigue present in more than half of the surveyed students is easy to understand because of the desire to obtain a high level of performance in school. Also, this result is confirmed by other studies carried out on adolescents in the area of Moldova from general education high schools (Albu, Dima, Dorofte, & Abdulan, 2017). When looking at technical colleges the preoccupation is oriented mainly towards obtaining the skills necessary for the future profession and less towards the theoretical elements thusly marked fatigue is recognized only by a third of the surveyed students (Albu, Dima, & Badaluta, 2017).

Intense fatigue is associated with the appearance of clinical signs represented by headaches, eye pain and insomnia, elements that are not specific to young people. Such problems are observed in other studies so they must be more closely analyzed by specialists in the field of school medicine and education. A worrying result was obtained in a study carried out on students with and without anemia. In those with anemia, sleep problems are much more common (Abduallah Hussein & Ahmed Ouda, 2018).

The observed clinical signs and symptoms must also guide us towards the risk of serious health problems, a phenomenon observed in a group of young people in the USA (Jacobs, 2019). No serious health problem was highlighted in the students in the studied group, which is encouraging.

Parents, teachers and the school doctor must carefully monitor these phenomena and intervene when there is a risk of chronic fatigue and health problems that easily lead to school failure (Cosmovici & Iacob, 2008).

Fatigue occurs due to a large number of hours in the school program, a large volume of homework, and insufficient sleep. We often encounter situations where the daily activity of a student is 10-11 hours (6-7 hours at school and 3-4 hours for homework) a period of activity that exceeds even that of an adult. We must pay attention to insufficient sleep, as it can lead to chronic fatigue. In adolescents, the recommended number of hours of sleep per night is 8-10, which is reported by only one-third of the questioned students. It is a result obtained in other studies carried out in the area of Moldova where only 25% of students report an appropriate number of hours of sleep per night (Albu, Hodorca, Onose, Negrea, & Cracana, 2016).

At the international level, the results are different, resulting in certain population characteristics that must be carefully studied. Only 39% of young people in Brazil have insufficient sleep, while those in Argentina reach 49% (Villa-González, Huertas-Delgado, Chillón, Ramirez-Vélez, & Barraco-Ruiz, 2019). Special attention should be paid to this issue because longitudinal studies of adolescents in Japan show an increase in the frequency of young people who sleep less and less (Yamamoto et al., 2018).

Unfortunately, in Romania, such studies are underdeveloped so for now we cannot compare the current results with those of 10-15 years ago. At the international level, there are such studies. These are essential for the correct assessment of past and future situations. The study carried out in the USA in 1997 highlights a percentage of 24.98% boys and 32.72% girls who report insufficient sleep (Jacobs, 2019).

Special attention should be paid to students who have insufficient hours of sleep because they can easily reach the point where they use substances that remove the feeling of chronic fatigue and even some legal drugs such as coffee, alcohol and tobacco (Baciu, 2019; Miller, Janssen, & Jackson, 2017). Young people have insufficient information so they easily resort to "invigorating" products obtained without restrictions but which can have negative effects on their health.

In the school program, the 50-minute activity must be followed by a 10-minute break to restore the body's effort capacity. In most cases, break time is respected by teachers (85.09%) but breaks are too short for students (21.15%). These are aspects related to the organization of the educational program that should be carefully analyzed by the specialists in this field.

Another factor that generates fatigue is the distance from home to school and back. According to the regulations in our country, it is recommended to cover 0.5-3 km or 30 minutes using transport (Gavat, Albu, & Petrariu, 2006). There are many situations in which students have to travel longer distances from home to school and vice versa, this being a factor of fatigue in 10.09% of cases. They usually travel using public transport or on foot.

In reality, there are problems with 40% of students who exceed the maximum recommended time of 30 minutes, but this is not considered by students to be difficult. If the students walk to school it is a positive aspect because this represents light physical activity that stimulates the body's functions. On the other hand, the long time needed to travel will be a source of fatigue, especially for students in rural areas. In Romania there are few high schools in rural areas, so students who want to continue their studies must attend a high school in the city, which explains the rather high percentage of young people who need a lot of time to get to school.

For the high schools in the studied group, there are no problems related to the school environment because they are located in a big city, so they have electricity, running water, an adequate sewerage system, and sufficient heating.

Studies carried out in seven African countries have shown a positive correlation between the prevalence of obesity / being overweight and giving up walking or cycling to and from school (Manyanga, El-Sayed, Doku, & Randall, 2014).

Parents still play an important role in the evolution of the adolescent. It is considered that parental supervision, positive monitoring and ensuring adequate parent-student communication are necessary in order to prevent the onset of inappropriate behaviors and even orientation towards delinquency (Zilanawala, Sacker, & Kelly, 2017).

In the studied group, the supervision performed by the parents concerning school activity is modest. Only 15.38% of parents are always interested in how their children prepare their homework. Also, 5.28% of students admitted as a cause of fatigue the fact that parents pay too much attention to school activities. It is a worrying aspect because most parents consider that school activity is the teacher’s / school’s responsibility and not theirs.

Numerous studies emphasize the positive role of parental involvement in increasing child's school results. Parental involvement practically means controlling the way the child does their homework, establishing rules, parent-student communication, learning support, and communication with the school. These are important aspects that will favor obtaining results adapted to the real abilities of adolescents (Erdener & Knoppel, 2018).

Internationally, there is a European survey called Health Behavior in School-Aged Children which tracks various aspects related to the lives of students represented by adolescents, school, families and groups of friends (Godeau, Dressen, Jeunier, Mouret, & Navarro, 2000). Such studies allow a deeper knowledge of the evolution of young people and intervention when needed.

6. CONCLUSION

It is necessary to pay special attention to the way students adapt to school requirements. In the studied group, many young people do not constantly study all subjects and who study for pleasure only certain subjects. A particular problem is the one related to teaching style because the students received explanations on learning methods only in certain subjects.

Fatigue is present in most students, but students from elite high schools are most exposed to this reaction. There are some clinical signs such as headaches, eye pain, sleep problems that need to be carefully monitored. There is a risk of triggering serious health problems, which is not desirable.

A particular problem is that of fatigue, which is due to a large number of hours in the school program, the large volume of homework, and insufficient sleep. Insufficient sleep is a problem for most students because it favors the onset of chronic fatigue followed by school failure.

Students associate fatigue less with the long road to school and with the parents' high demands.

Unfortunately, parents are not very interested in their children's school activity so many problems may occur that will be detected too late or even ignored.

Such studies are essential for maintaining the health of the students and ensuring the expected school results.

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Chapter #9

CREATING AN IMAGE OF PEOPLE WITH DISABILITIES IN LITERATURE LESSONS

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ABSTRACT
Inclusive education provides an opportunity for students with disabilities to learn with their non-disabled peers. However, inclusive classrooms do not guarantee that non-disabled students will accept or form friendships with students with disabilities. Therefore, there is a need for intervention that facilitates the acceptance of students with disabilities. Literary works are a readily available resource in education to help students learn about society's diversity and its cultural contexts, as long as they depict these social groups appropriately. This study aimed to identify the different recurring patterns of the disability conception within the content of youth literature in primary education, employing content analysis. The research results reveal that people with disabilities are extremely underrepresented and depicted stereotypically in the examined literary works. This representation can reinforce students' negative attitudes toward people with disabilities. Therefore, the stereotypical content should be clarified and discussed during the lessons.

Keywords: disability representation, youth literature, content analysis, inclusive curriculum.

1. INTRODUCTION

Social inclusion and all society members' active participation are vital for practicing human rights and promoting human dignity. Nowadays, the concept of accepting diversity plays an important role in social policy.

Inclusion was a dominant topic of discussion during the last decades of the twentieth century and the first part of the twenty-first century. In 1994 at the Salamanca World Conference on Special Needs Education, 25 international organisations and 92 governments developed a "statement that called for inclusion to become quite simply the norm" (Clough 1998, p. 2). A review of the last two decades of literature shows that inclusion has become an important part of educational thinking (Allen, 2008), gained high status, and acquired international currency (Hodkinson, Ghajarieh, & Salami, 2018).

Inclusion could be a great benefit to disabled students as they have an opportunity to spend most of their time being schooled with their typically developing peers. It also can promote greater social acceptance of difference and impairment. However, evidence consistently shows that being placed in mainstream educational settings does not guarantee that disabled children will be accepted, evaluated, and integrated into the classroom (Martinez & Carspecken, 2007; Lindsay & McPherson, 2012, Schiemer, 2017). Despite having several possibilities during the day interacting with their peers with disabilities, non-disabled children usually ignore their peers with special needs (Rillotta & Nettlebeck, 2007; Tavares, 2011). Nearly fifty percent of children with disabilities feel lonely, isolated, unsafe, and feel that they do not belong within their class (Lindsay & Edwards, 2012).

In light of all this, teachers need to take steps to promote the acceptance of children with disabilities. Literary works as readily available resources can be used by the teachers to help students learn about disabilities (Azano, Tackett, & Sigmon, 2017), if they represented appropriately.

2. BACKGROUND

2.1. Inclusion and textbooks

Cultural adaptation of disability is not self-generated; it develops gradually over a long period of time, affected by several different factors. Among other factors, beliefs and misconceptions about disability contribute to this process. Educational institutions could reinforce these beliefs by not receiving attention and emphasis in the curriculum not to be clarified (Ferguson, 2001). Children's attitudes towards their peers with disabilities are often firmly determined by their degree of knowledge about disability, which stems from their social environments (Ison et al., 2010). Children's lack of knowledge about disabilities often comes from negative attitudes towards their disabled peers and social exclusion of children with disabilities (Lindsay & McPherson 2012). Considering that the perception of disability often forms attitudes and behaviours, it is important to develop children's understanding of individuals with disabilities (Hunt & Hunt 2004). At schools, textbooks can be an easily accessible resource that teachers can use to help students learn about people with disabilities (Prater, Dyches, & Johnstun, 2006). Using textbooks that include disability issues can positively influence students' self-image and motivation with disabilities (Wieman, 2001) and will likely motivate non-disabled students to learn more about their disabled classmates (Hodkinson & Ghajarieh, 2014). Moreover, inclusive textbooks can help non-disabled young learners to realize diversity in their teaching materials, which raise their appreciation for diverse and different characters, and also tolerance among these students of others' impairments (Rasche & Bronson, 1999). Textbooks can be considered "tools" that help students become familiar with society's diversity and its social and cultural contexts (McKinney, 2005). A realistic and non-prejudicial image of people with disabilities should be an important part of public education institutions' textbooks (Artman-Meeker, Grant, & Yang, 2016). It can help students understanding the needs and reality of these people (Ostrosky, Mouzourou, Dorsey, Favazza, & Leboeuf, 2015).

The current study argues that when we try to integrate students with disabilities into regular education, we need to gradually incorporate the issues of people with disabilities into the curriculum of standard schools and classroom environments, thereby reducing barriers to inclusive education.

2.2. Disability and youth literature

Youth literature provides a powerful tool through which students make sense of both their cultural heritage and the world they live in (Ullah, Ali, & Naz, 2014). However, literary works can also function as mirrors, allowing students to self-reflect and recognize similarities and differences between themselves and the characters in literary works (Gilmore & Howard, 2016).

The disability representation of children's literature has a history dating back four to five thousand years (Flood, 2016). Since the 1980s, there have been numerous studies examining the portrayal of childhood literature (Greta, 1986; Harrill, Leung, McKeag, & Price,1993; Ayala,1999; Dyches, Prater, & Cramer 2001; Prater, 2003; Quayson, 2007; Beckett, Ellison, Barrett, & Shah, 2010; Hughes, 2012; Hodkinson & Park, 2017). These

studies highlight that people with disabilities are portrayed primarily through negative stereotypes; they are often portrayed as fearful, evil, and often become ridiculous. Moreover, characters with disabilities often become victims of violent acts, often beaten and in several cases killed. Quayson (2007) emphasizes that if children's literature contains disability characters portrayed negatively and used scary scenarios and images, it might make children dislike these characters. According to Wall and Crevecoeur (2016), such stereotypes in children's literature result in problematic attitudes towards disabled people. Almerico (2014) points out that literary characters have a powerful influence on children, almost as strong as the real people they encounter every day. The negative stereotyped portrayal of people with disabilities in children's literature can significantly contribute to the general fear of children toward people with disabilities. Wall and Crevecoeur (2016) highlight that this problematic representation may also have a negative impact on readers' attitudes towards people with disabilities.

2.3. The theoretical background of the analysis

The analysis of disability content in school textbooks and children's literature is closely related to inclusive education. Research in inclusive education has highlighted the conditions required for the successful implementation of inclusive education. One of these is that inclusive classrooms need inclusive books, textbooks that depict people with disabilities in a realistic way. Therefore, it is necessary to analyse current textbooks' disability content to uncover and remove stereotyped representations (Prater & Dyches, 2008).

The present study aimed to identify and critically analyse the presence of disability found within youth literature employed to support the Hungarian National Curriculum. The analysis was based on the categories of stereotypical representation revealed by the researches of Biklen and Bogdan (1977), and Rubin and Strauss Watson (1987 since these studies provide a detailed, complex description of the disability characters found in literary works. Analysing children's literature, Biklen and Bogdan (1977) found ten different commonly occurred stereotypical representations of people with disabilities, such as disabled people are 'pitiable and pathetic,' 'an object of violence,' 'sinister and evil,' 'curio or exotica,' 'an object of ridicule,' 'super cripple,' 'their own worst enemy,' 'a burden,' 'asexual' and 'incapable of fully participating in everyday life.' In 1987, Rubin and Strauss Watson added a stereotype category to the list of Biklen and Bogdan's stereotypes, such as a person with a disability being isolated from disabled and non-disabled peers'.

3. METHODS

3.1. Research questions

The textbooks' content reflects society's norms and attitudes on certain topics of a given era, but it can also shape them (Whitbourne & Hulicka, 1990). Textbooks can thus serve as a staple between curriculum content and social perceptions; they can help to explore and understand social processes and the possibilities of how these could be changed.

This paper focuses on the results of a study investigating the representation of disability in the literary works found in primary school Hungarian Literature textbooks. As in fact, students read these literary works in primary school classes so that they can serve as an instructional vehicle for students' understanding of individuals with disabilities; we formed the following research questions:

-What kind of disability concept can be found in literary works

-How can these representations affect students‘ perception of people with disabilities?

3.2. Content analysis

To address the research questions, a content analysis of the sample textbooks was conducted; content analysis is a systematic, objective, quantitative examination of message characteristics (Neuendorf, 2017) intended for the analysis of message contents to unfold "what they mean to people, what they enable or prevent, and what the information conveyed by them does" (Krippendorff, 2004, p. 2). During content analysis, recurring patterns provide the basis for interpretation and can “reveal the more subtle messages embedded in a text read by a student in a classroom” (Hoffman, Wilson, Martinez, & Sailors, 2011, p. 28). In quantitative content analysis, the text should be measurable and analysable by compiling special categories and topics into different study categories, the frequency of which can already be measured and analysed (Majoros, 2004). According to McQuail (2010), latent reports are the most important in modern content analysis, and they cannot be read directly from the quantitative analysis data. He assumed that it is not enough to count the frequency of the textual elements, but also have to examine their relationships. It may also be telling if some content is missing from the text.

3.3. Data analysis

The study began with selecting literature books for primary school students from the list of approved textbooks for the academic year 2019, which was revealed by the Hungarian Government. 39 books were selected from the list; whose literary works were analysed along with the research questions. In the chosen 39 textbooks, we examined 2301 literary works to reveal if they have any disability-related content. We found content related to disability in 132 literary works, and these works were further analysed along the research questions presented above.

Within the study content, textual and discourse analysis were applied. The first phase of the research, the macro analysis, focused on finding the disability-related messages represented within the examined literary works. The analysis targeted the frequency and location of the Hungarian words for disability in different literary works. The numbers of occurrences were analysed using descriptive statistics. We calculated the absolute and relative occurrence of each search term during this phase to reveal how frequently disability or disabled people were mentioned in the texts. Within the microanalysis stage, the relevant hits were examined to identify how disability was located within the text and what conception of disability was represented in them. We used linguistic analysis to reveal 'hidden assumptions' about disability and disabled people (Crawford, 2004, p. 21). In this procedure, linguistic forms such as lexicon, agency and action, voice, verbs, and adjectives (Ninnes, 2002) were scrutinized. Finally, the demarcated units were analysed how the constructed representation of disability might influence pupils' concept of disabled people (Hodkinson et al., Ghajarieh, & Salami, 2018).

Designing the coding system of the content analysis applied both inductive and deductive techniques. As a starting point, we developed the coding system of the analysis based on the disability-related stereotype categories compiled by Biklen and Bogdan (1977), and Rubin and Strauss Watson (1987). However, the need to develop additional categories arose during the analysis, so the basic code system was supplemented. Individuals with disabilities as (13) frightening characters, (14) dirty, filthy individuals, and disability as (15) punishment and (16) illness were depicted in the categories we added. The recurring patterns explored by the code system during the research formed the basis for the interpretation of the disability-related terms found in the texts.

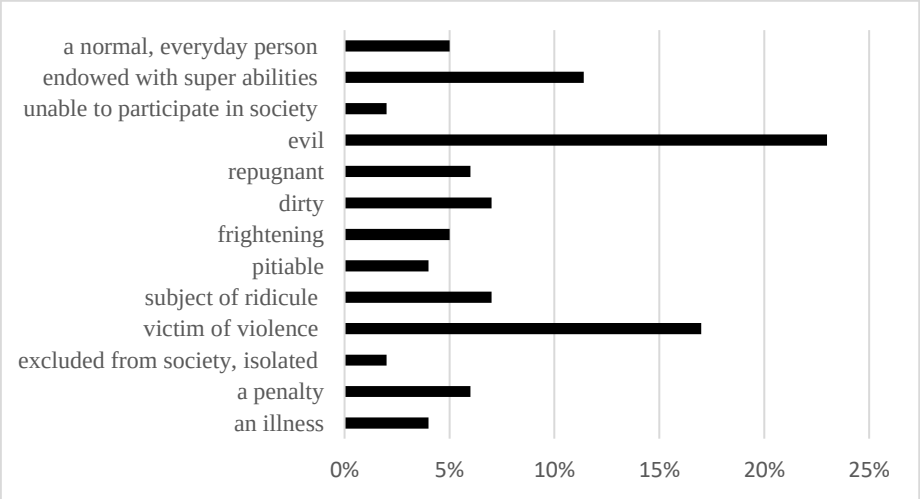
4. RESULTS

4.1. The categories of disability representation and their distribution in the works examined

The frequency analysis of disability content in literary works revealed that the concept of disability and people with disabilities as actors are present in the reviewed literary works, although they are very underrepresented (absolute frequency is 132, relative frequency is 0.053). The representation of disability most often reflects a stereotypical view (95% of all depictions of people with disabilities). 83% of all depictions contain negative stereotypes, while 12% of the representation writers employ positive stereotypes to describe the characters with disabilities. Realistic, stereotype-free representation of people with disabilities was found only in 5% of cases.

Within the negative stereotypes, additional subgroups could be identified, which distribution is also quite different. The vast majority of representations with a negative stereotype refer to a person with a disability (94% of all negative stereotypical representations), while expressions containing a negative stereotype describing disability as a concept account for only six percent of this group's results. Negative stereotypes about people with disabilities mostly refer to the character's personality (38% of negative stereotypes). Individuals with disabilities are most often portrayed as evil, cruel characters in the literary works examined, and to a lesser quantity as actors who cannot participate fully in social life (Figure 1). Depicting the external characteristics of people with disabilities is also not without negative stereotypes. They are mostly scary figures who wear dirty, torn clothes, in many cases repulsive, or have a pathetic appearance. One characteristic form of portraying characters with disabilities is that they are present as victims in the story. They often become victims of violence or ridicule.

Figure 1.
Percentage distribution of negative stereotypes about disability revealed in the analysed literary works (N=132).



The analysis of the data produced a number of results, which were grouped into individual themes. In the following, we discuss the stereotypical representations present in the largest proportion in the literature works examined in detail.

4.2. The topic of exclusion

Research findings showed a significant focus on excluding individuals with disabilities from society in the literary works we examined. In the analysed stories, the characters with disabilities often live alone, in exile, having no friends or family. For example, this theme of exclusion is detailed in Durell's My family and Other Animals. The Rose-beetle Man figure always appears lonely here; he never has company; he acts to entertain himself. We cannot know where he lives, he always emerges from nowhere, and his figure disappears into nothingness when he leaves. In the short story of Pál Békés: The Lead Soldier, we meet the protagonist on the street as he lies on the sidewalk. He was thrown away because he was no longer needed. Also, in Stevenson's novel Treasure Island Pew, the blind was deserved, left alone behind by his comrades, crying, "you will not leave old Pew, mates." Nevertheless, nobody answers or even helps him. Furthermore, the topic of exclusion appears in Andersen's story of The Ugly Duckling as well. In this story, one can well trace how someone becomes an exile in society simply because of a difference in his physical appearance. The well-known story focuses on a duckling that is ugly because it does not have the same features compared to others, so the stigma of someone with a dissimilar body from the 'norm' can be connected to the storyline (Hodkinson & Park, 2017). Because of this difference, the duckling is excluded and teased for much of the story. These literary works demonstrate clearly common issues surrounding 'normalcy' and 'aesthetic nervousness' that disabled people have to encounter in society daily.

4.3. The disabled character as a scapegoat

In the analysed literary works, the individuals with disabilities often cause the complication, the trouble, in many cases appearing as a scapegoat in the story. In *Story about the Echoes of Tihany*, the silent princess causes the death of the wave king's son because she does not reciprocate his love. In Gárdonyi's novel *Stars of Eger,* the one-eyed Jumurdzsák commits child abduction in two cases, which impact the further development of the story. Moreover, in many cases, these characters appear in the story as seeking revenge on non-disabled characters. This allows the reader to believe that people with disabilities blame and cause guilt on others because of their condition (Dahl, 1993). Another negative representation of disability may also be observed in a Hungarian legend, the *White Mare*'s Son. Within the story, one of the main characters is a "deformed dwarf" who is represented to be sly and mean. As an object of evil, he was introduced within the story when he takes the food of people by force. Moreover, these characters often were depicted as terrifying, horrible people. This type of depiction can easily result in negative prejudices about people with disabilities, as the readers usually dislike these characters. This perspective can also become a reality and cause fear of people with disabilities when students think that disability character traits determine the person's personality with a disability (Solis, 2004). This belief, far from reality, can play a role in the aesthetic nervousness towards individuals with disabilities because of their different physical appearance (Quayson, 2007).

4.4. Contrasting normalcy and disability

In the literary works analysed, the contrast between disability and perfection was noticeable. Disability usually appears as a problem or an error related to the appearance or personality trait of the disabled character, as opposed to other characters or even their own other character traits. When disability appears within the other characteristics of the disabled person, it is usually connected by the 'but' conjunction with the other traits. This often means that, unfortunately, disability is also present as a negative trait among other characteristics of the individual. For example, in *Story about the Echoes of Tihany*, we read the following about the protagonist, who is a blind princess: "*God made her not only beautiful but also gentle, kind-hearted, smart, and patient; however, she was mute."* The writer contrasts the beauty and goodness (which are positive attributes) of the princess with the muteness (which, in this context, can be interpreted as a negative attribute). Another example can be found in the story of Sándor Kányádi, *The Silent Tulip*, in which the punishment of the evil gardener is to shrink into a dwarf. This distorted view of disability can cause students to feel insecure concerning people with disabilities. This perception suggests to students that only the "normal" is acceptable to society (Santiago, 2007) and that people with otherness face punishment and exclusion.

4.5. The disabled characters as an object of violence

Research results show that a character with a disability usually dies or is injured in the story. Moreover, in the vast majority of cases, the disabled person is a victim of a violent act. Stevenson, in his novel Treasure Island, describes the death of the blind character as follows: "*Down went Pew with a cry that rang high into the night, and the four hoofs trampled and spurned him and passed by. He fell on his side, then gently collapsed upon his face and moved no more".* In *The Story about the Echoes of Tihany*, the mute princess also becomes a victim of violence; the King of the Waves kills her as revenge on his son's death. János Lackfy writes in his poem about a one-eyed cat: "*And if you do not die in the fight, then my dad will kill you!"* In Ady's poem, a fool black piano, cries, wins, hums, and suffers because his blind master tears, tortures it. The one-eyed character of Géza Gárdonyi's Stars of Eger was found under the castle wall. He was beaten and almost dead.

In these lines, we can read real acts of violence that are humiliating, often painful, or fatal to the character with a disability. These depictions influence students to believe that the disabled body can be an easy target for real physical violence of non-disabled others (Goodley & Runswick-Cole, 2011). Moreover, this perception of disability might enable students to place disabled people lower than themselves in terms of importance and hierarchy in society (McGrail & Rieger, 2014).

5. CONCLUSION

The present study explored and analysed the representation of disability in literary works in the textbooks of primary schools in Hungary. One of the research's main findings is that people with disabilities are underrepresented in the sample texts. The results also show that in the examined literary works, the characters with disabilities mostly appear stereotypically. A considerable amount of the stereotypical representation is made up of characters depicted by negative stereotypes. The main recurring patterns of the most significant negative stereotypes include a person with disabilities as a scapegoat, disability as punishment, and disability as an object of violence. The analysed literary works strongly reflect the notion that deviation from the "norm" physically or mentally is always

reprehensible, negative. According to Santiago (2007), this approach may have the consequence that learners become highly norm-oriented and find it difficult to accept individuals who differ from these criteria defined and accepted by society. Thus, they may have problems adapting the concept of social diversity and accepting members of different minority groups.

These results draw attention to the fact that these literary works are not inclusive; most of them reflect the perception of the moral model of disability. They do not help students get to know people with disabilities; they rather suggest fear about them and can lead to their isolation. Such a one-sided depiction of disability can reinforce students' prejudices who read works about people with disabilities and create an obstacle to social inclusion (Hodkinson & Park, 2017).

Given the results, it can be considered that the use of the analysed literary works without critical analysis is not recommended in literature lessons. Exploring the stereotypical contents of literary works from different historical eras can show students that prejudices about people with disabilities have existed for centuries. At the same time, analysing stereotypes can help students rethink their own prejudices about people with disabilities (Flamich & Hoffmann, 2014). Therefore, in teaching these literary works, emphasis should be placed on a critical examination of the stereotypical representation of disability. However, it would be useful if inclusive literary works appear in literature textbooks, as the results of Prater and Dyches's (2008) research show, it is only inclusive literature that can be arguably useful for all children. Inclusive readings based on more than just fiction reflect social diversity, but these literary works can also contribute to developing a positive self-image of students with disabilities (Beckett, et al., 2010). These are unquestionably essential conditions for the social integration and inclusion of people with disabilities.

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Chapter #10

SUBJECT TEACHERS AND ENHANCEMENT OF STUDENTS' ENGLISH PROFICIENCY IN SELECTED SENIOR SIX CLASSROOMS IN RWANDA

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ABSTRACT
This study was conducted in Sixth Form schools in Huye District in Rwanda. The researchers' concern was that most secondary school leavers enter university with low proficiency in English, the medium of instruction. The researchers focused on subject teachers because subject-related courses are allotted more hours than English. The study aimed to explore whether subject teachers offered any assistance in boosting students' English proficiency. The research drew on Language across the Curriculum (LAC) and Content and Language Integrated Learning (CLIL) approaches. LAC stipulates that all teachers are language teachers, that subject teachers and language teachers should work jointly, and that language should be taught across the curriculum. CLIL recommends that content be learnt through a second language and that the subject and the language be taught at the same time. For validity and reliability purposes, the current study made use of both qualitative and quantitative data collection and analysis methods. Findings revealed that only some of the subject teachers used strategies that could help promote their students' English proficiency. Findings also indicated that content and English language teachers did not collaborate and that the students were not proficient in English. In accordance with these findings, recommendations were made.

Keywords: English proficiency, subject teachers, teaching strategies, sixth form students, secondary schools.

1. INTRODUCTION

In Rwanda, the language-in-education policy stipulates that Kinyarwanda, the mother tongue, is the language of instruction from Primary 1 to Primary 3 while English, a second language, is studied as a subject and becomes medium of instruction from Primary 4 onwards. Proficiency in English from Primary 4 is, thus, a prerequisite for Rwandan students to deal with their studies successfully.

However, the researchers' language teaching experience in Rwandan tertiary education is that secondary school graduates admitted at university are not proficient enough in English to cope with their academic subjects delivered in this language. They lack both Basic Interpersonal Communication Skills (BICS) and Cognitive Academic Language Proficiency (CALP) as described by Cummins (1980, 2008, 2016). The researchers decided to conduct their study in secondary Sixth Form classes where students' success in the end-of-year national examinations determine their admission to higher learning institutions. Furthermore, the researchers' choice of subject teachers as research participants is that in secondary school advanced level (Forms 4, 5 and 6), content subjects are allotted much more time (280 minutes) than the English language (80 minutes). The researchers, hence, believe that subject teachers should not remain insensitive to their students' low skills in English. Rather,

as they are teaching content subjects, they should at the same time devise strategies to help their students develop proficiency in this language of instruction, which would equally promote their academic performance.

2. OBJECTIVES

The primary aim of the study was to assess whether subject teachers in the selected schools played any role in the development of their students' proficiency in English. The secondary objectives were to determine whether

- subject teachers used any learning strategies to promote their students' English proficiency;
- subject teachers informed English language teachers on suitable material to design for their students;
- English teachers informed subject teachers about how to assist their students to improve their English language skills; and
- the students were proficient in English, the language of instruction.

3. LITERATURE REVIEW

3.1. Impact of the medium of instruction on academic performance

Mastery of the medium of instruction is one of the preconditions for students to achieve at school. According to Dafouz-Milne and Camacho-Minano (2016) and Mugirase (2020), students' level of proficiency in the language of instruction affects their academic performance in one way or another. They hold that students who have gained a good level of competence in the medium of instruction may do well academically whereas those whose skills are not developed risk failing.

In Rwanda, secondary Sixth Form students need to develop proficiency in English to cope with their content subjects. Knowledge of English will also help these students to successfully deal with academic studies once they are admitted at university. Acquisition of English language skills will, moreover, enable Rwandan university graduates to meet language-related requirements needed in the job at the national level and to compete in regional and international markets where English is the lingua franca (Mugirase, 2020; Ndimurugero, 2015).

However, boosting Rwandan students' English proficiency is no easy task as the linguistic environment in the country is not conducive to the learning of this target language (Kagwesage, 2013; Ndimurugero, 2015; Sibomana, 2014). These scholars explain that 99% of Rwandans speak Kinyarwanda, the mother tongue, so they can communicate effectively without switching to any other language. Consequently, as the classroom is the only setting where most students encounter English, teachers should work out appropriate strategies to facilitate the learning of this language.

The present study focuses on the role subject teachers should play in helping enhance Sixth Form students' English language proficiency. As already mentioned, the choice of subject teachers stemmed from the fact that content subjects are allotted a lot more hours than English in Sixth Form classrooms in Rwanda. The researchers, therefore, assume that content teachers must be aware of the important part they have to play and commit themselves to scaffolding their students' learning of both content and the English language.

3.2. Subject teachers and enhancement of students' proficiency in the medium of instruction

Considering that Rwandan students' exposure to English is very limited, it is up to teachers to design techniques that can help boost the learners' skills in this language of instruction. It is normally language teachers' responsibility to promote their students' proficiency in the medium of instruction. Nevertheless, students in Sixth Form classrooms in the present study will hardly acquire this competence unless subject teachers feel they are equally concerned and endeavour to seek ways in which to offer assistance to the learners. As Lughmani, Gardner, Chen, Wong, and Chan (2016) and Moe, Härmälä, Kristmanson, Pascoal, and Ramonienė (2015) state, all teachers are language teachers. Kalinowski, Gronostaj and Voc (2019) are also of the view that all teachers are responsible for helping students meet academic language and literacy expectations. Content teachers in Sixth Forms in Rwanda should, thus, also contribute to developing their students' skills in English.

However, language learning does not take place in a vacuum. Accordingly, subject teachers ought to make use of the context provided by content to help prompt students' communication skills in the language of instruction (Chu, 2019), that is, English in the current research. This study is, hence, guided by the theories of Language across the Curriculum (LAC) and Content and Language Integrated Learning (CLIL). LAC and CLIL are two pedagogical approaches to additional language teaching that recommend the integration of language learning and content learning (Lin, 2016) to develop students' academic "proficiencies appropriate for use in different contexts" (p. 11). These two approaches are appropriate for use in the context of Rwanda where English, a foreign language, plays the role of medium of instruction in a Kinyarwanda dominating linguistic environment.

3.3. Language across the Curriculum (LAC) approach

Language across the Curriculum (LAC) is a teaching and learning approach that advocates integration of the second language and content subjects so as to provide students with comprehensible and engaging learning materials that are likely to enhance their language proficiency and facilitate assimilation of subject content at the same time (Joshi, 2018; Mugirase, 2020). Joshi contends that content and language learning should be integrated because they are closely connected. He claims that mastery of the language facilitates understanding of content whereas content provides the context for language learning. According to Sumekto (2018), the central tenet of LAC is students' exposure to meaningful contexts that promote their critical thinking and problem-solving skills. He explicates that rather than providing general language comprehension, LAC is highly specialised and put an emphasis on a "particular domain of professional content" (p. 92). As for Kalinowski et al. (2019), they maintain that appropriate contexts and experiences can lead to students' language development.

The above suggests that, apart from language teachers, subject teachers in Rwanda also should mediate Sixth Form students' learning of English besides delivering content. Therefore, they need to collaborate with English language teachers to get informed on appropriate ways in which to help their students deal with language-related difficulties encountered during content classes (Lughmani et al., 2017).

In Rwanda secondary schools, nevertheless, collaboration between teachers may not lead to the targeted aims as most of subject teachers are not proficient in English (Mugirase, 2020; Sibomana, 2015). To address this challenge of teachers' low proficiency in English, trainings should firstly be organised to aid them develop skills in this target language. Then subject teachers should be trained on appropriate approaches to use to promote their students' English skills while teaching content. Kalinowski et al. (2019) purport that as academic

language is complex due to complex academic discourse embedding specific rhetorical functions (grammatical, lexical, and discursive), teachers need initial in-service trainings on ways in which they can help students master language skills across the curriculum.

3.4. Content and language integrated learning (CLIL)

Content and Language Integrated Learning (CLIL) is an innovative approach that integrates the teaching and learning of content and language at the same time (Cenoz, 2015; Costa, 2016; Šulistová, 2013; Van Kampen, Admiraal, & Berry, 2015). Bonces (2012) also contends that CLIL is an educational method whose dual aim is the learning of both content and of a foreign language. In other words, CLIL emphasises the teaching and learning of content through language but also highlights the important role language plays in the teaching and learning of content.

For Costa (2016), CLIL is effective at all educational levels in that it increases students' motivation and language skills, and allows "deep processing of the subject matter or both the subject matter and language skills" (p. 20). Costa goes on to say that the teaching of subjects such as, History, Geography, Mathematics, and Biology through a foreign language promotes incidental acquisition of the language. Cenoz (2015) holds that, in language programmes with language-driven ends, CLIL refers to content-based themes or type B CLIL, and when applied in content-driven lessons, it is referred to as type A CLIL. In the present study, aims are based on mastery of English communication skills during subject content taught in English, i.e., on type A. Thus, the concern here is more of content-and-English integrated learning (Dalton-Puffer, 2011) than any other additional language.

Obviously, content cannot be learnt if students have difficulty understanding the language in which it is taught (Lin, 2016; Mora-Flores, 2019). Content subject teachers, hence, need to develop language-related practices during subject content classes to promote students' proficiency in the language of instruction through content and language integrated learning programmes (Hu & Gao, 2020). They have to promote their "learners' academic English skills while using specialized techniques to teach and have students engage with the subject area topics in a comprehensible manner" (Short, 2017, p. 4238). In line with this, Freire (1974) and Lin (2016) argue that subject teachers should make the content of their lessons comprehensible and encourage learners to negotiate meaning through interacting in the language of instruction. Accordingly, teachers ought to identify students' learning needs and strive to develop their Cognitive Academic Language Proficiency (CALP) to ensure academic success (Cummins, 1979, 1984; Lin, 2016). Marino (2014) also purports that in a setting where content subjects are learnt through English, as in the secondary Sixth Form schools in Rwanda, it is capital that students be assisted to develop academic language. Moe at al. (2015) explain that

> By emphasizing the language required to participate in content classes, teachers are able to set objectives that relate not only to the acquisition of content-related information, but also to the language functions necessary to negotiate meaning in that content area. (p. 52)

In Rwanda, subject teachers must employ teaching and learning techniques aimed at facilitating Sixth Form students' acquisition of English language skills so as to enable them to cope with highly complex academic language and later with job requirements. Jabbarova (2020) states that perfect proficiency in English is generally associated with career growth. Thus, Sixth Form school teachers in Rwanda must promote students' academically and professionally-oriented communicative skills.

4. RESEARCH DESIGN AND METHODOLOGY

Whereas a research design is like a plan or structure that ties all the components of research together (Akhtar, 2016; Creswell, 2012), a research methodology refers to a set of techniques that guide the researcher in conducting research (Igwenagu, 2016). Both research design and research methodology depend on the nature of the research problem. It is in this perspective that this study used a quantitative and qualitative case study research design to obtain more valid and more reliable data. Quantitative and qualitative case study research paradigms allowed the researchers to obtain quantifiable data, to conduct an in-depth investigation into a real-life phenomenon occurring in its real setting (Hoang-Kim et al., 2014; Ridder, 2017), and to triangulate the data.

4.1. Setting and participant selection

The participants in this study were secondary Sixth Form science teachers and their students from four selected schools in Ngoma Sector in Huye District of the Southern Province in Rwanda. Two of the schools were public and the other two were private. They were labelled School 1, School 2, School 3 and School 4 for the sake of anonymity. These schools were chosen among others because of their proximity to the researchers' workplace, which allowed them to concurrently conduct their study and to fulfill their academic activities at the University of Rwanda where they are lecturers. Purposive sampling was used and Biology and Mathematics classrooms, the only common subjects in the four schools, were visited. The subject teachers (of Biology and Mathematics) from these schools were respectively given the pseudonyms T1 and T2, T3 and T4, T5 and T6, and T7. All of them were men. Schools 3 and 4 shared the same Biology teacher, T5, so he was observed at both schools.

Concerning the students, 76 participants were selected from the four schools (19 from each) to answer the questionnaire. As the visited classroom at School 4 consisted of 19 students, the researchers thought it fair to choose the same number of participants from each of the remaining three schools. As for the interviewed students, their number was 40 (10 from each school). The respondents were students who volunteered to take part in the study.

4.2. Research questions

The following four research questions guided the study:

1. Do subject teachers use teaching and learning strategies that enhance their students' English proficiency?
2. Do subject teachers inform English language teachers on suitable material to design for their students?
3. Do English language teachers inform subject teachers about how to assist students to improve their English language skills?
4. Are the students proficient in English, the language of instruction?

4.3. Data collection techniques

Some researchers prefer to use the quantitative research method while others may opt for the qualitative method. Quantitative approach is used to answer research questions that require statistics, and qualitative approach for questions requiring words (Williams, 2007). In this study, the researchers made use of both quantitative and qualitative paradigms to gain more understanding of the phenomenon under study. According to Yeasmin and Rahman

(2012, p. 155), "the deficiencies of any one method could be overcome by combining methods and thus capitalizing on their individual strengths".

Both approaches enabled the researchers to apply various research techniques. The quantitative method allowed them to administer and obtain data from questionnaires. With the qualitative method, the researchers conducted classroom observations and semi-structured interviews for the sake of data triangulation.

4.3.1. Questionnaire

Questionnaires are generally viewed as an objective research tool capable of producing generalisable results (Harris & Brown, 2010). Thus a questionnaire consisting of five yes/no questions was administered to the secondary Sixth Form students (N=76) from the selected schools. The list of questions is provided below.

1. Do you easily follow teachers' explanations provided in English?
2. Do you easily interact in English during classrooms?
3. Can you easily read and understand texts written in English?
4. Do you write correct English?
5. Do content subject teachers help you improve your English skills?

The above questions were posed to gain evidence of patterns with statistics; nevertheless, as results from questionnaires can be threatened (Harris & Brown, 2010) in a way or another, semi-structured interviews were also conducted.

4.3.2. Semi-structured interviews

This study was also informed by semi-structured interview data. Face-to-face semi-structured interviews were conducted with 40 students and 7 teachers (4 teachers of Mathematics and 3 teachers of Biology; Schools 3 and 4 shared the same Biology teacher) during their spare time. Interviews for teachers consisted of four questions and interviews for students of five questions as indicate the following protocols:

Interviews for teachers	**Interviews for students**
1. While delivering your lessons, do you use any teaching strategies to promote your students' English proficiency? 2. Do you ever collaborate with English language teachers to help them design suitable materials for students? 3. Do English language teachers ever inform you about ways in which you can help students improve their language skills? 4. How proficient are your students in English?	1. How often do you interact in English during classrooms? 2. How well do you follow teachers' explanations in English? 3. How well do you understand texts written in English? 4. How correctly do you write in English? 5. Do subject teachers use any strategies to help you enhance your English proficiency? If yes, what are they?

As shown above, subject teachers responded to four questions and students to five questions. The questions were asked in accordance with the guides in the box. For Ricci et al. (2019), all participants are asked the same questions in the same order. However, where appropriate, responses from the set questions were followed by probing ones to allow the researchers gain richer insights from participants' own views in their real world. Interviews were tape-recorded and notes were written in researchers' research diaries to avoid omitting

relevant information. The recorded data were then transcribed and cross-checked with the participants for the sake of reliability.

Another technique used for data collection was classroom observations.

4.3.3. Classroom observations

Observations were conducted in Mathematics and Biology classrooms in January 2020. Depending on the researched schools' schedules, some observations were carried out before noon and others in the afternoons. Each classroom was visited three times to allow the researchers to describe classroom practices efficiently. This aligns with Hamilton and Finley's (2019) view that participant observation normally helps in describing how things are. Lessons were tape-recorded and notes were taken so as to include classroom management and teaching techniques in collected data. Recorded data were later transcribed for presentation and analysis.

4.4. Data analysis

Data presentation and analysis were done concurrently. Whereas quantitative data were translated into tables, qualitative data were inductively analysed. Large data sets from interviews and observations were sorted into broader themes and common themes were grouped into typologies for analysis. Thus, common themes were determined by gathered data. This complies with Maguire and Delahunt's (2017) position that important patterns in the data are identified and grouped to answer the research question.

4.5. Ethical considerations

This study is the researchers' own work, and all sources used in the paper were acknowledged by using in-text citations and by writing references. Both researchers worked jointly from beginning to the completion of the paper. Furthermore, the researchers sought informed consent from the participants and respected their anonymity. All students who participated in the study were eighteen years old and over, so there was no need to seek authorisation from their parents. Information obtained from participants was used for research purposes only. Finally, this paper has not been submitted anywhere else.

5. RESULTS AND DISCUSSION

Findings emerging from the research data provided information on the subject teachers' teaching strategies, their collaboration with English language teachers, and the level of students' proficiency in English.

5.1. Teaching and learning strategies

Students' answers to question 5 of the questionnaire (see Table 1) and to interview question 5 and subject teachers' responses to interview question 2 provided information on the teaching and learning strategies used in subject classes.

Table 1.
Students' responses to question 5 of the questionnaire.

Question 5	Yes	No	Total number of students
Do content teachers help you improve your English skills?	70 (92.1%)	6 (7.9%)	76 (100%)

Table 1 indicates that seventy (92.1%) out of seventy-six (100%) respondents to the questionnaire affirmed that content teachers used strategies that aimed to develop their English language skills. Only six (7.9%) students replied that their teachers did not provide any support.

To interview question 5, thirty-four (85%) out of forty participants (100%) answered that their teachers helped them enhance their English language proficiency. These students named strategies such as oral presentations, video use, group discussions, reading and summary writing, debates, dictionary use, shift to Kinyarwanda, use of IT tools, and inter-class competitions. One (2.5%) student out of the forty interviewed claimed that the subject teachers did not devise any learning techniques to promote the learners' English proficiency whereas five (12.5%) respondents gave irrelevant answers.

Subject teachers' responses to interview question 2 also informed the researchers on the teaching techniques they supposedly used to improve their students English language skills while teaching subject content. These were group discussions, presentations, debates, dialogues, dictionary use, essay writing, use of ICT tools and collaboration with English language teachers.

Classroom observations also enabled the researchers to note the teaching strategies that subject teachers deployed in their classrooms and to determine whether these techniques helped promote their students' English language proficiency. The predominating learning techniques observed were pair and group discussions and presentations, question-answer technique, teacher talk, and code-switching as discussed below.

5.1.1. Pair and group discussion

Pair and group discussions normally allow students to engage in peer interactions wherein the more knowledgeable students scaffold their group mates with low English skills. In addition, group activities enable the students to feel self-confident so they can negotiate meaning freely. According to Crandall (1999), small group discussions and interactions enable students to develop cognitive, metacognitive, social and linguistic skills. For peer interactions to be effective, teachers have to monitor the group activities and make sure everybody is involved. During classroom observations, the researchers noted that only some teachers (T1, T2, T3, T4, and T6) managed the group activities well, thus stimulating their students' engagement in active interactions while others (T5 and T7) did not.

5.1.2. Oral presentations

Oral presentations are another learning technique that may raise students' confidence, their ability to exchange ideas in the target language and their critical thinking ability (Brooks, 2015). In T1's and T2's classrooms, group discussions resulted in interactive presentations. In T3's classroom at School 3, individual presentations were also well done, and the whole class actively participated. Nonetheless, the researchers wondered why T5 did not use the same strategies with his students at School 4 considering that they had difficulties expressing themselves in English and obviously needed more assistance in this language of

instruction. Lack of students' English language proficiency at School 4 was also displayed in T7's classroom. The teacher gave the students opportunities to present what they had discussed in groups but they failed to explain their ideas in English. Both T5 and T7 should have tried various activities requiring students' interactions in English, the language in which they were instructed.

5.1.3. Question-answer technique

The question-answer technique is normally used by teachers to test the learners' knowledge and understanding of lessons. This strategy enables teachers to get feedback from students and allows the latter to make use of their critical thinking (Whitver, 2017). To stir up students' critical thinking and problem solving skills, teachers should ask higher-order thinking questions and minimise lower-level questions. It is questions of the higher-level type that are likely to boost students' proficiency in the language of instruction. However, questions that most of the subject teachers put were not challenging and did not give the students enough opportunities to express their thoughts in English.

5.1.4. Teacher-talk

The researchers observed that teacher-talk was another dominant technique that was used by five teachers (T3, T4, T5, T6 and T7). Teacher-talk is an old approach to teaching and learning that regarded the teacher as the only knowledgeable person in the classroom and whose job was to inculcate knowledge to docile learners. In this teacher-centred learning, students were expected to listen passively to the teacher and swallow whatever she was imparting to them (Ahmed, 2013; Emaliana, 2017). Lei (2009), nonetheless, posits that teacher-talk can have good or bad impact on students' communication depending on the quality rather than on the quantity of talk. He explains that good teacher-talk fosters students' communicative interactions in class. As mentioned above, this is not what happened in the five classrooms. Most of the teachers' questions did not aim at promoting the students' communicative skills but rather tested their understanding of the course content. Furthermore, the researchers noticed that the teachers made use of eliciting questions for the same purpose. In short, the teacher-talk technique did not give room to the students' active interactions.

5.1.5. Code-switching

The triangulated data indicates that teachers and students also made use of the code-switching practice. Code-switching refers to the commix or use of different languages in an utterance in a single conversation (Shafi, Kazmi, & Asif, 2020). In this study, some of the teachers, namely T4 and T6, confessed that, due to their limited English proficiency, they resorted to this learning technique to facilitate their students' understanding of the subject content. Moreover, although T3 did not acknowledge his lack of competence in English, classroom observations revealed that he had difficulty expressing his ideas in this language, so he code-switched between English and Kinyarwanda. This gives code-switching a negative connotation as it reveals the teachers' lack of English proficiency, which is a hindrance to the students' development of skills in this language of instruction.

However, in a bilingual or multilingual environment, code-switching appears to be a natural phenomenon that helps in raising students' voice, that is, in incorporating their input into the lesson (Alam & Ghani, 2020). This can be confirmed by some of the students' shift to Kinyarwanda during group discussions. Obviously, the students negotiated meaning and constructed common knowledge through their mother tongue, and groups using Kinyarwanda seemed very active probably because this language facilitated their understanding of scientific concepts.

5.2. Subject teachers' collaboration with English language teachers

Although subject teachers asserted during interviews that they collaborated with English language teachers, they seemed not to grasp the meaning of this concept. They understood collaboration as merely requesting and having assistance from English language teachers when they came across English language-related problems. Nevertheless, collaboration means more than that. It implies that subject and English language teachers ought to work jointly in their endeavor to strengthen the students' proficiency in the language of instruction as well as their academic performance. Furthermore, there is a contradiction in what T4, T5 and T6 maintained regarding collaboration with English language teachers. Responding to interview question 2, they claimed that collaboration took place, but at another time they stated the overloaded timetable did not leave them time to engage in this exercise.

This lack of collaboration between subject and English language teachers constituted a hindrance to the development of students' English proficiency. In fact, the researchers realised that students were not given exposure to academic genres that could help them master rhetorical functions used in their respective subjects. The researchers also observed that some of the subject teachers did not bother addressing English language difficulties that their students encountered and that prevented them from grasping content. This was possibly due to the teachers' ignorance about how to appropriately address the problem or simply to their not caring about the issue.

5.3. Students' English language proficiency

Data emerging from the questionnaire and interviews administered to the students disclosed that most of them did well in English.

Table 2.
Students' responses to questions 1, 2, 3 and 4 of the questionnaire.

Questions	Yes	No	Total number of students
1. Do you easily follow teachers' explanations provided in English?	75 (98.7%)	1 (1.3%)	76 (100%)
2. Do you easily interact in English during classes?	57 (75%)	19 (25%)	76 (100%)
3. Can you easily read and understand texts written in English?	59 (77.6%)	17 (22.4%)	76 (100%)
4. Do you write correct English?	59 (77.6%)	17 (22.4%)	76 (100%)

Table 2 shows that seventy-five (98.7%) out of the seventy-six (100%) respondents asserted they easily followed teachers' explanations provided in English, fifty-seven (75%) easily interacted in English during class, fifty-nine (77.6%) easily read and understood texts written in English, and fifty-nine (77.6%) wrote good English. One (1.3%) student confessed she had difficulties following teachers' explanations, nineteen (25%) participants did not interact easily in class, seventeen (22.4%) could not read and understand written texts easily, and seventeen (22.4%) avowed they did not write English correctly.

Of the forty (100%) students who participated in interviews, twenty-nine (72.5%) followed explanations provided in English well, twenty-nine (72.5%) others interacted in English often, twenty-six (65%) understood texts written in English well while twenty-eight (70%) wrote in English correctly. Eleven (27.5%) respondents claimed they did not follow

explanations well, eleven (27.5%) rarely interacted in English, fourteen (35%) had problems grasping the meaning of written texts, and twelve (30%) did not write correct English.

Findings from the interviews with subject teachers revealed that four teachers (T1, T2, T4, and T5) were satisfied with their students' level of English proficiency.

Nevertheless, data emerging from classroom observations and from what the researchers noted while they were interviewing the students conflict with the above. The data revealed that at all four schools, a good number of students strove to understand teachers' explanations, or to interact and write in English. This situation suggests that it is important that subject teachers in Rwanda develop awareness of their role in helping enhance students' English proficiency and that they should not leave the task to English language teachers only.

6. CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

Firstly, this study explored whether subject teachers in selected schools in Rwanda designed strategies to help their students develop proficiency in English, a foreign language and the medium of instruction in the country. Appropriate teaching strategies are one of the key elements that contribute to enhancing students' proficiency in the language of instruction (Fewell, 2010). The research findings showed that the main strategies used in the visited subject classrooms were pair and group discussions, presentations, question-answer technique, teacher-talk, and code-switching.

In some classrooms, pair and group discussions were effectively conducted as the teachers moved around the classroom to monitor the activities and to encourage all group members to actively take part in the tasks and interact in English. However, in some other classrooms, the teachers did not play their role properly. So some of their students either did not contribute to the group discussions or interacted in Kinyarwanda only. However, pair and group activities are techniques that teachers must encourage because they give room to students to freely interact in the medium of instruction and to learn from each other. As mentioned earlier, code code-switching can also be a good learning strategy if it is not overused.

Concerning classroom presentations, some teachers made all students present their group work, which gave them the opportunity to practise English, the language of instruction. Other teachers did not. Nevertheless, oral presentations should be assigned to students regularly for they allow them to practise speaking skills in the medium of instruction and to develop public speaking skills.

The findings also showed that teacher-talk predominated in the subject classrooms and that students were not provided with enough opportunities to deeply engage in interactions. The question-answer technique was also dominant in the visited classrooms. Nonetheless, most of these questions were lower-order questions that could not promote students' higher-order thinking and prevented them from using English in ways that could enhance their proficiency. Teachers would support their students' language learning more if they mostly asked higher-order questions to develop their critical thinking and problem-solving skills.

Secondly, the study sought to know whether subject teachers collaborated with their counterpart English language teachers to inform each other on how to scaffold their students' learning of English. Findings indicated that collaboration was almost non-existent, which was an impediment to the development of the students' English proficiency. Content and English language teachers in Rwanda have to be aware that they need to collaborate to develop teaching and learning strategies that can help boost their students' English proficiency.

Lastly, the present research aspired to determine how proficient the students were in English. Despite most students' claim that they were good enough at English, the researchers noticed that they were not as good as that. Indeed, the students needed more support from their teachers to reinforce their listening, speaking, reading, and writing skills in English.

De Vos, Strydom, Fouche, and Delport (2002) purport that limitations are unavoidable in any research. The current study also had limitations in scope and time. The researchers would have wished to investigate more than four schools and to observe more subject classrooms for a longer period of time, yet their tight teaching workload was an obstacle. The other impediment was the little availability of secondary Sixth Form students. In fact, the researchers could not be given more time to carry out their study because these students were preparing to sit for national examinations, so the subject teachers were striving to cover all the planned content.

As recommendations, content-subject teachers in Rwanda should feel concerned about their students' proficiency in English and use appropriate strategies to allow them to both acquire knowledge of scientific concepts and develop their English skills. Being the ones spending more time with the students, they should avail more time for activities promoting the students' English listening, speaking, reading, and writing skills. In addition, collaboration between content subjects and English language teachers would enlighten both groups of teachers about better ways to mediate their students' learning.

Rwanda Ministry of Education should also organize trainings on how subject teachers can help students develop their English skills and increase the time allocated to the English course in secondary advanced level classrooms.

7. FUTURE RESEARCH DIRECTIONS

The contributions in this paper can lead to new research directions in the field of Applied Linguistics/Language Education. For the generalisation of findings on whether Rwandan content teachers help students develop English proficiency, it would be necessary to conduct further research in Rwandan Sixth Forms across the country. Research should be conducted in English language classrooms, too, to explore whether teachers effectively help promote their students' basic interpersonal communication skills and cognitive academic language proficiency. The same research would investigate whether these teachers draw learning materials from the students' fields of study to raise the latter's motivation and their thirst to learn.

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Chapter #11

EDUCATION EXECUTIVES VIEWS ABOUT THE DEVELOPMENT OF AUTHENTIC LEARNING AND ASSESSMENT ENVIRONMENTS

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ABSTRACT
The aim of this study is to investigate how the concept of "authentic learning" and "authentic assessment" is formed in the discourse of education executives with previous teaching experience in primary and secondary education. Authentic learning is based on the theory of social constructivism, according to which the social nature of knowledge is emphasized and the learner builds knowledge by creating meaningful authentic activities. Authentic assessment is described as a dynamic form of assessment which focuses on the skills developed by students during the learning process (Woolfolk, 2007). The design of learning environments is based on the nine features of authentic learning, constructivism and the theory of embedded learning (Herrington, 2006). In this study examples of authentic activities that support authentic learning environments in which a variety of authentic techniques are used and they are related to different subjects are presented. The sample of the study consisted of 114 adults participating in a training program as a qualification for their professional development during the year 2018-2019. Quantitative analysis of the data was conducted. The analysis of the data revealed that an authentic learning environment consists of experientiality, interdisciplinarity, team work, problem solving, self-assessment, peer-assessment, real-world relevance, which are characteristics of authentic learning and assessment. Moreover, the implementation of authentic learning activities can lead to the development of the cognitive, metacognitive, social and communicative skills of the 21st century.

Keywords: authentic activities, authentic assessment, authentic learning, 21st century skills.

1. INTRODUCTION

The development of an authentic learning and assessment environment covers the three levels of knowledge: declarative knowledge, procedural knowledge and conditional dependent knowledge (Woolfolk, 2019; Reif, 2010). At the first level of knowledge, the declarative knowledge level, a general description of authentic learning is presented. The second level of knowledge, the procedural knowledge, describes the design of learning environments, based on the nine features of authentic learning, constructivism and the theory of embedded learning. At the third level of knowledge, the problem solving level, examples of authentic activities that support authentic learning environments are reported.

Authentic learning may be more important than ever in a rapidly changing world, where individuals are expected to progress through multiple roles. Although foundational skills (reading, writing, mathematics, history, language) remain essential, a more complex set of competencies are required today. The skills that are required to adapt to new conditions are classified into four categories (Binkley et al, 2012): ways of thinking

(creativity and innovation, critical thinking, problem solving, decision making, learning how to learn, metacognition), ways of working (communication, collaboration / teamwork), working tools (information and digital literacy), and living in the world (citizenship, life and career, personal and social responsibility). Therefore, schools must be connected with the real needs of society and promote changes that are necessary for the development of the 21st century skills. The changes must aim at different learning and assessment environments that can be created by "authentic learning".

However, it is observed that traditional methods and techniques are mostly used in teaching. According to the literature, these traditional teaching approaches produce inactive knowledge (Bereiter & Scardamalia, 1985; Bransford, Franks, Vye, & Sherwood, 1989; Gick & Holyoak, 1983; Renkl, Mandl, & Gruber, 1996). On the contrary, students taking part in authentic learning activities are able to develop cognitive, social and metacognitive skills, as they use knowledge to decide the steps and the strategies they must take on to solve a real life problem (Wornyo, Klu, & Motlhaka, 2018; Reeves, Herrington, & Oliver, 2002).

Authentic learning is based on the theory of social constructivism and supports authentic learning environments where learners build knowledge by creating meaningful authentic activities. Vygotsky (1978), Wertsch (1985), Lave (1991) and others argue that the acquisition of knowledge is the product of activities that take place in a particular cultural context. Knowledge is thus inseparably bound up with the social and physical environment in which it is developed and used rather than being an abstract entity (Roelofs & Terwel, 1999: 203). According to Lombardi (2007), authentic learning is “a type of learning that focuses on real-world, problems, using role-playing exercises, problem-solving activities, case studies, simulations, virtual learning communities, self-assessment and peer assessment” (p. 2). Har (2013) defines it as “learning which happens by participating and working on real-world problems” (p. 2). Finally, according to Pearce (2016) authentic learning is “learning which is designed to connect what students are taught in school with real-world problems of everyday life (p. 1). According to Frey Schmitt and Allen (2012), tasks are authentic if they mirror the complexity, collaboration, and high level thinking that is necessary in the most intellectual of professional problem-solving and decision-making (p. 10).

Authentic learning environments simulate real life problems and create the opportunity for using alternative approaches to solve a problem combining different ways of working and thinking. Therefore, problem-solving activities, simulations, on line learning communities, projects etc can be used to implement authentic learning in school environments. Reeves et al. (2002) describe what authenticity means in the design of learning activities. They present ten characteristics that define authentic Learning activities: 1. Authentic Learning activities have real world relevance, 2. Authentic Learning activities are ill-defined, 3. Authentic Learning activities require sustained student effort, 4. Authentic Learning activities involve multiple perspectives and resources, 5. Authentic Learning activities involve collaboration, 6. Authentic Learning activities provide opportunities for reflection, 7. Authentic Learning activities encourage interdisciplinary perspectives, 8. Authentic Learning activities integrate assessments, 9. Authentic Learning activities create polished products, 10. Authentic Learning activities produce diverse outcomes.

Students taking part in authentic learning activities are able to develop cognitive, social and metacognitive skills, as they use knowledge to decide the steps and the strategies they must take on to solve a real life problem (Wornyo et al 2018; Reeves et al., 2002).

2. METHOD

2.1. Objective and research questions

The objective of this study is to investigate the concept of "authentic learning" and "authentic assessment" as it was revealed by education executives with professional background in their field of expertise. In specific, the present study explores:

- How education executives create an authentic learning environment using specific examples of authentic learning activities.
- What results they expect to receive from the implementation of the authentic learning activities
- What the education executives consider as "authentic learning" and "authentic assessment"

Research Questions:

- What learning and assessment techniques do education executives use to ensure the authenticity of learning and assessment.
- What are the characteristics of authentic learning activities according to the education executives.
- What kind of skills do they consider students develop through the specific options.

2.2. Research strategy and instrument

A qualitative data analysis was carried out. The qualitative study was regarded appropriate because the researchers were interested to investigate how the concept of "authentic learning" and "authentic assessment" is formed in the discourse of the education executives (Delikari, 2005). All recorded data were analyzed by thematic analysis (Creswell, 2000). Data were collected in one phase for all the participants. The questionnaire that was administered to the education executives was divided into three parts.

The questions were closed and open type, so the education executives had the opportunity to express their perceptions about the meaning of authentic learning and authentic assessment. In the first part of the questionnaire they had to define the concepts "authentic learning" "and authentic assessment". In the second part they had to describe the connection between authentic learning and authentic assessment and in the third part to give examples of authentic learning activities and techniques of authentic assessment that they had used in their teaching practices". They had to answer questions such as the following: What do you consider is the difference between authentic assessment and traditional assessment? What types of authentic learning activities have you used in your daily school practice? Give some examples of authentic learning activities that you have implemented in your daily school practice. What skills do the students participating in authentic learning activities develop? Moreover, quantitative analysis of the data was conducted regarding the gender of the participants and the type of authentic activity chosen. 114 questionnaires were collected in total.

2.3. Participants

The sample of the research consisted of 114 adults participating in a training program in order to obtain a certification in leadership and management in education during the year 2018-2019. The trainees were education executives with previous teaching experience in primary and secondary level of education. During the training program they had to participate in a course entitled "Assessment in Education" and in specific in Educational Assessment.

3. RESULTS

48 men (42%) and 66 women (58%) participated in the study. 43 of the men and 56 of the women answered the questions. 15 of them did not answer the question about giving examples of authentic learning and assessment techniques.

Table 1.
The participants according to gender.

	They answered		*They did not answer*		*Participants*	
	n	*%*	*v*	*%*	*v*	*%*
Male	*43*	*89,6*	*5*	*10,4*	*48*	*100*
Female	*56*	*84,8*	*10*	*15,2*	*66*	*100*
Total	*99*	*86,8*	*15*	*13,2*	*114*	*100*

Table 2 shows the type of authentic activity chosen by education executives according to their gender.

Table 2.
Types of authentic learning activities according to gender.

	Men		*Women*		*Total*	
	v	*%*	*v*	*%*	*v*	*%*
project	*21*	*23,3*	*28*	*22,8*	*49*	*23,0*
portfolio	*11*	*12,2*	*23*	*18,7*	*34*	*16,0*
role-playing	*6*	*6,7*	*5*	*4,1*	*11*	*5,2*
case study	*6*	*6,7*	*5*	*4,1*	*11*	*5,2*
problem solving	*6*	*6,7*	*5*	*4,1*	*11*	*5,2*
rubric	*7*	*7,8*	*5*	*4,1*	*12*	*5,6*
concept map	*5*	*5,6*	*9*	*7,3*	*14*	*6,6*
simulation	*3*	*3,3*	*9*	*7,3*	*12*	*5,6*
self-assessment	*5*	*5,6*	*7*	*5,7*	*12*	*5,6*
peer-assessment	*4*	*4,4*	*8*	*6,5*	*12*	*5,6*
diary	*2*	*2,2*	*3*	*2,4*	*5*	*2,3*
ICT	*7*	*7,8*	*5*	*4,1*	*12*	*5,6*
experiment	*2*	*2,2*	*3*	*2,4*	*5*	*2,3*
brainstorming	*0*	*0,0*	*1*	*0,8*	*1*	*0,5*
observation	*3*	*3,3*	*3*	*2,4*	*6*	*2,8*
debate	*1*	*1,1*	*1*	*0,8*	*2*	*0,9*
visit	*1*	*1,1*	*3*	*2,4*	*4*	*1,9*
Answers in total	*90*	*100*	*123*	*100*	*213*	*100*

The findings resulting from qualitative data collected through questionnaires were grouped in three categories according to the objectives of the study. The researchers divided the findings of the research into the following three categories: the types of authentic learning and assessment techniques, the characteristics of authentic learning environments and the skills the students can develop through the participation in authentic activities, according to the perceptions of the education executives with previous experience in education.

The education executives, who were of different specialties and had previous experience in teaching, gave examples of authentic learning and assessment activities supporting authentic learning environments used in their daily school practice in a variety of subjects such as Maths, History, Geography, Biology, Science, Literature, Religious Education, Chemistry etc.

Most education executives in the sample (n=83) answered that projects and portfolios are the authentic techniques they mostly use in their school practices. According to their answers, projects and portfolios have the characteristics of authentic learning and assessment and support authentic environments. Using the above techniques, students learn to work in groups, reflect on their experiences, develop critical thinking, cognitive, social and metacognitive skills, and use strategies to solve a problem, design plans and follow steps to achieve a goal, as the answers of the participants in the study revealed. *"In Religious Education, my students planned a religious tour of the Parthenon for Muslims. During the course the students created a portfolio which included photos, explanations of important constructions and activities, samples of interviews, list of books they have read and content related to the topic they were working on"(P. 25).* In addition, reflection can be developed with the use of portfolio in the learning process *"I used portfolio as an assessment technique in History lesson. It is a flexible and valuable authentic technique which gradually revealed the personal development of the students and helped me to assess them in a holistic way. This technique helped students to be aware of themselves and discover their own skills". Moreover, it helped me to reflect on my teaching and improve it. (P. 81).*

One dominant skill that came up from the study is the problem-solving skill. Students use a variety of sources distinguishing relevant from irrelevant information and associate the gained knowledge with everyday life discovering links in order to solve a problem. Thus, they become an active part of the learning process and they stayed motivated through the process of creation. Moreover, from the answers of the participants came out that cognitive skills, such as search for information was developed as well. *"The students developed the skill to recognize information and to choose what was relevant to the subject" (P. 58).*

From the answers of the participants came to surface the fact that all the above authentic activities are a form of experiential learning, through students are initially exposed to an experience and then encouraged to reflect on it and develop new knowledge, skills, attitudes and behaviors (Phillips, 2004). Indicative examples of projects that focus on experiential learning are the following: "*In Geography I asked the students to make a research of a country they were interested in and to make a tourist guide of that country. Then they had to take on the role of a tour guide (role playing). (P.3)*. In a project that took place in a primary school in a touristic area "*My students in the English class had to make a tourist guide for their area in which they had to highlight the advantages of their area among other schools in Greece in order to attract other students visit it. Students had the chance to select between a printed tourist* guide *and a digital one by creating a website or posting it on local blogs*" *(P.10)*. The students gained practice in identifying the most important points of a story and learned how to write in a captivating manner.

In experiential learning, which is a basic characteristic of authentic learning, knowledge and experience are acquired outside the traditional academic classroom setting. An example of an outdoor authentic activity is the following: "*I was working as a teacher in a primary school in Athens. For Science my students had to study the plants, so they made their own vegetable garden and in this way they learned all the stages of vegetable development, the ways of cultivation, the parts of the plants, their species, the amount of*

water they need as well as the frequency of watering. They learned how to take responsibility for the protection of the plants, got to know their enemies and the ways to protect them" (*P.33)*.

In role-playing activities it is important to enable and encourage students to explore different perspectives on the topics from various points of view. According to the examples they gave: "*Learning takes place through a role-playing game for students, sometimes assuming the roles of traders and sometimes customers. In an experiential way, students learn how to use the knowledge they acquire in dealing with real-life situations*"*(46)*. In various authentic learning activities students act out roles in a particular scenario and have the chance to see a problem from different perspectives. In a role – playing activity "*The students take on the role of Municipal Counselor and try to face the big problem of pollution in the city they live. They try to propose solutions in order to solve the problem*" *(P.100)*. The most important session of this activity is the discussion about what the students learned, as they reflect on their own experiences, discuss the strategies they implemented and the ways they can apply them in real life.

In addition, the use of the diary as an authentic technique provides opportunities for reflection: *"Students write down n a diary the effort they made, the learning process and the means they used in order to complete the tasks they undertook, the problems they faced, the cognitive conflicts that finally helped them understand various concepts, their reflections and the evaluation of the knowledge gained (P.62)*.

According to the participants' answers based on their own experience in all kinds of authentic activities (project, simulation, role playing, case study, c-map etc) students become an active part of the learning process through their participation in authentic activities. "*Students act on their own by researching data, recording opinions, exchanging opinions and announcing results*." *(P.40)*

Through specific examples based on the education executives' experience, the relevance between authentic learning activities and real world situations was revealed. One of the participants mentioned: *"In Social Studies students should create a virtual business and take on different roles. Students started searching for funding, they designed products, materials, they gave interviews, made presentations at exhibitions and promoted sales. Students managed to create a movement in the local community, offered publicity to the idea of remunerative recycling with dozens of references in print media and many interviews on radio and television stations nationwide. These students have already made the first step of an entrepreneur. Most of their classmates may not have the chance to do that in their lives" (P.88)*.

Another basic characteristic of authentic learning and assessment which became apparent from the analysis of the answers is team work. In all kinds of authentic learning activities students work in groups, interact with others, cooperate and respect the other members of the team. The analysis of the answers revealed that "*Students share and exchange views, attitudes, experiences and information about a problem*" *(P.58)*. In classrooms team work can be encouraged through tasks that are addressed to a group rather than an individual. Moreover, collaboration can be established through communication technology.

The analysis of the data revealed self-assessment and peer assessment as dominant authentic characteristics in the kinds of authentic activities that were described by the participants (project, simulation, role playing, case study, c-map, diary etc.). The education executives based on their teaching experience referred that in authentic learning environments students are able to learn on their own how to find answers to some of the inconsistencies they came across and to resolve the ambiguities embedded in some of the tasks. According to their answers: *"In Literature I asked students to work in groups in*

order to study two poems of the same poet, Carver Raymond. Then they had to assess their classmates using an analytic rubric. By assessing their classmates work, they reflected on their own learning process". "They could get information from the other team members and compare it with theirs, express their point of view and correct their mistakes". *(P.11).*

In order to provide opportunities for students to reflect on their learning, the learning environment needs to provide an authentic task. The construction of a concept map and the creation of a portfolio enable students to identify their in different stages of accomplishment. As they pointed out *"Using concept maps, we can identify students' weaknesses and adapt their lesson to their needs". "Students choose the tasks they will include in their portfolio based on goals and criteria that are defined by them with our help" (P.74).*

In order to provide authentic assessment in classrooms it is required the assessment to be integrated with the activity and to provide criteria for assessing varied products. *"When participating in a competitive process with specific criteria to be met by the team, each member of the team was being evaluated at the daily meetings where feedback, peer comments and views of other members of the team and me were given,". (P.3).*

From the answers of the participants became prominent that authentic learning activities encourage interdisciplinary knowledge and involve multiple resources. *"In Environmental Education the aim of the project was to make students aware of the need for energy saving, renewable energy sources, to bring them in contact with the environment and to become aware of the value of this kind of energy, ie to know how to produce renewable / green energy; solar energy, wind, through photovoltaic systems and geothermal energy. The research encouraged interdisciplinary as the students needed to combine knowledge from different courses, such as Computer Science, English and Engineering / Electrical Engineering (P.2).*

In authentic activities students are able to get engaged in inquiry and problem solving, decision making and scientific research. Problem solving was emerged as a basic characteristic and as a metacognitive skill. In a given example based on the experience of the participants "*A rainy day can be the cause for exploring the circle of water. In Physics the students asked me questions, such as "Why is it raining?", "Where does the rain come from", etc. After activating the pre-existing knowledge, I followed the steps of constructive learning, meaning I asked students to formulate questions and make predictions. They were led to formulate functional definitions and draw conclusions. Through experimentation they approached the concepts of melting, coagulation, solubility, ventilation*" *(P.22).*

The answers of the participants revealed that ICT was used in most authentic activities, such as portfolios, simulations, online diaries, rubrics, c-maps etc and supported collaboration and team work. *"Students in collaboration with me created an online diary - blog where on a daily basis they posted topics related to daily school life, society, family, and the scientific community. Moreover, they posted announcements of events, school holidays, excursions and educational programs. The online diary is a technique of authentic assessment for stakeholders in the school community" (P.14).*

Finally, according to the education executives the students showed sustained effort and they focused on their goal through their participation in authentic activities. For instance, in a project that took place in Social studies: *"The students of second grade took voluntary action for the inclusion of refugees, immigrants in the local community. They organized sports, entertainment, arts, and music activities with children from different cultural backgrounds, so that all the children from different countries were included in our school life and community. They concentrated their effort on helping them in their daily schhol life and they developed the skills of planning, creativity and innovation, acceptance of diversity, flexibility and adaptability (P. 2).*

4. DISCUSSION

In this study we have focused on the definition of authentic learning and authentic assessment according to the perceptions of education executives with previous experience in education. From the analysis of the data we are led to the conclusion that the basis for authentic learning is the belief that students learn more easily and in depth if knowledge is combined with existing experience and practical application in everyday life (Reeves et al., 2002).The participants, who had previous experience in teaching through specific examples given were led to the definition of authentic learning and authentic assessment, which is consistent with the literature (Lombarti, 2007; Har, 2013; Herrington & Oliver, 2000, Wornyo et al., 2018). From the results of the research the authentic techniques that have been used the most were projects, portfolios, problem solving, self-assessment and peer assessment, role playing and the use of ICT.

According to the analysis of the examples given in authentic learning and assessment environments regarding the development of skills, students are provided the opportunity to construct their own knowledge, through research and problem solving and develop critical thinking and metacognitive skills. They work in groups and take initiatives. Through inquiry and the expression of different ways of thinking, students are encouraged to collaborate, to respect and consult one another (Wornyo et al., 2018). For example, in project based learning, working in groups, using ICT for searching information, developing a topic of research and presenting the findings and the conclusions are practices of authentic learning. These activities are conducive for creating an authentic learning environment where the real world becomes a part of the educational experience. For example, in Social Studies Lock and Duggleby (2017) argue that "when students are engaged in authentic learning that uses a global classroom approach, it influences how they see themselves as global citizens" (p. 21).

As it became apparent from the examples of authentic activities described by the participants, in the project method students are able to explore and solve problems by choosing information through collaboration and dialogue. The results are n line with other research, where through Project Based Learning (PBL), they have the opportunity to be involved in problem-solving, decision-making and scientific research (Hmelo-Silver, 2004; Panasan & Nuangchalerm, 2010; Thomas, 2000). Regarding rubrics, according to Jonsson, and Svingby (2007), when they are used by students to assess their own performance, the students are encouraged to take responsibility for their own learning and they are able to appreciate the strengths and weaknesses of their learning work. On the contrary, Orsmond and Merry (1996), argue that students might not find the qualities in their work even if they know what to look for, since they have a less developed sense of how to interpret criteria.

In authentic learning and assessment contexts students act out multiple roles, experiment and apply skills in diverse situations, organize, assess and synthesize information, relate facts, concepts, develop complex ways of communication, narrate and give explanations in order to present their conclusions (Roelofs & Terwel, 1999).

The findings of this study indicate that the above techniques give students the opportunity to use previous experiences and knowledge and share them in groups in order to gain new knowledge. According to Jarvis (1999:122), this happens because these techniques are focused on students who use pre-existing knowledge to solve problems and collaborate. Authentic learning is an active learning process where students are not passive. It has been observed that this learning is necessary for developing critical thinking skills and scientific contents (Apedoe, Walker, & Reeves, 2006).

As far as experientiality and interdisciplinarity are concerned, the analysis of the data indicated that they are key characteristics of authentic learning, as we find them as key characteristics in many examples of our study, such as project, portfolio, role playing and problem solving. This is in line with the literature according to which students' experiences are enriched by providing them multiple perspectives of a single topic or issue and authentic learning activities encourage interdisciplinary perspectives (Oliver, Herrington, & Reeves, 2011). Authentic activities can be integrated and applied into different subject areas and lead beyond domain-specific outcomes (Bransford, Sherwood Hasselbring, Kinzer, & Williams, 1990).

From the answers of the participants, it became evident that assessment of authentic learning can take the form of a number of assessment measures which do not include formal tests, such as portfolios, diaries, and self-assessment but they create opportunities which enable students to craft polished performances (McLellan, 1996). In this context authentic assessment enriches the teaching process and does not occur only at the end of the learning process but during it (formative assessment).

Finally, the important role of ICT in authentic learning environments was mentioned by most of the participants in their responses. In specific, ICT (Information and communications technology) was used in various authentic activities, such as e-portfolio, simulations, rubrics, e-diary etc. The 21st century skills can be built by having students complete literacy assignments from the viewpoint of a blogger. Students can edit peer work, share the product with the learning community and interact with others through online resources. Establishing a deeper familiarity with computers will also help with computer-based assessments. For example, Koenders (2006) reports how authentic online learning in Biology enhanced the learning experiences of the learners.

In most cases, technology provides the capacity to support them from a distance enabling them to consult and collaborate as they work (Oliver et al., 2002). The easy accessibility that the web provides to various resources enables them to share content and to create learning communities which can interact easily. Undoubtedly, the internet can be used most successfully to encourage reflection through the use of reflective online diaries, rubrics or e-portfolios and simulations, as it was revealed from the study (Piburn & Middleton, 1997; Lebow & Wager, 1994; Young, 1993).

5. CONCLUSION/FUTURE RESEARCH DIRECTIONS

The learning tasks implemented by the education executives with experience in teaching and education provided the opportunity to introduce interesting and challenging authentic tasks in classrooms of primary and secondary education. Describing specific examples of authentic learning and assessment activities they tried to define what they consider as authentic learning and authentic assessment.

According to their answers the authentic learning tasks and activities undertaken exposed both students and teachers to learning experiences that have enhanced social and metacognitive skills of them both. Students applied knowledge in practice and in real-life situations and they developed critical thinking, through experiential activities. Education executives reflected on their work.

Although authentic learning and assessment techniques are appealing, much research needs to be conducted on how to foster them in an effective way in classrooms. For example, teachers could introduce authentic activities by replacing textbooks with historical documents in History lessons. They could design problem-based activities to replace lectures and support innovation with visualizations, simulations, and interactive

technologies. Their learning goals can be achieved if they rethink the assessment strategies they use. Taking all these under consideration, much research needs to be conducted on the importance of the role of teachers who need to have a clear rationale for completing the task, understanding of the real-life application of the task and appropriate support to complete the task. Future research needs to focus on authentic environments that support student learning and enrich learning experiences. However, for this to happen it is necessary for teachers to carefully design and facilitate classroom tasks that promote the principles of authentic learning.

Finally, the findings could be a trigger for further research in which the perceptions and views of the students about authentic learning and assessment could be investigated. Though the research focuses on authentic learrning activities at primary and secondary level of education authentic activities could be successfully implemented in teaching various subjects at tertiary level, as well.

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Section 2
Teaching and Learning

Chapter #12

THE IMPORTANCE OF BILINGUALISM IN THE PRIMARY CLASSROOM

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ABSTRACT
The main purpose of this study was to give account of the importance of early bilingualism in the primary classroom and to ascertain if being bilingual from an early age is an advantage or a hindrance. In the context researched here (Primary school teachers and Primary trainee teachers in England), the paper seeks to determine how early bilingualism has influenced the respondents' education, career choices and overall learning and teaching experience at school. Action research was used in this study. The key findings concluded that early bilingualism has impacted positively on the respondents' education and life choices and that being bilingual from an early age is an advantage. On the other hand, there are some negative influences, but they are outweighed by the benefits that knowledge of home languages bring. It is hoped that this study will encourage primary teachers, trainee teachers and parents to look at bilingualism as an opportunity and utilise bilingual learners' linguistic and cultural knowledge in order to create an environment where students and teachers have the opportunity to learn and develop together.

Keywords: bilingualism, language acquisition, proficiency, classroom practice, impact.

1. INTRODUCTION

We live in a global melting pot. As the world gets smaller by the day and the means of communication, including languages, are changing fast, we need languages more than ever in order to communicate with people around us (Li, Patel, & Sooknanan, 2011). Although there is a significant amount of literature focused on the need for knowledge of additional languages (Conteh, 2012), early exposure to bilingualism has been chosen for this research Educational advantages and disadvantages of bilingualism have been the target of investigations since the 1920s (Cunningham, 2011). It is an important and much-discussed topic, which may evoke both positive and negative emotions (Robinson & Altarriba, 2014). According to Ramirez and Kuhl (2016), about two thirds of the world's population is now estimated to understand or speak at least two languages; bilingualism has become the norm rather than the exception in many parts of the world. However, not everyone agrees that knowledge of these languages is helpful or beneficial (Bialystok, Craik & Luk, 2008).

2. BACKGROUND

The author's interest in this area has originated from her practice as a former primary school teacher in the UK. She noticed that a number of parents were reluctant to maintain learning in class home languages and only equated academic success with learning in English, the 'dominant' language. They wanted to replace home languages with English as

soon as they could in order to integrate into the 'dominant' society. Even some teachers at school had shown no interest in bilingual children's culture and educational advantages that came with it. Javier (2007) recommends finding areas of strengths for each child rather than finding exclusive areas of deficiencies. He suggests avoiding tests that are too loaded in linguistic and cultural demands, especially if a newly immigrant child is being assessed.

The author's interest in this topic has increased further since becoming a teacher educator at the University. Having conducted a survey amongst primary trainee teachers, it was clear that a significant number of them was not able to recognize nor utilise fully bilingual children's existing knowledge and language skills. Javier (2007, p. 14) wonders if it could be due to "anxiety" associated with the presence of another language, that is not familiar to the "dominant" members of our society. Similarly, Byers-Heinlein & Lew-Williams (2013) suggest that some professionals may think that bilingualism causes delay in language acquisition and a possible decrease in vocabulary in both languages.

It was hoped that this study would establish if early bilingualism is helpful at primary school and if it can be used by teachers to foster a positive classroom environment where pupils and teachers have the opportunity to learn and develop together.

3. LITERATURE REVIEW

This section provides an overview of the literature that underpins this study.

3.1. The earlier, the better

Academic opinion varies over the extent to which an early start in second language learning influences higher level proficiency later on in life. Despite insufficient empirical evidence, there was an "enormous boom of interest" (Moon & Nikolov, 2000, p.v35) in early second language instruction in the 1990s, and it still remains a much-debated issue. Neurolinguists have been interested in bilingual brains for a long time and the way language is configured for bilingual people. Cameron (2001) supports the view that young children learn languages more effectively than adults, especially before puberty. At that age they use parts of the brain and mechanisms that are no longer accessible in later life. She illustrates the concept of the Critical Period Hypothesis (CPH), which represents Lenneberg's notion of a 'critical period' for language (1962). Lenneberg argues that the development of specialization of functions in the left and right sides of the brain begins in childhood and is completed at puberty. Although the "bilingual brain is still terra incognita", (Grosjean, 1982, p. 267) it seems that modern research may be shifting towards supporting Cameron's view (Bialystok, 2016). Similarly, Vygotsky (1962, p. 43) observes that speech and thought are independent at first, but begin to merge at around the age of two. At around that time "the knot is tied for the problem of thought and language". His view was that there was a profound connection between children's language and the early development of cognitive awareness and mental concepts.

3.1.1. Benefits of early bilingualism

In the literature one can find many examples of acknowledgement of the benefits of early bilingualism, which may be helpful to teachers. For instance, Baker (2006) notes that the ownership of two languages is increasingly seen as an asset as the communication world gets smaller. He also suggests that bilinguals' role is to preserve a linguistically and culturally diverse world. Bialystok (2001, p. 192) argues that bilingual children's ability to read and some of the components that prepare children for it transfer across languages and systems. If children have those skills in one language, they may apply them to the other

one. Sneddon (2000) reflects on the relationship between literacy at home and at school; his study shows that language and literacy skills are transferable between languages and that the knowledge of a home language lays a good foundation for successful learning in a majority language. Similarly, Baker (2007) notes that bilingualism may increase children's thinking power. For instance, corresponding words in different languages may have different connotations. As bilingual children have different association for each word, they "... may be able to think more fluently, flexibly and creatively" (Baker, 2007, p. 5). Ramirez and Kuhl (2017) show that the accumulating effect of dual language experience is effective against cognitive decline that comes with ageing and may delay the onset of Alzheimer's disease. Bialystok (2016) thinks this is due to the "cognitive reserve" in the brain, which is boosted by bilingualism rewiring the brain. According to her theory, in case of damage, bilinguals can compensate more because they have extra grey matter and alternative neural pathways.

Ramirez and Kuhl (2017) reflect on a growing body of evidence which suggests that bilinguals (from an early age) exhibit enhancements in both executive functioning and cognitive flexibility, which aids problem solving and planning. As the brain switches from one symbolic code to another and makes the effort of constantly managing attention to the target language, various brain networks are strengthened and enhanced. Moreover, bilingual learners have increased empathy, as learning a language requires careful listening to others and paying more attention to communication rather than speech errors. Nikolov (2000, p. 42) notes that second language learning can "…encourage the early understanding and appreciation of different cultures and values…" Research also suggests that bilinguals may be more sensitive during communication as well as 'more patient than monolinguals' (Baker, 2007, p. 5). Bilingual children's level of self-esteem is also higher, as they are able to switch between different languages. They are secure in their own identity.

Other advantages of an early start include access to enhanced employment prospects and rewarding career opportunities. Having a personal connection to a country or a language can help bilinguals understand other ways of life more effectively. Baker (2006, p. 423) observes that bilinguals are highly employable in almost all areas of business, be it tourism, banking, media, the medical profession, international transport, marketing, ICT, teaching, interpreting or government work. Interacting with customers in their own language is good for business. Carreira and Armengol (2001) and McGroarty (2002) note that bilinguals are often seen as more multi-skilled. Bilingualism can "become a marketable ability to bridge languages and cultures, securing trade and delivery of services" (Baker, 2006, p. 425). Although bilingualism does not "guarantee a meal ticket or future affluence" (Baker, 2007, p. 5) bilingual people are likely to be in a strong position in the competitive job markets.

3.1.2. Limitations of early bilingualism

This section will explain some of the perceived disadvantages of early bilingualism, that have been repeatedly associated with the process. Some authors are concerned that bilingualism puts children at risk of language delay or academic failure. Javor (2017) reflects on the assumption that early bilingualism affects the development of the mind in a negative way, as two languages disturb each other. Ramirez and Kuhl (2017) refer to several studies which report that bilinguals lag behind in grammar. Hoff et al. (2012) note that bilinguals control a smaller vocabulary in each language than monolinguals, when skills are measured on a single language. Similarly, Bialystok et al (2008) report about negative effects of bilingualism such as poorer lexical access and receptive vocabulary. As bilinguals split their time between two languages, they have less time for each language

than monolingual children. In a way, these results are not surprising. Nikolov (2000, p. 25) observes how the existence of a 'critical period' has been argued against by some researchers and that "older language learners are more successful and efficient that younger learners". Similarly, Singleton and Ryan (2004, p.4) observe that some studies point out that the existence of 'critical period' is not proven and that, in fact, older beginners do better. They favour a later start.

The view that home languages somehow 'destroy' children's learning in English may still be present. Even David Blunkett, the former Education Secretary, suggested that children can only learn one language at a time and that learning a mother tongue interferes with English (Casciani, 2003). However, Piper (2001, p. 12) observes that "…young children acquire two or more languages in much the same way as they learn different registers - socially defined varieties - of the same language". She argues that contrary to some views, bilingualism is an advantage and does not harm children.

Hall (2001, p. 2) wonders why, despite linguistic diversity being a norm in today's UK classrooms, educational literature is still produced with little reference to the fact that British society is multilingual and multicultural She observes that some teachers today "still equate a lack of English language skills with learning problems and low intelligence". Baker (2006) observes that minority languages are often thought of as being connected with problems of underachievement in school, poverty and lack of integration into the majority culture. The author witnessed various forms of assessments in schools that were too complicated and overloaded with challenging vocabulary and cultural references. Similarly, Cummins (1996) suggests that bilingual children's cognitive abilities are often considered to be synonymous with their level of English. This view chimes well with Datta's (2007), who started teaching in the UK in 1976, and was saddened to have found out that bilingual children were embarrassed about their home language. They tried to hide it and were obviously uncomfortable about their bilinguality. As they lacked motivation to learn English, the teachers thought that their bilingualism is "a handicap to learning". Moreover, parents may equate academic success with learning in English only. Conteh (2003) observes how some parents face dilemmas while attempting to involve themselves in their children's education. They have a strong sense of cultural identity and work hard on maintaining their home languages and cultures. However, they recognise the need to become proficient in English and work hard in order to succeed at school and later on in life. Enever, Moon, and Raman (2009) observe that some parents are keen for their children to be proficient in English first, as English is perceived as a universal world language, used for international communication and trade.

Some studies show that there is still a gap in general awareness of the *needs* of bilingual learners (Conteh, 2012). That is perhaps the biggest obstacle to effective teaching and learning. Enabling access to a broad and balanced curriculum, that involves parents and home cultures, can indeed be a challenging task. Some teachers may find it very difficult to cope with an ever-increasing workload and simply cannot find the time and energy to devote to their bilingual learners, let alone to talking to parents. Conteh (2003, p. 48), is concerned about some teachers who, due to the pressure of meeting targets, provide 'pre-packaged, uniform teaching that takes no account of their pupils' experiences.' She highlights that, as the benefits of bilingualism are long-term, rather than short-term, they are not exploited in most mainstream classrooms in England. Hall (2001, p. 6) stresses that the most important thing teachers and schools should remember is to look at the home language as a "valuable channel and NOT a hindrance". However, this process will not take place overnight. Ideally, schools should be able to handle all of these matters sensitively and sensibly. Furthermore, they should make sure that policies and the curriculum are

planned carefully to cater for bilingual children's needs, that they involve parents and that they reflect the need for continuity and sustainability. Only then will teachers be able to help their learners to fully utilise their cultural and linguistic experiences (Conteh, 2012).

This section has explained the benefits and limitations of early bilingualism. It is hoped that different views of early bilingualism will be beneficial to practitioners and encourage them to look at bilingualism from different perspectives.

4. METHODOLOGY AND INVESTIGATION

Sixteen respondents volunteered to take part in this survey – twelve primary student teachers from University and four experienced primary teachers from partnership schools. All of them teach bilingual children in their classrooms. In addition, eight of them are bilingual, so they were able to provide valuable insight into the impact of home languages on their own education, overall learning experience and career choices. The response rate was 100%. Action research was chosen for this study. Sharp (2009) suggests that this is a suitable approach as it can help teaching staff find answers to questions they face every day. In addition, it helps them to address specific concerns and issues they may have. McNiff (2013) explains that action research is an effective way of evaluating of what we are doing, while improving our own work and that of others at the same time. McGrath and Coles (2010, p. 109) observe that sharing good practice with other professionals will "spread out like ripples on a pond" and have a positive effect on other researchers' practice.

Researchers incur serious ethical obligations toward their respondents (BERA, 2018) The author was aware that bilingualism may potentially be a sensitive issue for some participants. Language allows speakers to articulate and conceal their feelings; this can have significant impact on their emotional understanding and experience. Newby (2014, p. 318) explains that researchers need to be aware of possible strong reactions, but the questions still had to be asked. He notes that the key ally in producing questions is 'the privacy of the questionnaire and the anonymity we should afford the respondent'. Newby (2014) also explains that the way to capture the participants' interest is to explain the purpose and possible outcomes of the research as succinctly as possible. In addition, the significance of their contribution should be explained and the questions should be straightforward. In order to ensure anonymity and confidentiality, each respondent was assigned a code. Ethical consent was taken into consideration and additional information was provided during face-to-face meetings. The participants were informed that the research was also an opportunity for them to explore and reflect on their understanding of bilingualism and their own experiences, in order to improve their classroom practice. Similarly, Cohen, Manion, and Morrison (2011) note that action research bridges the gap between research and practice and importantly, it makes education practice more reflective. Reflection helps us gain insight and move forward. Austin (2016) advises trainee teachers to answer all questions regarding their classroom practice from an informed and substantiated position. That can only be achieved by approaching teaching from a thoughtful and reflective perspective.

The research method involved semi-structured, individual interviews and three quantitative questions, in order to allow for more diversity in responses and to be able to adapt to new developments during the study. The qualitative questions were prepared in advance and the interviews were recorded. Newby (2014) suggests that the conclusion should be reached by reflecting on data consistently, without prejudice, in order to avoid bias. The respondents' answers were pursued in order to follow through interesting ideas and themes which arose during the interviews. Notes were taken in case the interviews ran

dry or if note-taking had to be reverted to in an emergency. Woods (1986, p. 81) suggests that during interviews, "...even the briefest of notes can aid recall …The cryptic joints made at the time are sufficient to stir memory later'. Primary evidence was used, which meant original and uninterpreted information, provided by the respondents, was analysed. Newby (2014) observes that in semi-structured interviews, interviewers have the freedom to clarify people's understanding, explore viewpoints and ask follow-up questions. Bell (2005) highlights that one major advantage of this approach is its adaptability. The way in which a response was made, such as facial expression or gestures can provide much more information than a written response. Solid, measurable data were needed too; therefore three quantitative questions were asked. The answers are presented in the 'Survey results' section. Bar charts were used to collate specific elements of findings in this section and to highlight key elements to the reader. Austin (2016) observes that presenting these key aspects of the data makes it easier for the reader to follow when it comes to the analysis.

5. SURVEY RESULTS

After the interviews, a quick analysis of the data was done by looking at patterns and how the answers related to the questions that were asked. More time was given for a fuller analysis later on. Some answers were slightly unexpected. McGrath and Coles (2010) advise this approach to analysing data, in order to avoid closing researchers' minds to other possibilities, such as patterns, surprises, the unexpected.

Figure 1.

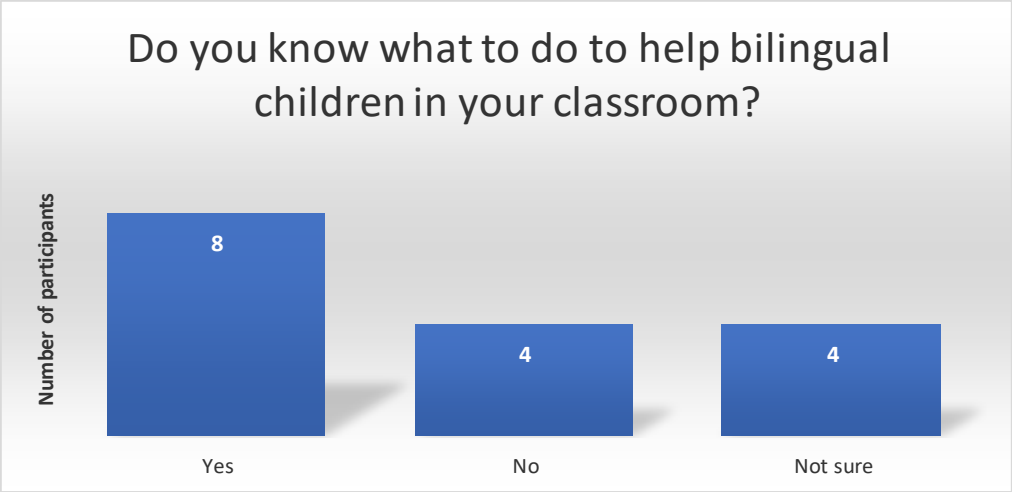
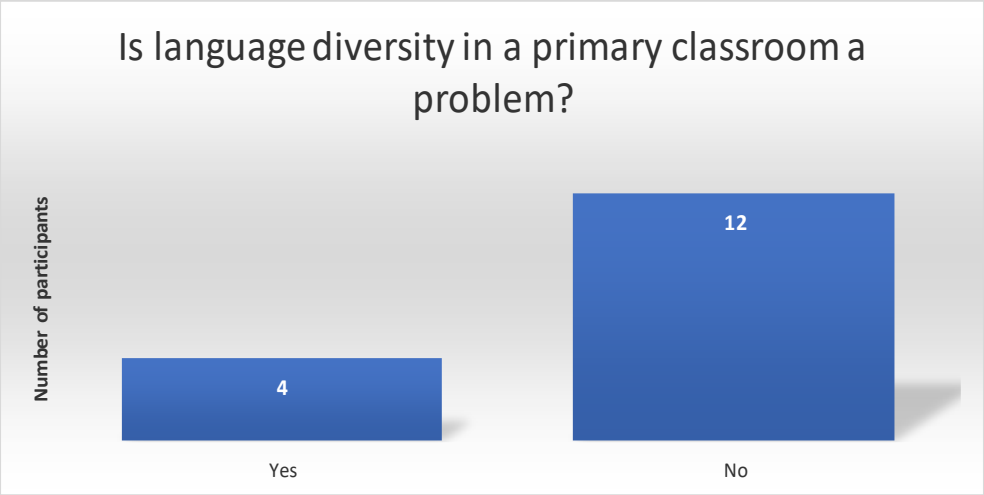


Figure 1. shows a mixture of results. 25% of respondents did not know how to help bilingual children in their classroom and 25% were not sure. This was a slightly unexpected outcome, as a higher percentage of the "Yes" answer was expected. However, all respondents expressed desire to learn more about bilingualism, in order to improve their practice, and some expressed frustration with the lack of support from schools.

Figure 2.

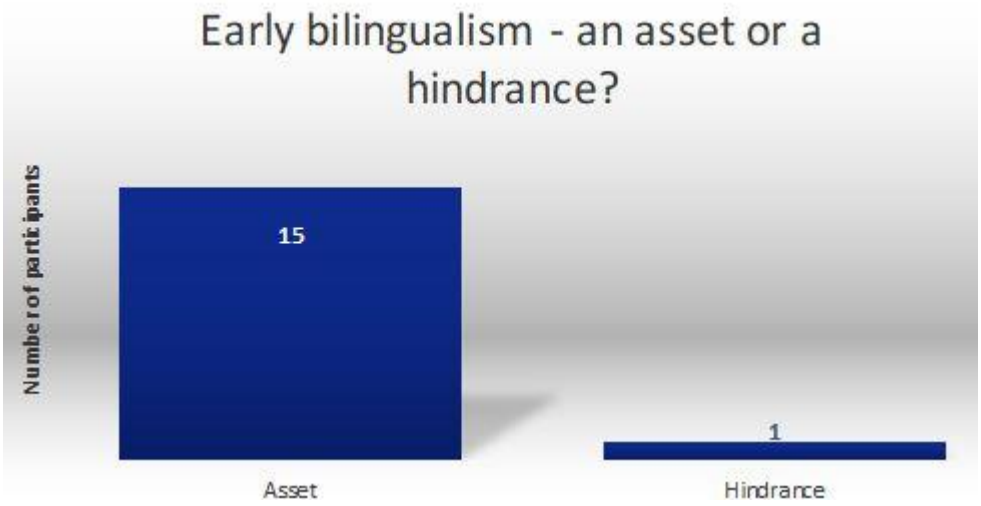


This was an interesting outcome. Figure 2. suggests that 25% of respondents think that language diversity is a problem in a primary classroom. They think that bilingualism might be an obstacle to learning and it would be best if children spoke English only at school. In addition, they said that some bilingual children they teach insist that they do not want to speak their home languages in public, especially with their parents, as this attracts unwelcome attention.

Cunningham's (2011) highlights the difficulties young children may experience when living with two languages. They attempt to analyse the stream of sounds into meaningful units and later they need to learn two words for everything and two systems of putting words together. This may lead to frustration and failed communication. Older children are expected to achieve literacy in both languages as quickly as possible, so they can perform well at school; this can be a daunting task. Cunningham (2011) adds that for some children, speaking a different language will attract attention. They may not be willing to be seen in public with their minority language-speaking parents for fear of being spoken to in the minority language.

The respondents who said that language diversity in classroom is a problem for them also stated that they lack training and that they simply do not have the time to prepare extra resources or do extra research, in order to accommodate bilingual children's learning. One respondent felt intimidated by their pupils' bilingualism and did not know how to help them. But the majority of respondents suggested that taking advantage of children's home cultures and experiences can be used as catalysts for interesting conversations and a springboard for projects in all areas of the curriculum. English speaking children can get involved, so everyone benefits (Issa & Öztürk, 2007).

Figure 3.



As shown in Figure 3, 94% of respondents have agreed that early bilingualism is an asset overall. They have noticed that, despite potential difficulties mentioned in Figure 2, bilingual children can learn more quickly and can use their existing knowledge and skills to create effective learning strategies Sanchez-Azanza, López-Penadés, Buil-Legaz, Aguilar-Mediavilla, and Adrover-Roig (2017) observe that, in recent years, the behavioural performance of monolingual and bilingual participants has become a theme of debate and a controversial topic in cognitive science. Their study supports the idea that bilinguals show enhanced cognitive control capacity when compared to their monolingual peers. This phenomenon is known as `bilingual advantage'.

To summarise, the majority of the respondents (94%) agreed that early bilingualism is an advantage and they send a strong message to bilingual children. “Your home language is a very precious skill. Don’t be ashamed of it; embrace it.”

6. DISCUSSION OF FINDINGS

The main findings of the study are cited below.

6.1. Knowledge of home languages improves communication

The majority of respondents (81%) have stated that one of the main benefits is improved communication. Most bilinguals have access to two cultures, which is the only way to experience fully different ways of living, customs, food and drink, beliefs, ideas, art and ways of thinking. Baker (2007) agrees that the main advantage of speaking two languages is the ability to communicate. Likewise, Cunningham (2011) notes that this ability gives bilinguals a sense of pride and achievement. By using their home language, the child builds relationships with the extended family or the wider community and feels a sense of belonging and identity. Similarly, Robertson, Drury and Cable (2014, p. 611) refer to children’s and families “funds of knowledge” (resources, competencies, values and assumptions), that are developed through social networks and life experiences.

Bridging generation gaps is another important role. The respondents in this study found that their respective home languages help them communicate with the grandparents, relatives and other members of the community, which increases their sense of belonging.

6.2. Good classroom practice and positive, inclusive ethos are essential for effective teaching and learning

A common thread through this study was the respondents' willingness to learn more about bilingualism and how it affects learning and teaching. 25% of them (even those who are bilingual) found that they did not really know how to help bilingual children in their classroom, but they all wanted to learn more.

40% of bilingual respondents expressed frustration with their teachers during early years of education. They found that the teachers looked at their bilingualism as an obstacle to learning. Some of them were even put in lower ability groups unnecessarily and received very little support from schools when they were settling in. Three respondents said that their home culture and language were totally ignored by their teachers, but this has made them even more determined to succeed at school. Whitehead (1990, p. 84) notes how important it is for educators to look at children's "underachievement" against a wider cultural background, as culture and language go hand in hand. Accordingly, teachers should be able to understand and listen to their pupils and families without prejudice, as 'they too may learn to move more easily and confidently between language worlds and culture'. Grosjean (1982, p. 158) talks about difficulties people may experience when adapting to a new culture, which educators should be aware of. It can be a trying experience and can result in "loneliness, hostility, self-pity, disorientation, and fear of ridicule." Classroom practitioners should bear these factors in mind when dealing with newly arrived immigrant children and parents.

One bilingual respondent had a positive learning experience at school, as the school employed a few bilingual teaching assistants, who were always ready to help and interpret. They provided stable emotional support to children and were valuable links between home and school. Enever et al. (2009) observe that enthusiastic and trained teachers, together with a rich and stimulating learning environment, should be able to provide good quality provision. Kelly (2010, p. 95) advises that interactions are more likely to be productive in schools which send consistent messages that home practices count "because they are part of the children's experience". This effective learning practice should enable children access to a balanced curriculum, show them that their home cultures are valued at school and ultimately, have a positive effect on their learning.

6.3. Increased parental involvement is crucial to success both at school and at home

94% of respondents suggested that increased parental involvement is vital in ensuring effective learning. They thought that successful cooperation between teachers and parents is essential and can make all the difference. Supportive parents can motivate children by showing genuine interest and a positive attitude towards learning in both languages and praise progress, no matter how small.

A significant number of bilingual respondents (43%) said that their parents were reluctant to get involved in their education. They thought of English language as the 'superior language' and only wanted their children to use English at school and even at home. The respondents often felt ashamed of their home languages and did not want to speak it in public with their parents. The Bell Foundation (2017) advises immigrant parents

to encourage children to feel proud of their home language and culture and to be actively engaged in school life. Conteh (2012) suggests that one of the ways for establishing an effective relationship between parents and teachers is for teachers to report children's achievements to their parents and providing parents with an opportunity to discuss their children's progress. Arrangements for reporting may differ according to parents' linguistic and cultural background, but teachers can find creative ways of resolving this (e.g. the child or a family member may interpret). Baker (2006) suggests making use of bilingual teachers and teaching assistants as an effective strategy. This will make children and parents feel more involved and appreciated by the school.

6.4. Children's home culture and identity go hand in hand with language

The majority of respondents (87%) observed that language, culture and identity are closely related. One cannot exist without the other; they shape who we are.

A surprising 60% of bilingual respondents reported that their schools largely ignored their home language and culture. This approach made them feel insecure and sometimes silent; consequently their silence was interpreted as low academic achievement. One respondent was teased by other children about the food they ate and the music they listened to. The teachers did not do anything about it. Cummins (1996, p. 2) observes that in the past, "schools' rejection of students' language and culture tended to reflect the broader society's subordination of cultures and languages other than those of the dominant group". In addition, sometimes bilingual children may experience an identity crisis and not feel comfortable with having two identities and constantly moving between them. Identity is often imposed and being a member of a 'minority' may bring stress and tension to one's life.

90% of respondents agreed that careful planning and taking children's background into consideration is of crucial importance for any policy planning and implementation. The OFSTED report (2005, p. 3) illustrates the importance of recognising pupils' linguistic backgrounds in order to improve their attainment. The report notes how in most institutions there was "little systematic analysis of students' linguistic backgrounds or the impact of bilingualism on academic achievement". However, in those schools where senior managers did collect this information, it was successfully used to provide appropriate resources to help students, which contributed towards raising their standards of work. The report also stresses how some schools actively encouraged students to take GCSEs (General Certificate in Secondary Education) in community languages and their achievements were greatly valued and a source of pride for the whole school.

40% of respondents said that the children in their classrooms reacted very positively to their culture and identity being recognised, e.g. registers being taken in home languages, bilingual stories being read and different songs being sung Moreover, parents enjoyed being invited to class and talking to the children about their customs, language and food. By promoting bilingual children's mother tongue and cultural heritage, teachers show them that their culture and identity is validated; therefore, the whole child has been accepted. "This process forms the basis for meaningful learning" (Issa & Öztürk, 2007, p. 18).

6.5. Promotion of the home language at school helps develop children's cognitive abilities in the majority school language

75% of respondents observed that they believe their home language has contributed significantly to the development of their own cognitive abilities. They said that the bilingual children they teach are better at switching between tasks and they can focus better on relevant information and ignore distractions. These observations fit in well with research

carried out by the University of Groningen (2012); the results show that bilinguals often perform better on tasks that require conflict management, as they are better than monolinguals at ignoring irrelevant information Javor (2017) observes that in a research on performance of bilingual and monolingual children, the bilingual children actually performed better than their monolingual counterparts, despite low expectations in non-verbal tasks (such as symbol manipulation and organisation). This evidence shows that bilinguals have greater cognitive flexibility and a diverse set of mental abilities.

6.6. Knowledge of home language enhances career opportunities

70% of respondents have said that knowledge of two languages has enhanced their career and employment prospects. They felt that their early bilingualism has made them more tolerant and more open minded to new ideas and perspectives at work It has also brought economic advantages, as some of them were able to find careers that required knowledge of additional languages, such as retail, hospitality, NHS and interpreting jobs. They also said that their bilingualism has brought practical advantages at work, such as increased salary packages and securing business deals. Two respondents said they will go back to teach in their home countries once they finish their teacher training. They are confident that the language competence in two languages will be an advantage over other candidates. United Education Institute (2017) confirms that knowledge of languages can lead to successful and rewarding career opportunities.

7. FUTURE RESEARCH DIRECTIONS

The number of respondents in this study was limited to sixteen; however, the project could be a beneficial preparation for a possible larger study with a higher number of participants. It is envisaged that primary school practitioners, including trainee teachers, would benefit from a larger, more in-depth study on understanding the cognitive benefits of bilingualism and implementing good practice in teaching bilingual children in primary schools.

8. CONCLUSION

This study has given account of the importance of early bilingualism and its role in the primary classroom. The evidence has illustrated that the benefits outweigh negative influences, providing optimal conditions are created: increased teacher awareness, effective teacher training, a positive and stimulating learning environment, parental involvement and continuity in effective practices. As the world changes and the means of communication, including languages, are changing faster than ever before, the future of languages is complex and multi-faceted. The debate on value of bilingualism is likely to continue and will probably remain a much-discussed and prominent feature in the education sector for a long time.

It is hoped that this study will encourage practitioners and parents to view bilingualism as a tool which can improve teaching and learning in the primary classroom. If there is to be a wider impact on practice, the research must be shared with the staff and trainee teachers within the institution, as well as partner schools and at learning and teaching conferences. This implies a positive impact on practice.

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Chapter #13

DO YOU STUDY OR WORK?
Project based learning as an enriching experience in education

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ABSTRACT
Project Based Learning (PBL) is a very popular teaching strategy nowadays because it offers a great number of advantages and/or opportunities from a teaching point of view, such as achieving a deeper learning, developing teamwork and leadership skills, or getting the student to take control of what and how to learn. For all these reasons, the authors believe that, in the context of the Master's studies, as the last studies before insertion into working life, the PBL can be a very appropriate teaching methodology, since well thought out it will prepare students for the real situations that they will later experience in their professional lives. The objective of this work is to present the experience of the application of PBL in the development of a common project for four subjects of the University Master in Engineering, Processing and Characterization of Materials, taught at the Polytechnic School of Alcoy, belonging to the Polytechnic University of Valencia (UPV).

Keywords: project based learning (PBL), teamwork, active learning.

1. INTRODUCTION

Project Based Learning (PBL) is a growing teaching strategy in which students, combined in groups, carry out projects based on real situations.

In the framework of the European Higher Education Area (EHEA), learning is centered on the student. The contents are given a second priority since what really matters is the need to teach how to learn and the methods used to do so. The objective is to prepare the new generations for continuous learning (Reverte Bermabeu, Gallego, Molina-Carmona, & Satorre Cuerda, 2007). In this new paradigm, the PBL offers us a series of advantages and/or opportunities among which it is necessary to stand out:

- It produces a deeper learning in students.
- It makes the students become the main protagonists of their own learning process.
- It promotes teamwork and leadership.
- It changes the teaching approach focusing on the development of skills and not on the memorization of knowledge, which will result in a better preparation of students for working life.
- It generates an active and dynamic teaching environment where teachers and students interact and there is a way for feedback, which in the end generates an improvement in learning.

For all these reasons, PBL has awakened a lot of interest in teaching, not only in the area of higher education, but at different educational levels (Donnelly, 2017, Li & Tsai, 2017; Joshi, Desai, & Tewari, 2020; Chen, Kolmos, & Du, 2021).

De Graaff and Ravesteijn postulate that PBL allows for the development of teamwork, problem solving and leadership skills, within a framework in which the student takes control of what and how to learn (De Graaff & Ravesteijn, 2001).

On the other hand, Schön suggests that, in the work environment, engineers reflect in action, so the skills needed to acquire to do this cannot be taught in the classroom or in the laboratory, using only scientific theory, but carrying out a design study (Schön, 1987).

For all these reasons, authors believe that, in the context of Master's studies, as the last studies before insertion into working life, since few students decide to try to get a doctorate, Project Based Learning can be a very appropriate teaching methodology, since well thought out, among many other things, it will prepare students for the real situations that they will later experience in their professional lives.

The objective of this work is to present the experience of the application of PBL in the development of a common project for four subjects of the University Master in Engineering, Processing and Characterization of Materials, taught at the Polytechnic School of Alcoy, belonging to the Polytechnic University of Valencia (UPV).

2. BACKGROUND

Four compulsory subjects have been selected from the University Master's Degree in Engineering, Processing and Materials Characterization. Table 1 shows the subjects selected, as well as the semester in which they are taught and their teaching load. As these are compulsory subjects, it is guaranteed that all students will take them.

Table 1.
Subjects involved in the PBL project.

Subject	**Semester**	**Teaching hours (Theoretical + practice)**
Structure and techniques of characterization of advanced materials	1st	30 + 30
Research methodology	1st	25 + 20
Non-conventional techniques for forming and joining materials:	2nd	25 + 20
Diagnosis and in-service behavior	3rd	25 + 20

It should be noted that each course the number of students registered on this Master's tends not to exceed 25 and that in general the academic performance is above 90%.

3. OBJECTIVES

The general objective proposed by the authors is that the students, combined in groups, develop new products made with advanced materials. This will require the complete characterization of these materials. The idea is to approach and work on the contents of the two main parts while developing the different phases of the proposed projects.

3.1. Specific objectives

On the other hand, the specific objectives proposed to the students are:

- Propose a possible new product that needs to be made with advanced materials.
- Formulate a new product with advanced materials.
- Develop a new product with advanced materials.
- Characterize the advanced materials used in the new product.

With these specific objectives it is intended that students acquire the following competences:

- Development of innovation, creativity, and entrepreneurship.
- Development of teamwork and leadership.
- Development of ethical, environmental, and professional responsibility.

4. IMPLEMENTATION OF PROJECT BASED LEARNING

It is proposed to structure learning through a common project that includes all the aspects and knowledge to deal with the four subjects.

To this end, the authors initially proposed to modify the training programme of the four subjects in the dimensions of curriculum design, curriculum development and curriculum evaluation, in order to achieve curriculum alignment, and to this end the following questions were posed: What to teach? How to teach? When to teach? What, how and when to evaluate?

The answer to "What to teach?" can be answered from the following driving question proposed to the students: "Am I able to develop and fully characterize a new product with advanced materials", as well as from the specific objectives proposed to the students listed in the previous section.

As for the “How to Teach?”, the PBL is the methodological and didactic strategy that determines the activities and the necessary resources, but in a general way, the following types of activities and teaching tools have also been used:

- Puzzles: They are used to help students learn the theoretical topics. The topics to be studied are distributed within each group of students. Then each member of the group takes the role of teacher, explaining to the rest of the group members the topic he has to study and making sure that all the members of the group learn well the topic in question, which he first studied. At the end all the members of the group have played the role of teacher and student, and all the topics will have been learned. On the other hand, for the study of the topics the students have a wide repertoire of teaching material prepared by the teachers responsible for the subject, including the learning objects of Teaching on the Net (Media repository, Teaching Articles, Screencast, etc.).
- Expository Classes: It is necessary to give a limited number of them to solve doubts that arise during the project. They are of short duration and only aimed at solving the problems that arise during the development of the project, at the appropriate stage.

The question "When to teach" requires the teachers responsible for each subject to establish a detailed weekly work plan, which contemplates the activities to be carried out with reference to the different groups, the dates to complete the different stages, etc.

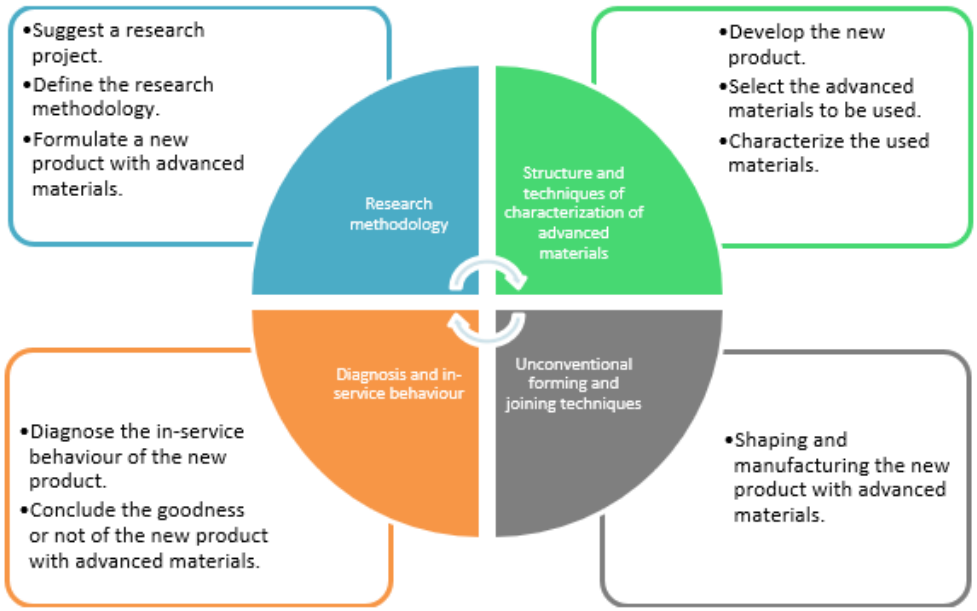
And finally, as for "What, how and when to evaluate?", the evaluation tools used have been the following:

- Self-evaluations. These are individual exercises on the project's topics that the student must self-evaluate. For this purpose, there is a list of conditions to check, such as: What would happen if..., What difference is there between ... and ..., etc.
- Peer evaluation. Each group of students will evaluate two other groups in each of the subjects. For peer evaluation, students have a rubric prepared by the teachers responsible for the subject.
- Tests to verify the acquisition of knowledge using the Kahoot tool.
- Partial deliveries.
- Deliverable and final public defense.

After several brainstorming sessions by the teaching staff, different products, parts and assemblies with a high technological content are proposed, incorporating the most advanced designs, calculations, manufacturing processes and materials in the field of engineering, to be presented to the students as examples of possible projects to be developed. This does not mean that students cannot make their own proposal, which must be approved by the teaching staff to ensure that the proposed product needs to be worked on and developed in the four areas involved.

Figure 1 shows a schematic view of the contents of the four subjects to develop the project. The next step was to carry out a detailed planning covering all aspects and from which each of the steps to be taken were derived, which addressed in great detail the methodological development of the innovation.

Figure 1.
Relationship between the subjects in the PBL project.



For each subject, a detailed weekly planning has been made, which includes all the partial objectives, contents, tasks, aspects to be dealt with, etc., for the development of the PBL. In this planning the teachers have also considered the development of the competences

of each subject and the transversal competences that are developed when carrying out work that involves several subjects. The development of the proposed project represents approximately 40% of the time of the subject "Research methodology", 50% of the time of the subject "Structure and techniques of characterization of advanced materials", and 30% of the time of the subjects "Non-conventional techniques of forming and joining materials" and "Diagnosis and behavior in service".

An example of a product developed in these subjects is a biodegradable gastroenterological stent made of polylactic acid (PLA), a biodegradable polymer. Halloysite nanotubes are added to the polylactic acid and serve as nano-containers for the controlled release of drugs (antibiotics, anti-inflammatories, etc.). Through the subjects "Research methodology" and "Structure and techniques of characterization of advanced materials" the research project is proposed, advanced materials are defined and characterized. Using additive manufacturing techniques for 3D printing, in the subject "Non-conventional techniques of forming and joining materials", the prototypes of these "stents" are developed. And finally, in the subject "Diagnosis and in-service behavior", tests are carried out to evaluate their behavior. One of the members of the group. One of the members of the group is currently doing a doctoral thesis developing this initial work in more depth.

5. RESULTS

The experience of applying project-based learning in the subjects of the master's degree is being developed from the 2018-2019 academic year. Since these are subjects from three different semesters, a generation of students have already completed these subjects. The results achieved after the application of the Project Based Learning methodology have been very satisfactory. Not only have 100% of the students who have followed the subject managed to pass it, but also a higher degree of knowledge acquisition has been achieved, which translates into average qualifications generally higher than those of previous courses.

But in order to get the students' opinion and their attitude towards the new methodology applied, a questionnaire was carried out and completed by all the students. Table 2 shows the questions and the results obtained.

Table 2.
Questionnaire made to students to determine satisfaction.

1	What type of teaching methodology would you prefer to use in the classes?	PBL - 100 % Traditional method - 0 %
2	Have you previously had other subjects in which project-based learning will be used?	Yes - 58.3 % No - 41.7 %
3	Do you think it would be interesting that more subjects of the Master will be coordinated in the common project as a central axis of learning?	Yes - 100 % No - 0 %
4	Were the objectives of the project clear and concise from the beginning? 1 - Neither concise nor clear 5 - Very clear & concise	1 - 0 % 2 - 0 % 3 - 8.3 % 4 - 25.0 % 5 - 66.7 %

5	In the subjects affected by the project, were the planning, duration, and management of the proposed project adequate? 1 - Not adequate 5 - Adequate	1 - 0 % 2 - 0 % 3 – 0 % 4 - 16.7 % 5 - 83.3 %
6	Do you think that the realization of a project has been useful to obtain knowledge about the subjects that you consider that you would not have achieved through traditional teaching?	Yes – 91.7 % No - 0 % I'm not sure - 8.3 %
7	Would you recommend this type of teaching to other students?	Yes - 100 % No - 0 % Maybe - 8.3 %
8	Do you think you have learned more with this new type of methodology than in classes where a traditional method is used?	Yes – 91.7 % No - 0 % I'm not sure - 8.3 %
9	Do you think you have become more involved in this subject because of the type of methodology used than in others with a traditional methodology?	Yes - 100 % No - 0 %
10	Are you satisfied with the project? 1 - Not at all 5 – Very satisfied	1 - 0 % 2 - 0 % 3 - 0 % 4 - 33.3 % 5 - 66.7 %

Analyzing the students' answers, a series of very enriching conclusions are drawn for the teaching activity of the teachers involved in this methodological change, since:

- In general, the students are very satisfied with the PBL methodology applied.
- The objectives, planning, duration, and management of the project have seemed adequate to them.
- Most of the students think they have learned more and better than with a traditional teaching method.
- All the students think that their involvement in the subjects has been much greater with the application of the PBL methodology.
- And finally, all the students say that it would be interesting to add more subjects from the Master's degree in the common project, this being the intention of the teachers involved in this project.

6. CONCLUSION

As mentioned above, the academic results of the students can be considered very good after the application of the Project Based Learning methodology in a common project of several subjects of the Master. The 100% of the students who have followed the subject have managed to overcome it and also have registered average qualifications generally higher than those of previous courses.

On the other hand, the opinion questionnaires given to the students show not only that they like this methodological tool, but what is more important, their feeling that they have learned more, better and with a higher degree of involvement.

As a final conclusion, although we think that the PBL cannot be a magic recipe that can be used for everything, and that it may not have good applicability in certain subjects, for many others it does, and the fact of combining several subjects of the Master in a common project allows the knowledge of the different subjects to be interrelated. And in fact, the PBL

methodology should also be implemented progressively in the engineering grades, so that, especially in the last years, it would have a greater weight in the students' activity, since this type of methodology, apart from the many advantages it promotes, listed in the introduction, it really prepares students better for their insertion in the working world.

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Chapter #14

ENHANCING LEARNERS' INTRINSIC MOTIVATION USING STUDENT TEAMS ACHIEVEMENT DIVISIONS (STAD) IN MULTICULTURAL CLASSROOMS OF SOUTH AFRICA

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ABSTRACT
This chapter is drawn from a PhD study that employed Student Team's Achievement Divisions as a learning technique to enhance learners' intrinsic motivation in Technology Education within a South African multicultural school. The authors over the years observed learners' actions, and interactions in Technology classes and realised that some of the learners find it difficult to engage in behaviour that arises within themselves - an aspect known as intrinsic motivation. Most learners in the Technology class, registered no concerns in obtaining low scores or failing the subject. However, a minority of the learner population obtained high achievement scores and maintained interest throughout lessons. This study explored the development of the ZPD in a cooperative learning context. The authors used STAD, as a cooperative learning technique, in motivating learners intrinsically to increase their participation in class activities. The study explored STAD in1) closing the gap between pedagogy and content knowledge, and 2) intrinsically motivating learners to develop high levels of achievement in the subject of Technology. This study employed the Bricolage design in gathering data from two Grade eight Technology classes over a six-month period. The findings indicated that the learning environment cultivated learners' development, curiosity, and positive attitude toward Technology.

Keywords: student teams achievement divisions, technology, intrinsic motivation and zone of proximal development.

1. INTRODUCTION

This chapter is a part of a broader doctoral study that employed Student Team's Achievement Divisions (STAD) as a learning technique to enhance learners' intrinsic motivation (IM) in Technology Education in a South African multicultural school. Classroom practices in most schools are driven by the traditions and policies uphold by those schools. Secondly, novice teachers could only follow examples of what is done by those who have been in a school for years, even if it doesn't reflect their worldview of teaching. Teaching methods not excluded from the above assertions, novice teacher could only teach in a way that experienced teachers do, and school management encourages. The lecture method where a teacher is a conveyor of subject content and all-knowing in the classroom tend to be mostly preferred by most seasoned educators, including those at the school where the research study was employed.

In this chapter, STAD as a cooperative learning technique was used to explore effects enhancing learners' development of intrinsic motivation and positive attitude in Technology as a school subject. Internal motivation is said to decrease from childhood to adolescent stage

in certain school subjects (McGeown, et al. 2014), which may hamper or negatively manipulate their life chances for the future.

Intrinsic motivation is mostly referred to as the zeal or drive that pushes the learners towards completing their tasks (Lee, McInerney, Liem, & Ortiga, 2010) and placing value of the work upfront. Therefore, intrinsically motivated learners set high goals for their academic performance basing their intentions on the importance and value of the task.

The choice of pedagogical methods was arrived at after consulting with literature on various methods of teaching, for addressing the concern on low or the absence of intrinsic motivation within numerous learners in Technology class.

As authors of this chapter, we believed that cooperative learning methods of teaching would best address the problem at hand as they use structured and well organised group learning activities, where learners learn to take responsibility for their learning (Johnson & Johnson, 2005). We are further convinced that this accountability for learning among learners could also be value laden, thus adapting to values of teammates that foster intrinsic motivation, especially in multicultural school contexts. Furthermore, we are of the belief that teaching should not only be based on the finished product but also on the development process for future references. I therefore opted for STAD since it has been explained to be the less complex of the cooperative learning methods for learners and the teachers to implement (Gaith, 2003; Slavin, 1990). STAD as a learning technique and a teaching method should create an interactive environment conducive for learners who are intrinsically motivated in Technology, to positively influence their peers in the groups. Furthermore, STAD creates a platform for extrinsically motivating learners by awarding groups with most points, a 'prize' (Slavin, 1990), which is expected to coerce internal motivation towards sustaining improved academic performance.

2. PROBLEM STATEMENT

The National Curriculum Statement (NCS) of South Africa classifies school subjects as essential and non-essential. The non-essential subjects in which Technology education falls under, could be failed or passed with very low requirements and as such it would not affect learners' progression to the next grade if failed. In most schools Technology ends at Senior Phase which represents, grades 7-9 (Junior Secondary) and not offered at the Further Education and Training Phase, which represents, grades 10-12, (Senior Secondary). This phenomenon causes amotivation to majority of learners in a Technology Class in a multicultural school. However, there are learners who would not settle for mediocrity in any subject whether they like it or not. There are also those few learners who excel and enjoy Technology as a subject. Then, there are those who would just do enough to pass and the ones who really do not have a problem in failing the subject. The question that the chapter seeks to answer is "***How could STAD be employed to enhance learners' intrinsic motivation towards Technology as a school subject*?"**

3. CONCEPTUAL FRAMEWORK

This section elaborates on the contextualisation of STAD as a teaching method and a learning technique in Technology classrooms in multicultural schools. As a teaching method, STAD would be a vehicle a teacher uses to deliver the content accurately to learners. As a learning technique would be a way for learners to implement and learn the content or material at hand, including skills and values that they need, to cultivate intrinsic motivation. The use

of STAD in the context of developing intrinsic motivation among the learners is underpinned by constructivism as a teaching paradigm with specific reference to the Zone of proximal development theory by Vygotsky as the main theoretical basis, whilst other theories relating to social interdependence and motivation, self-efficacy and self-determination serve as supporting notions.

De Kock, Sleegers and Voeten (2004) assert that social constructivism is founded on Piagetian theory that contests learning as an individual and internal process which is influenced by various developmental stages and experiences of learners. (Powell & Kalina, 2009; Palmer, 2005). Whereas in Vygotskian Zone of proximal development (ZPD), social interactions and debates within the STAD teams (Dagar & Yadav, 2016; Shabani, Khatib, & Ebadi, 2010) play a role towards individual construction of knowledge and making meaning of what is learnt. This forms the foundation of cultural enhancement towards self-motivation in team discussions during the STAD lesson in multicultural class settings. Therefore, constructivism advocates theories and teaching methods that sort to encourage construction of knowledge by individuals and the society (Sanchez & Loredo, 2009).

3.1. Zone of proximal development

The Zone of proximal development (ZPD) as a social constructivism concept suggests that learners interacting with others that are more knowledgeable in a well organised round-table group work could bear positive effects in enhancing the expected culture within a group (Shabani et al., 2010). In this study the authors of this chapter, assigned learners into STAD groups for effecting positive change on learners with low motivation towards improving their performance in Technology. The significance of ZPD concept to this study is zooming into specific potentialities individual learners in Technology class are seemingly lacking maturity and could possibly achieve at higher levels through cooperation with others such as STAD teams (Li & Lam, 2013; Gade, 2010). We are of the belief that learners' aptitude in simulating behaviours and practices of well performing peers would result in majority of learners improving their academic performance. Therefore, enhancing their internal motivation to keep up the academic standards recently achieved. In the context of this chapter, ***Zone*** could be defined in terms of an area in a learner that is awaiting to be triggered through interaction with more capable team members whereas ***proximal*** may denote those behaviours and actions that eventually coax learners to adapt and reach whilst the ***development*** that could be regarded as intellectual maturation of learners to implement the learnt behaviours and actions from more able peers (Gade, 2010). ZPD is mostly explained as the contrast between what a learner can do individually and what he/she may achieve with some assistance from a more knowledgeable peer (Least, 2014; Rezaee & Azizi, 2012), implying that STAD as a teaching method and a learning strategy is a suitable vehicle in enhancing intrinsic motivation of learners that are underperforming academically. Chaiklin (2003), further argues that the theory of ZPD considers the holistic development of a learner within a time interval from lack of particular psychological abilities to the attainment of such capabilities resulting from the support of more able peers or the teacher.

3.2. Social interdependence

Social interdependence theory provides a foundation on which cooperative learning is built. It is said to occur when individuals' actions affect others' achievement of the expected outcomes including their own (Smith, 2010; Johnson & Johnson, 2009). Thus, intrinsically motivated learners in Technology in multicultural school settings would be encouraged to improve the situation of the demotivated others, in STAD communities to effect positive interdependence through ZPD. Therefore, learners need to understand that each member has

to put an effort for the team to succeed – the less capable learner should be willing to put more effort to learn from others and more knowledgeable ones give their full support to others (Johnson, Johnson & Smith, 2014). In this study, social interdependence was promoted by ensuring that learners work effectively with group members to achieve group goals.

3.3. Motivation theories

Various motivation theories such as Maslow's needs theory, mentions basic hierarchical needs including, physiological, safety, love (social), esteem and self-actualisation needs. the study focused on levels of safety, love, and esteem that learners could receive and appreciate from their respective groups towards self-actualisation in their academics (Martin & Joomis, 2007; Maslow, 1943) Alderfer's Erg model has three levels, existence, relatedness and growth. therefore, STAD groups assist with the nurturing of sustainable interpersonal relationship (relatedness), which will boost the strive for personal growth (intrinsic motivation) among members of the STAD teams. Mcclelland's achievement motivation theory asserts that needs are acquired through life experiences, namely, need for achievement, need for power and need for affiliation. when employing STAD in a technology classroom, we are of the view that each learner has a need to excel or achieve praiseworthy results in all their school subjects (Ball, 2012; Redmond & Cramer, 2012; Moore, Grabsch & Rotter, 2010). secondly, learners in stad learn to take control over their studies and appreciate a sense of belonging by affiliating to a stad group (Ball, 2012; Borkowski, 2005). These motivation theories were studied to find out the factors that may influence the development of intrinsic motivation among the learners in technology classroom. motivation can be defined as the internal or external drive that directs and informs people's behaviour towards doing something (Lai, 2011; Pew, 2007). Moreover, motivational theories have indicated to direct focus on dynamizing and redirecting learners' demeanour to trigger internalisation of expected behaviours (Pintrich, 2003). therefore, highly motivated individuals willingly put more effort, vigour and time into the journey leading to the achievement of intended outcomes.

For this chapter, more emphasis is on process motivation theories such as self-efficacy and self-determination theories.

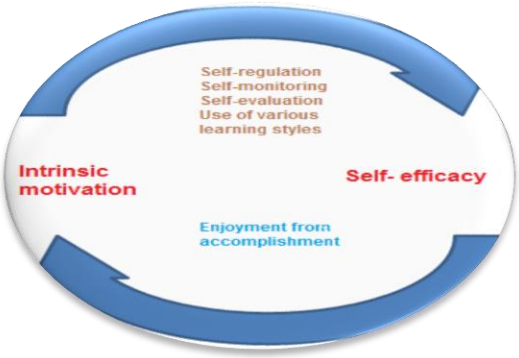
3.4. Self-determination theory

The self-determination theory classifies motivation into intrinsic (autonomous) and extrinsic (controlled) motivations. Intrinsic motivation is regarded as the highest level of self-determined regulation and it involves doing an activity, because it is interesting and enjoyable. Self-determination theory further addresses the energising and directing of behaviour of learners through the satisfaction of three essential psychological needs natural to human life, namely competence, relatedness and autonomy (Bachman & Steward, 2011; Gillard, 2007). A STAD classroom environment would be conducive to nurture these inherent tendencies by meeting the abovementioned needs. Competence, relatedness as well as autonomy learner traits could be improved as they discuss and debate facts within their groups and among different groups in the multicultural classroom. Learners sharpen one another improving internal motivation to do well in the task (Mario, 2019; Bachman & Stewart, 2011; Stone, Deci, & Ryan, 2008).

3.5. Self-efficacy theory

Self-efficacy by Bandura is classified as a process motivational theory due to particular processes individuals should experience as a mechanism to enhance motivation within themselves. Academic self-efficacy could be defined as beliefs that students have about their abilities (Scherer, 2013) to perform well in their academic tasks. The higher academic self-efficacy learners have, the higher they set own academic goals and earn higher grades and this correlates with intrinsic motivation (Niehaus, Rudasill, & Andelson, 2012; Usher, 2009; Bandura, 2001).

Figure 1.
Self-efficacy vs IM.



According to Bandura (1986) as cited in (Ritchie & Williamon, 2011), self-efficacy is influenced in four main domains, namely: through accomplishing a task, observing the completion of a task, verbal encouragement or physical signals. STAD groups could be a reliable platform for the enhancement of individual members' self-efficacy. Furthermore, self-efficacy of learners is regarded to have positive effect (McGeown, et al. 2014) in enhancing intrinsic motivation towards their academic performance.

3.6. Technology as a school subject

Technology evolved from the era of industrial arts through technical education period where various technical subjects such as technical drawing, woodwork, metalwork, electricity and electronics were taught independently from early school ages in South Africa. Technological knowledge emanates from human activity to solve societal problems and meet the needs of the community using various available materials, skills, values and knowledge – taking into consideration the environmental and social factors (DBE, 2012; Stein, Ginns, & McDonald, 2007). Moreover, Technology in nature is a broad concept that cannot be limited to engineering, sciences, handcraft or industrial arts, but almost every human activity that strives to meet the needs and wants of the society by providing practical solutions, including the use of high-tech computing (DBE, 2012; Järvinen, 2001; Wonacott, 2001). It could therefore be deduced that Technology lays the foundation for most technical and vocational education and training (TVET) subjects especially in the engineering department.

Therefore, the authors further add that Technology, Technology Education or Design and Technology continued to show its holistic nature from its inception and now it incorporates information and communication, electrical and electronics, mechanical and civil, food and material, environmental and medical technologies (Householder, 2012).

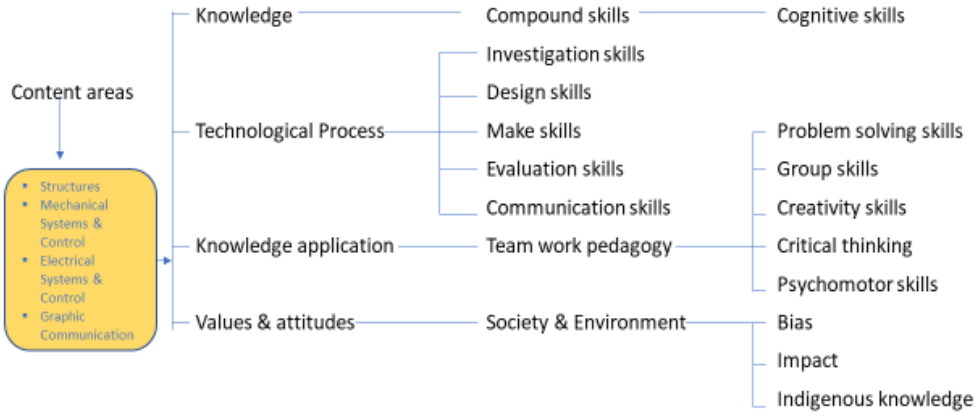
Whereas the listed subjects within the TVET (Technical, Vocational, Education & Technical) sector are taught as specialised fields of study. Due to its holistic nature, Technology education includes conceptual knowledge in the explanation of various topics, procedural knowledge in the design process, physical nature knowledge in natural structures and material, functional knowledge in the mechanical and electrical systems, and action knowledge in the practical exercises of developing solutions.

Apart from the core content of Technology, the design process outlines the process skills that form a backbone for Technology. Therefore, the design process is employed as a framework around which the teaching of Technology is encompassed. The outlined design process could be versatile to TVET students within the engineering division also. The design process stages include investigation, design, make, communicate and evaluate. However, these stages may not be chronologically followed, the designer needs to go back and forth between the stages. It is therefore advisable that TVET engineering studies need to include the design process to stimulate creativity and innovativeness among the students. In the model below the researcher extracted the problem and the design brief from the design stage to indicate their significance during the process. High school learners tend to focus more on initial design sketches without following their design briefs' requirements for the problem identified.

Figure 2.
The Technology Design Process (Masoabi, 2015).

The Technology structure below shows the holistic nature of knowledge and skills, values and outcomes.

Figure 3.
The Technology Education Structure (Masoabi, 2015).



3.7. Research methodology

Scholars in the constructivists' paradigm seek to develop theory through inductive methods of collecting and analysing data striving to understand, explain and disseminate knowledge about a social context, such as the Technology STAD multicultural classroom environment through the interpretation of research objects or participants (McGregor & Murnane, 2011). Moreover, the ontological understanding of the world view or the epistemology that guides this study states that knowledge is constructed by people on how they interpret their interaction with their environment and others. Therefore, it is not practical to detach factual knowledge from values, attitudes, beliefs, intentions and assumptions that govern people in a specific phenomenon (Arthur, 2012; Nieuwenhuis, 2010a).

Furthermore, the epistemological perspective of interpretivism holds that the researcher and the participants cannot be totally detached and therefore the investigator is interactively connected to the proceedings of the inquiry. Therefore, as authors we were able to interpret and understand the observed phenomenon and also through the perspective of the researched (Krauss, 2005). Axiological stand of the constructivist researchers is to abstain from pre-conceptualising the understanding of the phenomena, as knowledge in this paradigm unfolds inductively from data (Allen-Collinson, 2012; Mertens, 2010). Adopting the methodological bricoleur approach, the scholar is perceived as someone who combines multiple research tools to accomplish a meaning-making task. A methodological bricoleur is flexible regarding research approaches and tools (Masoabi, 2015; Denzin & Lincoln, 1999).

This study was guided by the interpretive and methodological bricolage designs during the fieldwork for collection of data and data analysis. We observed groups' interactions, processes and how learners communicate with each other amongst their groups. We further gathered the quotes of groups' conversations in their own words to determine time on task and conflict management strategies (McMillan & Schumacher, 2010). This study employed a case study design as guided by the constructivist paradigm. The inquiry tried to holistically understand the in-depth effects of STAD on learners' intrinsic motivation levels in order to assist those with lower motivation levels or unmotivated to develop intrinsic motivation for Technology as a school subject in a multicultural learning environment.

This study was conducted in a public school situated in an urban opulent residential area in the city of Bloemfontein, South Africa. Furthermore, the school has a long history of existence with over hundred and fifty years practicing and embracing the English culture, tradition and ethos (historically White school).

STAD was implemented in two Grade eight classes that consisted of thirty learners in each class. According to the South African admission to school, learners begin Grade one when they are seven years old, which brings the majority age group in Grade eight to be fourteen years (adolescent stage).

The case study design was also employed to allow the researchers (authors of this chapter) to become an active participant with the learners, but still upholding expected research ethics (Andrade, 2009). The findings thereof were not generalisable as the inquiry was bound and therefore, thorough and contributing knowledge pertaining to the social context had to be developed (Brown, 2008).

3.8. The STAD procedure and process

Since the study was employed in a boys-only school, we used the mid-year results of learners to group them. The teams of four to five members were formed using academic heterogeneity, each team sat around a table. Therefore, groups consisted of various races and or ethnic groups, high achiever 80%-100%, average achievers 50%-79% and under achiever 49% and below (Tarim & Akdeniz, 2007). The learners were informed about the purpose of the groupings and use of STAD in Technology classroom- they had to work with peers to improve academic achievement. The researcher introduced the STAD for the first three weeks of the third term to teach the teams about STAD's principles and values and how they need to work before data was collected.

On the commencement of data collection, we introduced a new topic in a lecture method allowing probes from the class (Berry, 2008; Tiantong & Teemuangsai, 2013). Throughout this semester contents on electrical and mechanical systems were taught to learners- these contents focused on the relationship between theory and calculations. Every new topic or advancement in a topic was introduced in a lecture, including question and answer methods of teaching (Slavin, 2010). Then the groups would be issued with worksheets with calculations ranging from easy to complex; to work as teams and ascertain that all members participate and eventually comprehend the exercises (Masoabi, 2015; Van Wyk, 2010). After the teams have completed their tasks, the teachers (authors) would then appoint a member from a group to do one of the sums on the board with the support of his team members. Then the rest of the class would be asked if they approve the calculation or if they have done it differently to show their method to the class. At the end of a specific topic, the learners were assigned a test which they had to do individually. The team members test results would be added together divided by a total number of team members to get a group score in percentages. The group with highest percentage was awarded a certificate of highest achiever (Tarim & Akdeniz, 2007).

After all the STAD processes were completed, we would assess, in conjunction, with the teams their improvements made, advantages and benefits of the activity and the challenges within individual groups. We also discuss with the STAD teams, the individual improvement, contribution to the team and the challenges that each member faces within the team. If there are any challenges indicated, we would then resolve them before proceeding to the next topic.

These exercises assisted learners to take responsibility of their individual and corporate actions for the betterment of group functionality.

Learners that improved their scores were then promoted to compete at a higher level (Slavin, 1977). This formula motivated learners to strive for improvement in order to compete at a higher level in the next class test.

3.9. Data collecting tools

As teacher-researchers (authors of this chapter), we employed two types of observations, namely the unobtrusive or non-reactive which were done by external observers, such as our colleagues (members of school teaching staff) distancing themselves from being involved. Secondly, we practised, reactive observation by because we (as teachers and researchers) wouldn't be part of learners' groups, but from time to time we needed to do some interventions amongst the STAD groups, as to help and guide learners toward reaching their group goals (Arthur, 2012). A learner classroom observation schedule was used as a tool for collecting data during STAD group discussions. About ten of our teacher colleagues were invited to observe procedures and processes in Technology STAD classes. We did not have specific criteria for choosing the observers.

Secondly, we attempted at giving each group an opportunity to be interviewed in order to gather more insight about how they experienced and interpreted the phenomenon. The interviews used semi-structured questions, though the interviewees were allowed full expression of their experiences during this period of STAD as compared to their traditional classroom set-up and teaching methods (Turner, 2010; DiCicco-Bloom & Crabtree, 2006).

Thirdly, we used video recordings which are classified under visual methodologies or techniques. We understood audio-visual methodology as using digital technology that is able to capture pictures that show movement, actions, nonverbal communication or behaviour including verbatim conversations from participants. The recordings assisted us as the teacher-researcher to develop accurate description of the phenomena and analysis of data.

3.10. Discussion and analysis of data

According to Nieuwenhuis (2010b), qualitative data analysis is established on an interpretivist epistemology that targets construction of knowledge by understanding the phenomenon through analysing participants' perspectives regarding the phenomenon. Furthermore, the purpose of analysing qualitative data is to interpret the words spoken in conversations and interviews, also behaviours that could not be represented by numbers or statistical calculations.

For the purpose of this study, inductive content analysis for qualitative data analysis was used guided by ethnographic and phenomenological ways of analysing data (Elo & Kyngäs, 2007). The phenomenological analysis of data took significant utterances to generate knowledge and understanding. We transcribed all the raw data from video recordings word for word including non-verbal behaviours. After all the data was transcribed, it was typed and coded and categorised into themes (Elo & Kyngäs, 2007).

3.10.1. Video recorded data

Under this data category, the following subthemes were identified during team study and presentation phases as more relevant to the learners' levels of motivation in Technology classes in a multicultural school. During team study, aspects confined to communication, group interactions, facilitator intervention; disruptive behaviours and positive interdependence were observed. During group presentations aspects confined to teamwork, sharing responsibility, confidence and excitement and self-determination were observed.

Communication level in Group 1Y (labelling of groups) was minimal, only to find out the leader, who was the high achiever did all the work and the rest of the group members, copied from his workbook. Therefore, we intervened to explain that they are doing the wrong thing that would demotivate other members from taking part in future discussions. We reiterated the crucial role of each member to be part of the process towards obtaining the final answer. As social interdependence theory suggests that each member's actions should be directed at accomplishing team goals (Johnson & Johnson, 2009). From then onwards, the situation improved- all were engaging in discussions demonstrating improved motivation to achieve and understand the work. Regarding group interactions, the majority of groups in Class 8Y showed acceptable levels of engaging each other on the work at hand and each member in the group was given an opportunity to contribute. Group members asked for further clarity from the beginning of fieldwork. On the contrary, we had to intervene in Grade 8X to clarify the purpose of using STAD in Technology as to assist one another to improve their academic achievement as well as the motivation to comprehend the subject. Social interdependence theory also indicates various psychological processes such as substitutability, infusibility and cathexis that need to take place within an individual before positive interdependence could be achieved in STAD groups (Johnson, Johnson & Smith, 2007; Johnson & Johnson, 2005). The process took several days for this class to fully interact within their groups showing enjoyment of the work due to some learners that thought working in groups allows them to disrupt others. Eventually all groups jelled well and displayed high levels of communication and focus on the tasks to be completed.

When groups were presenting their solutions to the whole class, there was a commendable oneness (teamwork) of teams as they defend their work to the class. They came to the black board sharing responsibilities by appointing the scribe and the spokesperson while other members were responsible for responding to questions from the floor. The observing groups were also cooperative, paying attention during the presentations and asking clarity seeking questions once a presenting group was done. Self-determination increased among the groups showing enthusiasm to come to the board and correct work that other groups could not get right (Bachman & Stewart, 2011; Barkoukis, Tsorbatzoudis, Grouios, & Sideridis, 2008). This exercise rose the confidence and excitement among the groups to be vigilant, and as such, other individuals in the STAD groups also able to come up with and demonstrate alternative methods of solving the calculations. For us as teacher-researchers, this development showed improved interest and determination to master the taught material.

3.10.2. Class observation data

Ten of our peer teacher colleagues volunteered to do the class visits and complete the observation schedules for learners' group work processes. Our extension of invite to external observers was to minimise our bias as teacher-researchers, as much as possible.

Themes from the class observation data included behaviour in groups, communication in groups, respect for team members, and adherence to time frames, ensuring mastery of the content, ensuring individual accountability, and ensuring positive interdependence. Below are the assertions by the peer observers under the theme of behaviour in groups.

> Mr Barnard: *Learners behaved excellently and were disciplined with appropriate interactions.*
> Ms Logan: *No disruptions experienced – boys were focussed on task at hand*.
> Mrs Blitz: *They were mostly co-operative and getting on with their work*.

The above contentions are a sample from the peer observers. The majority of them indicated that learners were generally motivated to work together in their groups. Moreover, more observers indicated that monitored group work encourages learners to focus on their task and are motivated to engage one another in their discussions (Johnson & Johnson, 1995; Johnson, Johnson, & Smith, 2004). This type of constructive engagement could result in better comprehension of the work increasing self-efficacy and self-determination in individual learners, especially when the process bears expected fruits (outcomes).

> Mrs Blitz: *The teacher was continually moving amongst the groups, but they were self-motivated.*
>
> Mr de Venter: *They are absorbed in the task at hand.*
>
> Mrs Gomez: *My walking amongst the groups observing and asking questions promoted some focuses as well as the presence of the teacher as facilitator*.

Moreover, the respectful atmosphere that reigned with the STAD groups further motivated learners to engage freely in their group discussions knowing they are protected and supported by their peers.

> Ms Robinson said: *They respond very well. Good behaviour from the learners suggests that the educator commands his classroom with authority. Learners respect the class and quickly quieten down once the educator talks to them.*
>
> Mr De Venter: *They treat one another with respect and consider each other's opinion.*

Learners were able share ideas and develop each other's knowledge using constructive arguments that made groups to be productive on their work (Smith, Sherpard, Johnson, & Johnson, 2005).

> Ms Matthews: *They did very well some even encouraged others to do better and waited for all to finish before moving on.*

Furthermore, teachers stated that learners motivated one another to do better and gave each other a chance to finish before moving on to the next activity. Moreover, teammates helped each other to comprehend the work and complete the given tasks. This was evident when learners shared their resources and knowledge to better one another. As the teacher-researchers, we believe that once an individual receives trust from the significant ones, his self-efficacy and confidence increases, motivating the individual to work harder to maintain that trust. Secondly, when a group member is held accountable for his input, it boosts self-esteem seeing that the team expects constructive contributions from him. These kinds of actions in STAD groups could be regarded as playing a significant role in developing learners' internal (intrinsic) motivation (Bachman & Stewart, 2011; Deci & Ryan, 2008) in multicultural class settings and to do better and enjoy their work because they perceive themselves as valuable members.

3.10.3. Groups interviews

There were fourteen STAD groups in total from both classes with each class having seven teams of four and five members. We managed to have group interviews with twelve of the groups, due to tight extra-curricular program.

The analysis of group interviews was done using constant comparison data analysis. Thus, the research question was How would STAD effect the intrinsic motivation of learners in Technology subject? The group interview sub-questions were: How did working in STAD teams effect your personality and academics? How do you perceive Technology as a subject? What is it that you saw or heard from the group that motivated you to be at your best?

Themes such as relationships, experiences, task completion, sharing, increased effort, lessons learnt, and challenges encountered, emanated from the learners' responses.

It could be revealed from leaners responses that, though they were in the same class, they were strangers to each other's world view and perceptions about schoolwork. In the groups interviews we asked questions that made the groups look back from the beginning of working in STAD groups to the end.

> Learner 2AX; '*Firstly we did not know each other well, we started growing to know each other and began to work well together as friends*.'

> Learner 6BX; '*Attitude to each other was not good at the start of our group work*.'

Therefore, using STAD teams to develop intrinsic motivation towards Technology as a school subject was not a smooth ride, since learners had to first reconcile their perceptions and attitudes among themselves. They first had to be encouraged and be motivated to work as a unit.

Trust developed among the groups after oiling the friction caused by their personality differences. Every member felt welcome and valuable assert of the team. They began to embrace free spirit within their respective groups as their viewpoints were also constructively criticised. Thus, learners managed to develop positive interdependence as one of the cooperative learning essential elements (Laing, 2002).

> Learner 8AY; '*We are efficient in our work and contributed equally*'.

Learners further alluded that, working in STAD teams boosted their self-confidence. Therefore, this internal contentment could be viewed as a step into developing intrinsic motivation towards the subject. The learners showed that in order for the team to succeed every member should be valued equally and support each other through the work.

It is not foreign when another learner explained the importance of focussing and putting extra effort, other if said by the teacher who is all matured having no idea of teenage challenges. However, when uttered at peer level, the learners might find it to be a possible exercise that is achievable as other learners could do it. Therefore, in this case a learner judges his actions by comparing himself to the actions of other learners.

> Learner 3CY; '*It was fun and interesting*'.

As teacher-researchers, we therefore attest that, when a learner has the necessary support in the classroom, it is easy for him to enjoy the work, develop confidence, boost self-esteem and be free to contribute to whole class discussions (Deci & Ryan, 2008; Johnson, Johnson & Smith, 2007). Furthermore, learners were able to exercise their creativity and

critical thinking, as well as learning how to ask good questions when taking part in team discussions. In addition, sharing information was highlighted as a source for more insight into the subject as indicated below.

> Learner 2DX *"Working in a group improves our thinking patterns"*.

Furthermore, learners stated that their motivation levels are increasing by being aware that it is necessary to be to update with the one might have missed due to absenteeism.

> Learner 4CX; '*We help each other catch up in case of absenteeism*'.

Moreover, self-efficacy of individual learners was also increased, and they had determination to work efficiently (Vansteenkiste, Lens, & Deci, 2006), even on their own, as they have learned from others that work must be done with diligence. They also learned that the more time spent on learning the better and easier it became to understand the material taught in class.

> Learner 7CX *"Individual homework became easier because of the group discussions"*.

> Learner 4CY; '*I learned that even the smallest mark can have improvement on your total*'.

Learners further took home the notion that each mark is important to improve one's academic achievement. On this basis learners deemed it fit to internalise motivation to strive for excellence (improved self-efficacy), other than doing work for the sake of doing it. Moreover, emulating good practices and behaviours from others (Veenman, Denessen, Van den Akker, & Van der Tijtl, 2005), that strive enhance one's performance and comprehension of the work became a significant factor as well.

> Learner 1AX; '*I saw one of our group members was getting high marks – that motivated me to put more effort to improve my marks with the assistance of group members.*'

Therefore, as teammates learners learn good quality ethos from each other that improve group's effectiveness towards motivating members to aim for the sky.

> Learner 2AY; '*My group leader's work ethic was of a high standard where each mark or point matters – I decided to be more involved in group activities and promote excellency at all costs*'.

> Learner 2AX; '*When my contributions were wrong – my group members encouraged to keep trying. That boosted my confidence*.'

Moreover, in STAD groups learners acquire good questioning skills to receive appropriate and developmental assistance (Murdoch & Wilson, 2008) from his or her countenance. Empathy from other members of the team facilitates the zeal to learn effectively towards becoming a confident and internally motivated (Slavin, 1990) member with constructive contributions for group success.

> Learner 5DY; '*As a group leader, it was encouraging to me when I saw one of our members who was struggling – obtaining grades far above his usual performance*.'
>
> Learner 2DY; '*Group work made me work harder and improve my attitude towards schoolwork*.'
>
> Learner 3DY; '*we learnt each other's work habits and styles – were able to use each other's abilities to the maximum*.'

Teachers should use collaboration teaching methods to improve learners dialogue in multicultural schools; to question the knowledge from textbooks and argue based on how they view the world (Gillies & Boyle, 2009)- this assist learners to see the bigger "picture" of things, beyond normal analytical stage.

4. CONCLUSION AND RECOMMENDATIONS

Learners in the STAD teams, in the context of this multicultural school, managed to fulfil the second to the fourth level of Maslow's needs theory. In the process individuals' self-esteem was boosted leading to self-actualization and individuals tend to recognize their unearthed potential. Process based, motivational theories are based on particular evolution or course that individuals have to pass through towards enhancing motivation within themselves, self-efficacy and self-determination.

It is evident from the research results that learners with high self-efficacy set their own academic goals to earn high scores. These kinds of learners make it their business to diligently complete their task. Therefore, when employing STAD in Technology class, the efficacious learners supported the other learners to value every piece of work given in class and to observe the importance of timeframe for the completion of given task. When the other learners realised that, with dedicated focus, tasks can be completed efficiently, they appear to become motivated to finish their next task well. As they further receive encouragement and affirmation, they begin to volitionally want to do more to the best of their abilities. Within this environment, learners develop inquiry skills by probing thought patterns of others, including the teacher to construct his/her knowledge on the content.

Similarly, according to self-determination theory, STAD teams build learners' competence through support and adapting efficacious norm and values from their peers within a secure professional relationship. In the process, learners improve their work ethics to receive approval from their teammates and self-fulfilment – then they begin to enjoy what they are doing from within.

Furthermore, in some situations, rewards (extrinsic motivation) were issued to STAD teams that performed well in their first test. However, as time went on, it was no longer about receiving a reward for achieving higher that other groups. But the teams engaged in their tasks due to internalised motivation to improve and enjoy the subject.

Finally, we as authors of this chapter recommend that Technology teachers be trained STAD and other cooperative learning methods in order to enhance learners' motivation in the subject. The more teachers learn to facilitate groups professionally, learners will also begin to enjoy working in groups until they are able to monitor their own group processes. This method of teaching brings respect among the learners as well as between the learners and the teacher. Most importantly, learners learn not to just accept what comes from the teacher or textbook without constructively engaging in dialogue to probe the world view and application of knowledge. This study also recommends the training of school-based teachers

and the lecturer staff attached to TVET college. STAD should be construed as a vehicle for enhancing intrinsic motivation among the students. The reason being majority of these students leave mainstream education hoping TVET route would be easier because of the prevailing social perception as compared to high school route. Hence, low throughput rate in the TVET sector due to the perceived low morale of students when facing difficult content.

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Chapter #15

MOOCS FOR BRIDGING THE SCHOOL - UNIVERSITY GAP

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ABSTRACT
This chapter presents an update of the MOOC orientation strategy implemented by Federica Web Learning, Centre for Innovation, Experimentation and Diffusion of Multimedia learning at the University of Naples, Federico II since January 2019 and already published in the same year. A solid orientation strategy is designed to support students in their university choice and prepare them for the intellectual demands of university life and study. According to OECD, graduate numbers in Italy increased in 2019 from 20% to 28% (25-34 age range), and Italy has high numbers of post-graduate degree holders. However, overall graduate numbers are still relatively low compared to other European member states and dropout rates continue to be high, as do the numbers of students changing degree course after one or two years of study. In line with the updated DEAP, Digital Education Action Plan (2021-2027), and Italian Ministerial recommendations, the Federica MOOC-based orientation strategy explores ways of bridging the gap between school and university in a 3-pronged approach designed to address students' choice of degree subject and university; preparation for university entrance exams and difficult modules; and last but not least, raising student self-awareness to help them adapt to change as they shape their future.

Keywords: MOOCs, freshman orientation.

1. INTRODUCTION - DEGREES TO PLUG THE SKILLS GAP?

Orientation is a crucial phase for school-leavers as they face major decisions about their future, and whether to aim for a university degree or not and, if so, in what subject. The global jobs market is a fast-changing and unpredictable place, and it is getting harder for students to choose a degree that will make them career-ready in a world where "8 - 9 percent of 2030 labor demand will be in new types of occupations that have not existed before" (Manyika et al., 2017, p, 12) and OECD statistics predict that "15.2% of Italian workers may see their job being automated and another 35.5% may see it significantly overhauled in the next ten years" (OECD, 2019). EU and OECD data confirm that demands from the jobs market are shifting towards more complex, non-routine tasks and non-cognitive skills as a result of digitalization and globalization. On average, shortages are the strongest in the "knowledge of Computers and Electronics followed closely by substantial demand for Judgment and Decision-Making Skills and Verbal Abilities (written expression and comprehension and oral expression)"[1]. A recent World Economic Forum report stated that although Italy has good culture and civic literacy, critical thinking and problem-solving skills, its citizens have poor foundation skills, including literacy, numeracy, scientific and financial literacy (World Economic Forum, 2018). And despite the need for increased digital skills in Italy, women continue to be

[1] https://skillspanorama.cedefop.europa.eu/en/useful_resources/oecd-skills-jobs-database-2018

under-represented in ICT education, with only 13% of ICT students being female in Italy in 2016. (Eurostat, 2018a).

School-leavers, both male and female, may well be tempted to try and choose a degree subject that aims, in some way, to plug one of these skills gaps. In Italy and elsewhere. On the other hand, the value of humanities degrees is also being re-recognized, as was recently evidenced by Microsoft executives amongst others: "as computers behave more like humans, the social sciences and humanities will become even more important… (as they) can teach critical, philosophical and ethics-based skills that will be instrumental in the development and management of AI solutions" (Business Insider, 2018).

2. VALUE OF TERTIARY EDUCATION

Whichever department or subject area students may choose however, one thing still holds true. University degrees continue to be the main currency for the jobs market and, in general, increase a student's chances of employability. In America, for example, employment rates are 89% for students with a bachelors or higher degree compared to 59% for those without (NCES, 2020). Italy is following this trend with educational attainment continuing to grow. More Italian students have MAs than in many other European countries and even though Italy still has a higher than EU average number of NEETs, people with degrees are less likely to be unemployed long-term (OECD Education at a Glance, 2020).

Although many school-leavers are thus encouraged to think that a university degree is the best next step, statistics regarding drop-out rates amongst university students would seem to indicate that a significant percentage of students continues to leave university without a degree (Eurostat, 2018b) and that 19% of Italian students graduate only after changing subject and course, and 27% take a year longer to complete and then regret their choice of degree (Almalaurea, 2015 and 2020).

This has a "scarring effect in the form of greater marginalization and negative labor market outcomes" (Sosu, & Pheunpha, 2019, p. 1) and thus significant consequences for individuals, institutions and society. Although the reasons for university dropout are many and varied, "students' intellectual capability to cope with the academic demands of university study is one of the most significant risk antecedents consistently identified across the literature" (Sosu, & Pheunpha, 2019, p. 2). And in Italy Anvur reports that, for example, in Industrial Engineering, 19% of students have abandoned their studies at 3 years from registration and 27% at 6 years, and overall, on a National level, dropout rates are at 12.2 % for 3yr bachelors, at 5.9 % for 2yr MAs and 7.5% for 5 or 6yr Combined degree programs, meaning an overall dropout rate of approx. 25% (Anvur, 2018).

In June 2020 the Ministry of Education and the Ministry of Universities and Research (MIUR) sent out a public letter to remind schools and teachers "that access to opportunities and initiatives for orientation remained a priority even in the emergency situation engendered by Covid-19"[2] and the consequent transition to remote learning. They stress that economic hardship resulting from the pandemic could discourage families from continuing to finance their children's education post-secondary school, whereas a supply of graduates and differently qualified citizens will be indispensable to the social and cultural growth of Italy post-pandemic.

[2] Note on "Attività di orientamento alla formazione post-secondaria". [Orientation activities for post-secondary education]. June, 22, 2020

The issues of a difficult transition between school and university have been broadly discussed in the literature, but "it is argued that the topic is still largely under conceptualized, and under researched", which is significant when "its interpretations variously inform policy, research and practice in the field and that despite a growing level of interest in higher education…" (Ferreira, 2018, p. 3). It is extremely important to understand the transition from school to university because "the process presents academic challenges, personal and social challenges, administrative challenges and even academic challenges (Ferreira, 2018, p. 3).

This chapter makes a key contribution to the literature in proposing a MOOC-based orientation strategy as a cost- effective and subject-agnostic approach to exploring and easing this transition.

3. EFFECTIVENESS OF MOOC-BASED ORIENTATION STRATEGY

MOOCs have seen a huge increase in user numbers both pre- and post-pandemic, totaling over 120 million worldwide by July 2020. It is recognized that learning technologies can provide structured learning pathways with clearly mapped stages, engaging and relevant multimedia content that allows for flexible access, interaction within local or global classrooms and involvement in group projects as well as individual and personalized learning. At the same time, predictive analytics improve content quality in subsequent iterations of any course, and can also flag issues that help identify at-risk students. A MOOC-based orientation strategy could therefore be, as reported in our previous paper, an effective tool for:

> a) raising awareness of degree content in different subject areas to enable school-leavers to make a more informed choice, especially in popular degree subjects that are not necessarily included in school syllabuses, like psychology, law, engineering, communication sciences etc.). MOOC lessons also give a taste of the university classroom, with clear indications of teaching style and approach, as well as expected performance and attainment levels via the accompanying assessment activities;
>
> b) providing preparatory or remedial study content in specific areas to boost learning and fill the knowledge-gaps, thus reducing the possibility of students finding themselves unable to cope with the level of intellectual difficulty posed by university study.

The main areas for a MOOC strategy then are twofold: the first is to provide useful tools and links to help students choose the right degree for them. The second is to provide preparation for university study in the sense of "filling in the knowledge gaps" using specific subject MOOCs. A third prong of the strategy that is currently being proposed at Federica Web Learning is to use MOOCs to:

> c) improve students' levels of self-knowledge and awareness, to render them more resilient in the face of the major changes that university and its associated study, as well as the future workplace, pose for them.

In all cases it would seem that orientation strategies require the support of the teacher for successful implementation. Already in 2014, the Italian Ministry for Education published national guidelines for lifelong orientation which recognized the important role that schools had in "helping people develop their own identity and make the right decisions regarding their personal and professional life, as well as facilitating the match between demand and

supply in the jobs market"[3]. Many schools already had a Head of Orientation who is responsible for orientation initiatives and approaches, nominated as a result of a former Ministerial decree in 2004. The commitment of the teachers as disseminators and multipliers is central to the uptake of online learning initiatives like MOOCs, which might otherwise remain hidden on the Web.

In the recent ministerial letter mentioned above, it is suggested that students need to able to hear first-hand accounts of successful university experiences and subsequent successful careers from students who have gone before them, and the ministry encourages teachers to offer this, and pledges to offer support to technological solutions that offer this kind of orientation initiative.

4. COVID-19 AND UNPRECEDENTED USE OF TECHNOLOGY

During the first wave of the global pandemic in Spring 2020, teaching and learning activity were transitioned online across the globe, highlighting the digital readiness of individual countries to guarantee continued education to their populations in terms of infrastructure, content and management. The recently-published Digital Education Action Plan (2021-2027) (European Union, 2020), outlines the European Commission's vision for high-quality, inclusive and accessible digital education in Europe in the wake of the first wave of the pandemic. It highlights the importance not only of addressing the digital divide but also of providing digital skills training for students, as almost 60% of the respondents had not used distance and online learning before the crisis and more than 1 in 5 young people across the EU fail to reach a basic level of digital skills. Participation in MOOCs, where the instructional design incorporates a range of online learning and interaction tools, is considered a valid way of enabling students to gain experience and expertise in the digital environment. The DEAP also highlights the importance of shareable quality asynchronous learning content of the type that MOOCs offer, that can be accessed by teachers for use within flipped classroom models and by students in self-learning mode. The public letter issued by the Ministries of Education in Italy and mentioned above, also insisted on the importance of MOOCs, stating that "it is necessary that students, especially those in their final year of high school, are made aware of existing online platforms where University providers deliver content that is useful for orientation". The letter also mentions the importance of providing motivational, vocational and self-assessment so that students can analyze their own inclination and motivation and compare their own skills and abilities in terms of the stated pre-requisites for any course of study. Small, single university MOOC initiatives started to emerge in response to the pandemic to help schools during the forced closure. One example is the University of Urbino, with an accredited, multidisciplinary, communication MOOC comprising 10 lessons, to increase school students' cultural know-how, including digital theory and digital learning during the period of enforced closure.[4] University Ca'Foscari, Venice also offered online courses, but closed, to develop transversal competencies and soft skills for university orientation.[5]

[3] Article on the website "Orizzonte Scuola": Il ruolo dei docenti nel percorso di orientamento universitario. [The role of teachers in university orientation]. Retrieved January 13, 2020 from https://www.orizzontescuola.it/il-ruolo-dei-docenti-nel-percorso-di-orientamento-universitario-ecco-la-guida-alla- scelta-del-corso-di-laurea-di-edises.

[4] L'Università di Urbino per le Scuole Superiori https://mooc.uniurb.it/wp/didattica-aperta-per-le-scuole/

[5] Futurelearn offers a collection of courses, specifically designed for students aged 16-19, with the purpose of giving an overview and a sample of different universities and university subjects that they may be interested in, in order to choose the right degree, university or career (January 2019).

5. INSTITUTIONAL INTEREST IN MOOCS FOR SCHOOLS

There are signs that institutional interest in MOOCs for schools has continued since our last paper. The new European Commission President, Ursula von der Leyen, has updated the Digital Education Action Plan and is encouraging an increased use of MOOCs in the area of digital skills to "get Europe up to speed (Techcrunch, 2020) and the H2020 project UP2U[6] aims to bridge the gap between secondary schools and higher education & research by better integrating formal and informal learning scenarios and adapting both the technology and the methodology that students will most likely be facing in universities. In the same period, June 2019 – July 2020, the French national MOOC initiative, FUN, significantly increased its Orientation offer. The FUN platform is now offering 31 orientation MOOCs of which 20 are new, fruit of the MOOCFOLIO project[7] financed by the French Government. The aim is to enable students to "1) choose the right degree 2) reinforce their knowledge and bridge the gap between school and university". The Italian EduOpen University Consortium has also now inserted a section on its homepage entitled Orientation, and offers 30 introductory courses in aspects of maths, physics, statistics, law and other popular university subject areas. On the other hand, the leading European and American OPMs that offered the university preparation initiatives we reported in our previous paper (Merciai & Kerr, 2019) have made no specific further investment in orientation. Futurelearn now offers a section called Study Skills instead of the going-to-university section1 which includes courses like *A Parent and Supporter's guide to University entry* and *Live Smart: Your essential guide to living at University* both from the University of Reading and *How to learn online* from the Open University UK. In the US; the Harvard-MIT provider, edX, still offers the section on its website called "Get College Ready. Get Ahead. Get Learning" (https://www.edx.org/high-school with specially designed courses from top high schools and universities to help students prepare for Advanced Placement (AP®) Exams and CLEP® Exams, as well as introductory-level courses to help get ahead of the game. The number of courses available in this section seems to have reduced from 50 to 13 however. The Coursera platform has started to offer support to pyscho-social and emotional aspects of degree choice, and the important of self-knowledge for a successful university study and life experience. Notable examples are the course in *Global adolescent health*, from the University of Melbourne and *Know thyself - the value and limits of self-knowledge* from the University of Edinburgh. The Khan academy continues to stand out for its offering of learning tools primarily for school-age students, and teachers, also in relation to the pandemic (e.g. a section on "How to motivate students who are distance learning during COVID"). It also provides services, such as mentoring for parents and teachers and other tools dedicated to helping students navigate college admissions, career choices, personal finance and entrepreneurship. In Italy, the Polytechnic of Milan, through its platform Pok (Polimi Open Knowledge), benefits from the instructional design experience of one of the most advanced multimedia teams in Europe to help create a bridge with university learning. Their courses are realized with the idea of facilitating preparation on some key subjects such as mathematics or physics, or some specific topics for each Master's degree, responding to the transition needs between two different levels of study.

[6] UP2U project. Retrieved January 8, 2020 from https://up2university.eu
[7] MOOCFOLIO project on FUN platform. Retrieved January 8, 2020 from https://www.mooc-orientation.fr

The University of Torino in Italy offers 20 open access courses via its Start@UniTO project, in conjunction with the San Paolo Company. These are aimed at final year High school students with a view to better aiding student choice of course.

As reported in our previous paper, the Federica Web Learning Centre has been experimenting with the use of meta-MOOCs for bridging the gap between school and Higher education since 2019. These place the emphasis on the first of the main MOOC strategies identified above, that is, they offer chunks of the major degree courses offered at national level, and thus enable students to experience the university classroom and content and standards first-hand. The role of the teacher as multiplier was fundamental to the success of this project, as the initial point of contact was with individual class teachers who chose to adopt this series of orientation mini-MOOCs as a classroom activity and involved the class in the creation of their own digital artefacts as a project outcome. 8452 local students in the Naples area followed the meta-MOOC project in 2019. As teaching and learning continue in the online space as a result of the global covid-19 pandemic, these mini MOOCs could see wider leverage as the asynchronous content within a fully online flipped classroom mode of delivery where video-conferencing software provides the "face-to-face" element.

"The issue of student transition to university is on the radar of many stakeholders involved, evidenced by: some university departments offering taster learning days or conferences for final year High School students; learned societies holding "bridging the gap" days to learn what it is like at university" (Ferreira, 2018, p. 1); and establishing ambassador schemes where current university students visit schools; local GA branches providing support for students and links with universities through their activities; and some discussion from some teachers and academics in the discipline (Ferreira, 2018), to mention just some examples, but there is potential for involvement from a broader spectrum of organizations to be involved.

6. MOOCS AS PREPARATION FOR UNIVERSITY ENTRANCE

In a new extension to the Federica MOOC Orientation activity, and in line with the second of the main MOOC strategies identified above, the Federica Web Learning Centre has recently started a collaboration with Cisia (Consortium Interuniversity for Integrated Access Systems). The Cisia is a non-profit consortium, comprising 50 Italian Public universities, whose role is primarily to aid university access and orientation, by creating, administering and marking university admissions tests. Their role also includes the development of tools on the part of their consortium members, to plug freshmen knowledge gaps in a bid to reduce repeated failure in all-important modules of the course and thus reduce potential dropout rates. The MOOC initiative is a valuable addition to their toolbox.

The Cisia/Federica Web Learning collaboration consists in offering specific online courses - on the Federica platform - to help students prepare for university entrance exams to those faculties where stringent selection procedures are in place. These MOOCs can also serve as remedial learning content for struggling first year students.

The Italian Ministry for Universities and Research, first with the PLS and then with the POT projects (Plan for Science Degrees and Plan for Orientation and Tutoring) (MIUR) published open Calls to Universities to design and produce learning content for final year school students in the 6 disciplinary areas where gaps had been identified: Basic Maths; Physics; Chemistry; Biology; Logic; Text Analysis and Comprehension and Italian Language Skills. The design and development of MOOCs to improve baseline knowledge in these key areas is specifically mentioned in the Ministerial Decree. The aim is to boost interaction

between schools and universities to improve levels of college readiness on the part of school-leavers and with the overall objective to:

- increase university enrolment rates;
- promote awareness in choice of degree;
- reduce dropout rates;
- support students in completing degrees within the recommended time-frame.

Within this Ministerial initiative, the Cisia consortium is committed to designing effective self-learning and self- assessment tools, and MOOCs will make a valuable contribution to this orientation and tutoring activity on their part. The Federica Web Learning/Cisia collaboration, which focuses on the production of new introductory MOOCs to improve baseline knowledge for better university access and performance, is already under way. It includes establishing guidelines for effective MOOC design and creation with a national committee of stakeholders. The first phase of the joint initiative saw the creation of a set of courses in Basic Mathematics for the following subject areas: Engineering and Science, Agricultural science, Economics and Pharmacy. Maths was identified by the universities and teachers involved in the project as being one of the most significant hurdles for students on these degree courses, and according to OECD statistics, Pisa performance for mathematics and science shows poor performance for Italy compared to its European counterparts (OECD, 2012).

The design of the courses was aimed at a school-leaver audience and enables them to explore and clarify basic concepts in 10 lessons. Numerous videos, texts and formative assessments accompany the student through the theory and practice of functions, equations, logarithms, geometry and other fundamental aspects of maths for further science studies.

Once the courses were ready, a two-pronged dissemination plan launched the initiative. Major stakeholders from both partner networks were invited to a Study Day on Technology Enhanced Learning where the courses were presented. This coincided with the launch of a dedicated page on the Federica platform www.federica.eu/cisia (April 2019) and on the Cisia platform that publicized the initiative and also provided access to the four Mathematics courses.

7. INITIAL CISIA / FEDERICA WEB LEARNING PROJECT RESULTS

The initiative was launched with four related courses in basic mathematics that were differentiated according to the specific needs of four popular degree courses. They met with success in terms of student numbers as reported in the table below, demonstrating broad interest in the topic. A significant finding was that Basic Maths for Engineering and Basic Maths for Economics attracted much higher audiences than Pharmacy and Agriculture, and it was decided in the second edition to merge the courses and offer a combined Basic maths course lasting 12 weeks.

Table 1.
Subscription Distribution to the Cisia's Courses – first wave.

COURSE	TOTAL ENROL
Matematica di Base - Ingegneria e Scienze	15.495
Matematica di Base – Economia	8.054
Matematica di Base – Agraria	1.038
Matematica di Base – Farmacia	1.210
TOTALE	**38.067**

In the second edition of the course, which opened in Spring 2020, the data demonstrated increased learner uptake during the month of April, in line with generalized increases in MOOC learning across Federica courses and other MOOC platforms as the pandemic took hold. Learner numbers then increased extensively during the months of July and August. This second peak coincides with possible preparation for university entrance exams which are held in September, and an analysis of the student demographic shows that 18% of the learners were 18 years old or below and 34% were 19 years old, and were thus conceivably trying for university entrance for a first or second time. It is also interesting to observe that 41% of learners were aged between 20 and 30 years of age, many of whom were most likely registered university students who were seeking online support for forthcoming, and

potentially difficult, university exams. One of the strategic aims set out in the recently updated DEAP is to develop higher education curricula which attract women to engineering and ICT based on the 'STEAM' (science, technology, engineering, arts and mathematics) approach. This course seems to be a good example as there were more women than men registered (51% women, 49% men). The second iteration of the course also benefited from an increased teacher presence on the class forum, so that personal learning problems or doubts about specific questions in the exercises or end-of-lesson quizzes could be addressed.

Table 2.
Subscription Distribution to the new Cisia's Course.

COURSE	TOTAL ENROL
Matematica di Base – New Edition	12.270

The Federica Web Learning/Cisia collaboration will be extended in the forthcoming months. The Ministerial letter (quoted above) encourages "the activation of orientation projects that are the result of synergies between upper secondary schools and higher education institutions to reduce the academic gap in competences between leaving school levels and required university levels. It would be opportune to offer certification for these credits which learners who intend to continue their studies could subsequently exchange for university credit (CFUs)". The Federica Web Learning/Cisia courses already offer certificates of attendance, for free, to students who successfully complete 80% or over of the course, and are therefore already on their way to achieving this ministerial goal.

8. FUTURE EXTENSION OF MOOC STRATEGY TO VOCATIONAL ORIENTATION

In addition to the two routes towards orientation that Federica has already explored, and that we have presented here above, future work at the Centre will also focus on the third way; that of vocational orientation for students. The objective is to equip students with life skills that develop an awareness of self, and the changes that their lives will undergo as they enrol at university, and how this new level of understanding will enable them to achieve personal goals and fulfilment. This is one of the overall objectives of one of the most significant and wide- reaching POTS under way - that of Engineering, which involves 41 Universities. The University of Naples Federico II is heading this group, due to its research and teaching excellence in this area, and Federica Web Learning, as a consequence, will incorporate experimentation of this approach to orientation in future MOOC initiatives.
A National Day of Study devoted to tools and ideas for vocational orientation, was already organised by Federico II in November 2019, touching on subjects like *New directions for an inclusive and sustainable futur*e; *Policies, practices and pathways towards more active student orientation*.[8]

9. CONCLUSION

A two-pronged MOOC strategy for Orientation has been implemented effectively by Federica Web Learning in the last twelve months: preparation for university choice via the Meta-MOOC initiative, and knowledge enhancement via the CISIA initiative.
A forthcoming change of platform interface will give greater space and visibility to these orientation initiatives, that respond to the needs and expectations of the digital generation by speaking and using their language. These existing orientation activities will be reinforced and extended. New experimentation will move in tandem with the University Engineering POT, adding a third prong to the orientation strategy, that of vocational orientation and life skills.

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Chapter #16

DIGITAL ENGINES AT WORK: PROMOTING RESEARCH SKILLS IN STUDENTS

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ABSTRACT
The paper focuses on the digital teaching and research practices which make an indispensable integral component of upscale education. The authors compare traditional approaches to education against the much demanded by the society, promising approaches which heavily rely on the digital engines. Most relevant – education-wise – features of centennials / millennials, also referred to as "digital natives", are taken into account. The digital teaching practices and digital research practices that can be used in teaching are outlined; teaching and research potential of some digital engines is examined. Corpus-based experiment along with the analysis of search engine results, cultural-linguistic research through Google and Yandex searching, Tropes Zoom's content analysis and some other methodological novelties that can be used in the classroom as well as facilitate and substantiate the research results are analysed.

Keywords: education, digital, teaching, research, experiment.

1. INTRODUCTION

In the digital-age renaissance educators prepare learners with essential digital-age research skills, and integrate powerful digital tools (DT) into classes.

The authors focus on linguistic research in didactic perspective.

Key ideas what we focus on are:

1) ever growing awareness in the academic circles that research should make the integral indispensable component of upscale education;

2) in the ever changing environment many approaches to education are "stillborn" and rapidly grow outdated;

3) living in the digital age inhabited by centennials / millennials, also referred to as "digital natives", calls for new approaches in education;

4) what digital teaching practices and digital research practices can be used in teaching.

The ideas we are going to promote here are: the world is rapidly changing towards digital global transatlantic happiness; it is to be taken into account in the education as it is the teachers' responsibility to prepare young people to cope with it – through using DT for academic and research purposes, the research being one of the key education components.

In this section of the book the authors will briefly focus, first, on the state of affairs in the academic sphere as regards digitalization in education, then proceed to the problems people have to cope with in the rapidly changing world and the challenges these changes entail; after that, the specifics of modern students related to their "digital life" in the educational perspective will be tackled, and finally, the digital research strategies will be suggested that can motivate the students making research practices more efficient and even more enjoyable. These practices still need attending to and call for detailed elaborating.

2. ACADEMIC ENVIRONMENT

The academic environment as the most mobile sphere is answering the digital challenges the global world has to face nowadays. The academics reconsider time tested conventional teaching practices to adapt them to the digital environment (Feng & Duarte, 2019; Suleimanova & Vodyanitskaya, 2020), suggest new ones (Hamdani, 2018; Kimura, Ghahramani, Takeuchi, Iwata, & Ueda, 2018) and take advantage of them in teaching research skills to students (Chernyavskaya, 2018; 2019).

Let us focus on the research as the integral indispensable component of upscale education. It is an open secret that the education is getting more and more practically oriented, still – fortunately – the academic community persists in promoting research skills in students as it is the methodology and research techniques and methods that shape a modern specialist who is able to find solutions to the challenges the world offers today (Chernyavskaya, 2018; 2019; Diemer, 2011). In fact, research skills – in the broad sense – are the cornerstone in all kinds of human activity. The first researchers are newly born babies doing research all day long learning to survive in our world. The research competence is explicitly declared in the operating EMT (European Master's in Translation) standard as the leading reference standard for translator training, to be in effect until the year 2024.

The EMT standard specifies 35 crucial competences, which must be mastered by prospective specialists. Let us focus on some of them, and research-related ones among them, and reword some of the competences in a wider perspective – in addition to EMT requirement, or instead, he/she has to be able to edit the text, we would say, **process** the text in different formats with different purposes as the final requirement a translator / interpreter or a linguist is to meet is to generate a text – ideally in Queen's English, at least (providing there are no special stylistic requirements). We have to admit, however, that this competence is often seriously underestimated and even neglected (regularly by the so-called innocent translators, with no specialized education). Then a would-be linguist is to be able to explain and justify the translation choice. It implies that the translator should be on good terms with the linguistic and translation theories.

3. COPING WITH THE EVER CHANGING WORLD

Our next point is that the world nowadays is an ever changing environment in which we have to teach students correspondingly, while many running approaches to education are practically "stillborn" and rapidly grow outdated. We have to deal today with a New Learner who emerged some 15 years ago – it is IGeneration, Millenials, or Generation Y. M. Prensky admits: "Our students have changed radically. Today's students are no longer the people educational system was designed to teach", referring to them as digital natives, digital immigrants (Prensky, 2001. p.1).

What makes the issue extremely complicated is that the world has, quite recently, started changing and whirling as fast as it never had before. The problem is, as many scientists claim, that the traditional institutions are not as flexible as we want them to be. It refers to education as well. Evolving educational landscape is getting less and less recognizable.

It is enough just to look around and see how rapidly it flip flops our traditional perceptions of time, finance, gender, even space which is getting, all of a sudden, unbearably and painfully global.

We are facing a dynamic combination of changing mindset, behaviors and skills – how to cope with this?

Greater access to the abundant information resources changes the learning trajectory focus from memorizing and listening to arming the learner with the tools that help get oriented in the information oceans.

E. Sheninger claims that now students are engaged in their digital worlds learning without us − professors (Sheninger, 2014).

Maybe they no longer need us? Or we should reconsider our roles and learn to navigate and pilot them through this digital world, domesticate that digital monster?

We argue, though, that it is still professors who can explain the basic points, the theoretical background and arm the students with the methods and methodology, teach them how to learn, how to extract info from and through search engines and pilot them towards the goal.

So, we are not going to be extinct, at least for some 100 years. If we cope with the changes. There are lots of strategies suggested for meeting the challenges of the changing world, to mention one of them.

The general strategy on how not to lag behind the learners, or to get "change savvy" (Herold & Fedor, 2008) involves:

- careful entry into the new suggested setting;
- listening to and learning from those (students included) who have been there or been at it longer;
- being enthusiastic, genuine and sincere about the changing circumstances – obtaining support for what needs to be fixed;
- developing a credible plan for making a fix or improvement.

We do not reproduce here the full list the author suggested, though the message is clear – the present-day professor must be open to changes. The point is that it refers to general principles while does not offer a tangible tool arming us, professors, with the practical guide to be used in class.

For example, today delivering lectures in the traditional way as *a sage on stage* makes little or no sense at all. Why?

1) Students are not motivated enough as they are only too well aware of the fact that they can refer (and actually **must** be sent) to abundant information resources at their disposal. The teachers' responsibility here is to arm them with the routes, where to go and how to find what they need.

2) In the pragmatical world which we live in now, students are practically oriented – they need practical skills and knowledge on which they expect to survive in their professional life – *Do not give me fish teach me how to fish*, – as the old adage goes.

One of the practical tools of change which we tested with our students is Project-Based Learning (PBL) (Suleimanova, Yaremenko, & Vodyanitskaya, 2018; Fomina, 2018), directly relating to the discipline students are studying, instead of the end-of-the-term exams – it is the strongest motivator for a student, as well as for professors. PBL adds to the teambuilding, students learn to exercise the team spirit, they solve a practical problem, learn how to manage the research data. Besides – what is essential – practice public speaking, fight the stage fright, not to mention student satisfaction after invariably successful presentation of the project.

Pascal Finette (from Google) says that we live in "a culture of participation plus technologies plus networks" (Finette, 2012) that will in his opinion change the course of human history. It means teambuilding nowadays is one of priorities, to be promoted in education.

Another tool that changes the teaching practices is analytical interpretation – e.g., in teaching Theory of linguistics (which is not the most exciting discipline for sophomores), we may offer students a research object – e.g. a cluster of synonyms and ask them to analyse the research route within the frame of different linguistic paradigms: it is actually a traditional "what if" exercise applied in a new perspective. Students toy with research object in the cognitive / semantic, discourse or theory of speech acts or psycholinguistic or sociolinguistic perspective, then they are to elaborate corresponding research routes.

Now they know how to handle research in a variety of linguistic schools and approaches and, if needed, they will be able to draw data from different sources to prove their ideas. They grow multidisciplinary.

We also tried to delegate simple descriptive topics to students: they were asked (teamwork format) to prepare team presentations and in this way we may "kill quite a few rabbits": students did search, arranged the information and delivered a presentation working as a team (instead of a boring professor drifting along the theme). There is also some competition between the teams and students are listening to each other with much greater interest than to a monotonous professor. In this way we delegate much work and creativity (quite a powerful motivator) to the students, and try to cope with "the wind of change".

The list of the tools we apply is by no means exhaustive, and the idea to try and reconsider time honoured teaching instruments seems promising, though there still seems to be more questions than answers.

4. DIGITAL NATIVES

The digital learner prefers to network simultaneously with others, processes pictures, sounds, colors and video before texts; learns what is relevant, active, instantly useful and fun (Sheninger, 2014).

Today's kids are born digital-born into a media-rich, networked world of infinite possibilities. But their digital lifestyle is about more than just cool gadgets; it's about engagement, self-directed learning, creativity and empowerment (Finette, 2012; Sheninger, 2014).

We are immersed into this world whether we like it or not, we live in the digital-age renaissance and have to be in tune with the real world.

It is amazing how dramatically digital we are getting. Educators are learning (life-long learning – one more new popular concept) to be the catalysts for change and prepare learners with essential digital-age research skills, and integrate powerful digital tools into classes.

Let us look at the concept of a digital learner against a traditional educator. Digital learner prefers:

- to access information quickly from multi-media sources (educators prefer slow release of info from limited sources);
- parallel processing & multitasking (educators prefer linear processing, single tasks or limited multitasking);
- random access to hyper-linked multimedia information (educators prefer to provide information linearly, logically, and sequentially);
- to learn "just in time" (educators – "just in case");
- instant gratification & immediate rewards (educators – deferred gratification & delayed rewards);
- **to network simultaneously with others** (educators – students to work independently before they network and interact);

- processing pictures, sounds, colors & video before texts (educators – text before others);

- **learning that is relevant, active, instantly useful & fun** (educators – feel compelled to teach memorization of the content in the curriculum guide) (bold type is added) (Sheninger, 2014).

As we can see, teamwork (=working simultaneously with others) and being practical and fun are emphasized. We are tasked with preparing students for success in a world that is becoming more dependent on technology, whether we like it or not. The good side to it is that it transforms universities into vibrant learning communities.

5. DIGITAL TEACHING PRACTICES & DIGITAL RESEARCH PRACTICES

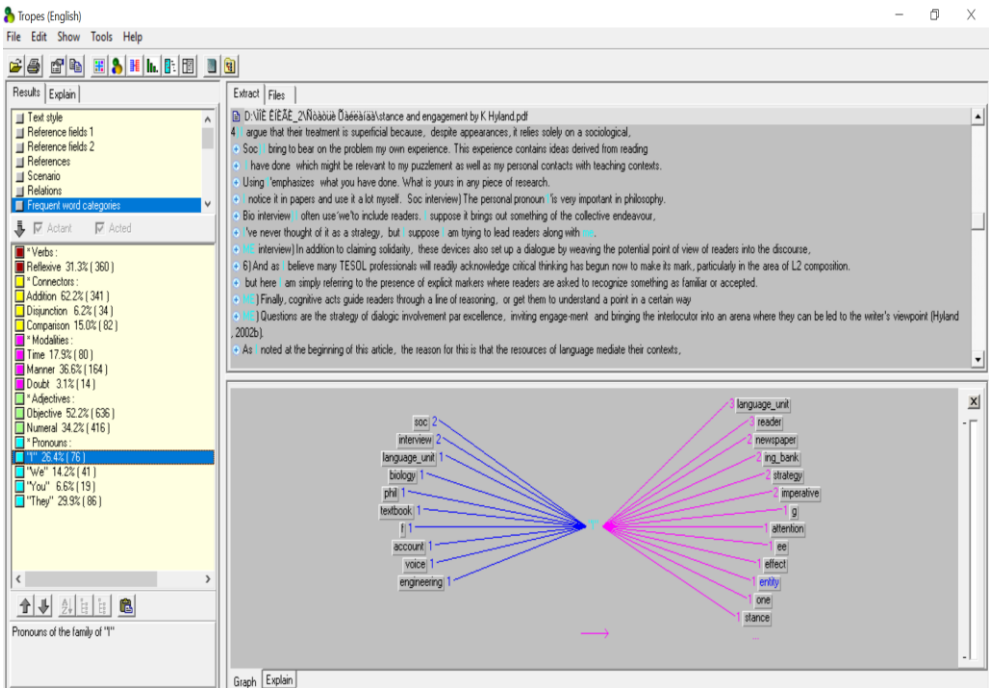
Digital engines can facilitate and substantiate the research results, not to mention the teaching practice where they make edutainment possible. Digital engines may be divided into **search** engine vs **research** tool: text analysis and linguistic experiment.

As a **search** engine Google and other big data resources, e.g. text corpora are used as a source of linguistic data which are time and resource efficient data acquisition and preliminary processing tools – through them functional style, discourse analysis can be effected.

What remains dramatically underestimated in teaching theory practice is the **research** potential: we can analyze the texts in a variety of perspectives, e.g.: ***SentiStrength*** which focuses on ***Sentiment Analysis / Opinion Mining,*** the system searches for emotionally charged vocabulary in the text (on the basis of the dictionary data) and evaluates the negative vs positive tone of the text (Suleimanova & Vodyanitskaya, 2020). Applicable in analyzing social networks communication; ranging along the intensiveness scale; compares the original vs translated texts as regards their emotional and evaluation contents. Another tool is ***VAAL-mini*** which evaluates subconscious emotional impact of phonosemantic structure of the text on recipient, predicts emotional response of the audience and exploits it when compiling the texts with the desired effect. Applicable in advertising (naming, slogans), analyzing individual speech characteristics, mass media texts. These powerful digital instruments empower the researcher with the means of analyzing "ready" text.

Consider a free desktop search engine and semantic analysis software from Acetic / Semantic-Knowledge – ***Tropes Zoom*** (now available in English, French, Spanish, Portuguese, Romanian) whose uses cover a wide spectrum ranging from content-analysis and defining stylistic register, chronology, communicators, parts of speech (frequency), key episodes, logical steps, modality, etc. to analysis of free-response questionnaires, studies of the effectiveness of advertising, monitoring changes to brand image, analysis of clinical interviews, behavioral studies, or analysis of literary works (http://www.semantic-knowledge.com/). Many research projects in theoretical disciplines such as theory of grammar, lexicology, introduction to linguistics, general linguistics rely on discourse analysis. The analysis starts with collecting the empirical data for the research. To collect the data (consider for instance stance and engagement expressions as linguistic representations of the category of subject) within content analysis "manually" (search options in Microsoft Word for .rtf or .doc(x) formats or Adobe Reader / PDF-Xchange Viewer for pdf files might be of some help still do not provide for the scenario – a frame of the text analysis) turns out to be a multi-hour monotonous, tedious task. *Tropes* can significantly facilitate the research procedure and reshape research methodology – e.g. all the statements with reader pronouns (*you*, *your* and inclusive *we)* as well as absolute and relative frequency of these "engagement" expressions can be easily extracted from the analysed text in no time (see Figure 1 for *Tropes*'s results).

Figure 1.
Tropes Zoom's results – absolute and relative frequency of pronouns.



We may also use Google, Yandex and other search engines' research potential for cultural-linguistic research, for example, while analyzing the word order in the attributive group to show that it is indicative of the national cultural practices (see Suleimanova & Petrova, 2020) for a detailed account of using big data experiments in cognitive and linguo-cultural research in English and Russian). For example, the request for "competing" attributive phrases *вкусная здоровая пища (delicious healthy food)* and *здоровая вкусная пища (healthy delicious food)* reveals the following statistics – *вкусная здоровая пища* – 546,000 Google entries, while *здоровая вкусная пища* – 738,000 entries. What follows is that the Russian cognitive practice admits existence of both delicious, and healthy food, but higher frequency of the class of delicious food (if this figure is taken as 100%) against healthy food (74%) means that for the Russian linguistic picture of the world it is more relevant to distinguish delicious rather than healthy food. We can also conclude that we have a more hedonistic vision than people in the English-speaking world, where these data are almost equivalent (935 and 939 million) with 0.4% difference, according to Google (see Table 1) (Suleimanova & Petrova, 2020, p.389-390).

Table 1.
Occurrences of the attributive groups 'вкусная здоровая пища' vs 'здоровая вкусная пища', 'delicious healthy food' vs 'healthy delicious food' in Google (accessed 10/2020).

Phrase	Google Search
вкусная здоровая пища	546,000
здоровая вкусная пища	738,000
delicious healthy food	935,000,000
healthy delicious food	939,000,000

What is more appealing in digital tools is that they offer research resources for **experimental** methods: in psycholinguistics, sociolinguistics, and semantics.

We can also verify semantic hypotheses, registering the number of acceptable phrases (instead of polling native speakers). In the linguistic experiment, corpus-based experiment and the analysis of search engine results are rapidly getting ground. While in linguistic experiment we obtain the so-called 'negative linguistic material' (the term used by L.V. Scherba), i.e. the sentences graded as unacceptable, the text corpora do not provide the researcher with marked sentences. Most frequently occurring search results are likely to be acceptable and preferred, while marginally acceptable and not preferred sentences are to be rare. To verify the hypothesis with corpora and Google big data, the researcher determines whether the corpora and Google experimental data complies with his/her predictions and expectations, and to what extent. So, in accordance with the expectations we get frequent search results with the word *empty* describing a physical object (a container, a cup, a stomach, a bottle, etc.) construed as three-dimensional physical space; and rare or no results with the word *blank* in these adjective-noun-combinations (see Table 2).

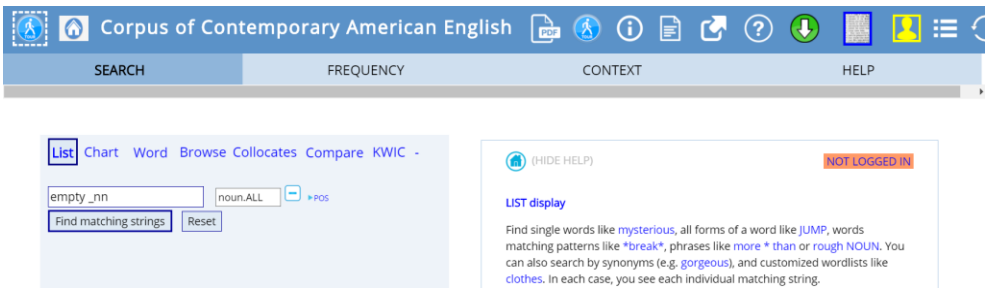
Table 2.
BNC and Google search results (accessed 11/2020).

	container (Google / BNC)	**cup** (Google / BNC)	**stomach** (Google / BNC)	**cheque** (Google / BNC)	**screen** (Google / BNC)	**sheet of paper** (Google / BNC)
empty	313 m / 4	472 m / 24	219 m / 51	17.1 m / 2	1.410 m / 2	177 m / 1
blank	130 m / **0**	273 m / **0**	0.048 m / **0**	12.3 m / 38	757 m / 12	279 m / 20

Moreover corpus-based data can provide very useful insight into the meaning and usage of the words at the initial stage of the semantic research that consists in gathering information on their left and right distribution and valence characteristics (the results of this preliminary analysis enable the researcher to frame a hypothesis on the meaning of the

linguistic units). For example, in investigating semantics of adjectives *empty* and *blank* we can limit the search to noun collocates with a simple query *empty _nn* (*blank _nn)* (see Figure 2).

Figure 2.
Searching for collocates.



The search results (see Figure 3 and Figure 4) feature the most common nouns after *empty* and *blank* – nouns denoting a physical object (*a chair, a house, a room, a stomach, a seat*, etc.) typically construed as three-dimensional physical space after the adjective *empty*; and nouns denoting objects conventionally conceived of as two-dimensional flat objects (*a check, a page, a canvas, a screen*, etc.) after *blank*. In this case we can put forward a hypothesis on the meanings of the chosen adjectives, and then proceed to its experimental verification.

Figure 3.
Frequency of 'empty + noun' collocations.

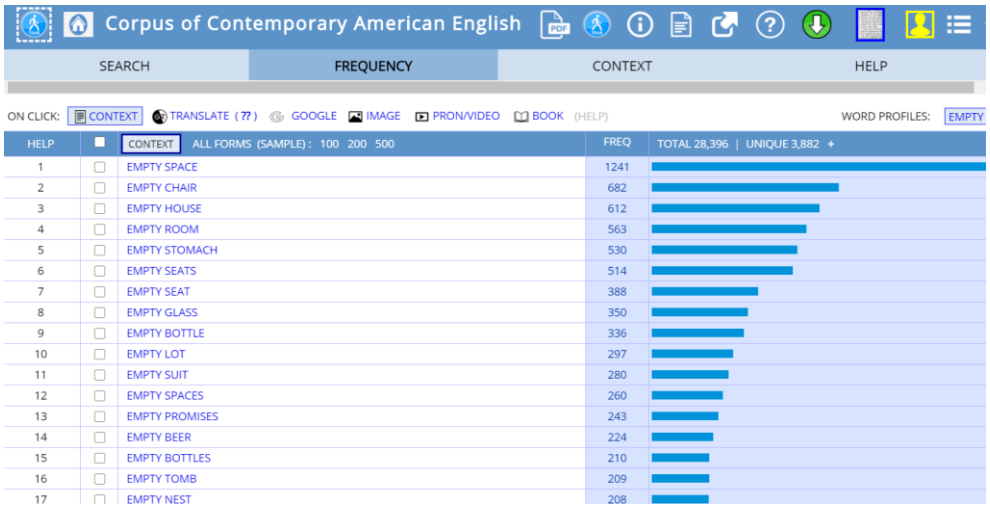
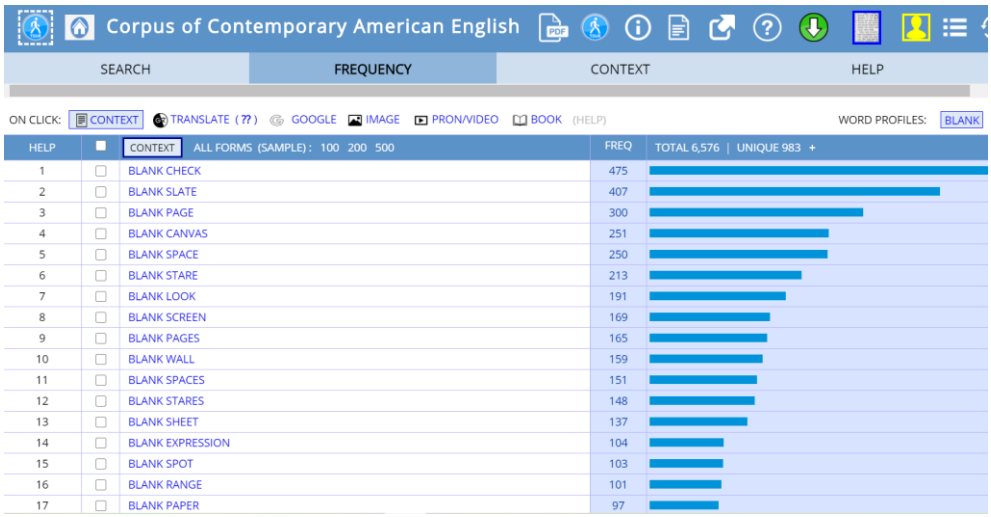


Figure 4.
Frequency of 'blank + noun' collocations.



Digital engines do reshape research methodologies. Actually, they are a challenge to the traditional polling psycholinguistic practices: e.g. associative experiment. Let us see how it works in the Mentimeter (MM). MM is the system that can process the polls online and represent immediately the results in a variety of graphic formats (about 10). Its VAT is that it is attractive with the younger generation (edutainment – students enjoy it at first when asked to use their telephones, they look puzzled as, normally, telephones are discouraged in class). See (Sheninger, 2014) for more digital tools (Twitter, Wordle, VoiceThread, etc.) used in the classroom.

6. CONCLUSION

The modern pedagogy emphasizes priorities, among those are accepting this "brave new world" of digital environment, being open to fast changes in the world. Living or rather surviving in the digital ambience, and enjoying it, an individual has no choice except mastering / fostering / befriending digital tools of all kinds. Digital engines reshape research methodologies as well as teaching research to the students.

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Chapter #17

NATURE OF SCIENCE INTERDISCIPLINARY TEACHING AT PRIMARY SCHOOL BASED ON SYMMETRY AND THE SEARCH OF INVARIANTS

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ABSTRACT
The project is situated in the field of teaching physics, generally speaking, science education. It aims at studying the interplay between physics and mathematics, introducing an interdisciplinary approach based on the modern concept of symmetry or sameness within change (i.e., invariance). The interdisciplinary methods integrate the process skills common to discovery-based science and problem-based mathematics, typically of Nature of Science (NoS) modelling. We designed a teaching-learning sequence (TLS) and implemented it in an Italian primary school on a sample group (N = 96). Research conforms to pre- and post-test design with a control group. The resulting data were examined through a mixed method. We assess the effectiveness of the TLS by analysing the learning changes in the level of pupils' knowledge of symmetry. The findings show that the pupils were in the regime of competence for grasping the changed view of symmetry. It also provides ideas that the concepts of symmetry and invariance will allow building the architecture of more extensive scientific knowledge. The study of transformations and invariants facilitates the acquisition of cognitive procedures fitting in many domains, modelling and generalization processes. This research contribution brings important suggestions for designs of successive steps in the learning path on symmetry.

Keywords: teaching science, NoS, symmetry, invariants in science education.

1. INTRODUCTION

1.1. Background

Remarkable studies (Pisano, 2011; Boniolo, Budinich, & Trobok, 2005; Fuson, Kalchman, & Bransford, 2005) have been devoted to the problem of teaching together mathematical and science contents. In addition, the language of mathematics makes sense of a wide range of natural phenomena (Wigner, 1967, p. 230). Mathematics is a vehicle of meaning and sense, and the mastery of symbols is essential to move from one level of abstraction to another of a higher degree. One of the most significant examples is the symmetry and the different forms used in the scientific disciplines throughout history.

Despite the fact that mathematical proficiency is highly relevant in and to the research fields, mathematics education is failing to support interdisciplinary and educational connections to physics. In fact, sometimes from students' prospective, mathematics, physics and biology typically appear as separate subjects with few interconnections (Redish & Kuo, 2015).

This compartmentalization generates many theoretical misunderstandings in the process of learning certain important concepts (Meltzer, 2002; Buick, 2007). For instance, students showing adequate computational skills still lack the ability to apply these skills in

a meaningful way. Leikin, Berman, and Zaslavsky (2000a) illustrate the difficulties and misconceptions for seven eight-graders students associated with the symmetry transformations. The issue is exposed by Seah & Horne (2019), Ng & Sinclair (2015), Knuchel (2004) in the elementary school. The continuity and ruptures identified in the use of the symmetry concept are analyzed by Chesnais and Munier (2013) at the transition from primary to secondary school in France. There is evidence that students focus their attention more on basic comprehension and memorization of concepts and formulas than on critical thinking. In this sense, a key aspect of educational innovation is to promote creative and flexible frameworks for integrating productive ideas across disciplines. Symmetry is a unifying concept due to its ability to connect a variety of domains (Dreyfus & Eisenberg, 1990, p. 53). The relationship between symmetry and invariance in mathematics and science has been symbiotic, each contributing to the other's development (Klein, 1990; Weyl, 1952, p.135). Indeed, invariance is very relevant in teaching and learning geometry, but it does not receive the attention it deserves in education (Libeskind, Stupel, & Oxman, 2018; Schuster, 1971). The activities described below are designed to achieve this topic in the teaching-learning process at primary school.

1.2. Focus of the study and literature review

Our project aims at contributing to the research in the field of Nature of Science Teaching regarding the interplay between physics and mathematics (Pisano, 2011; Doran 2017; Wigner, 1960) within an interdisciplinary approach based on symmetry and invariance. Symmetry and searching of invariants can be employed in interdisciplinary perspective because of its crosscutting character and its historico-epistemological value (Dirac, 1939; Feynman, 1964-1965; Galileo, 1623). The possibility of widening the fields of application in which to choose the rules to be considered from time to time offers the starting point for reflections on the relationships of equality and more generally of equivalence, on the relativity of the concept of equality, of form as a physical system that is preserved (Rosen & Copié, 1982; Weyl, 1928; Wigner, 1967).

The processes of change or modelling of a rule are themselves subject to a principle of legality[1] that guarantees compatibility and consistency with those already in existence: in physics, this set of binding conditions is represented by the principles of symmetry. The symmetry perceived with the meaning of the invariance of a form undergoing a change becomes a powerful tool of inter-disciplinary knowledge included applied sciences both into history (Pisano, 2011) and in society (Marchis, 2009). According to Darvas (1997, p. 328), symmetry as a mathematical tool is also advanced in a general scientific method. Thus, it can establish principles generally applicable throughout the sciences.

The essential idea is to extend symmetry starting from line symmetry and aesthetic qualities with the search for regularity to more general and interdisciplinary aspect of dynamic principles of transformation (Leikin, Berman, and Zaslavsky, 2000b). In fact, the figures that have characteristics in common to our eye from different points of view somehow refer to the concept of invariant to the sameness within change (Thyssen & Ceulemans, 2017; Weyl, 1952).

The search for invariants is inherent in the description of reality, introducing dynamic principles of transformation that give meaning to the modern concept of symmetry in science. In other words, a system is said to possess a symmetry if one can make a change (a transformation) in the system so that, after the change, the thing appears exactly the same (is invariant) as before (Lederman & Hill, 2000).

1.3. Research questions

Several notable studies point out that the concepts and the principles of the application of the modern concept of symmetry can be taught and understood at the high school and early college level (Bertozzi, Levrini, & Rodriguez, 2014). Our experimental project tries to answer the following General Research Question:

GRQ. How can we use symmetry and the search of invariants as bridging concepts in science education for fifth grade pupils?

These aims lead to the following Specific Research Questions:

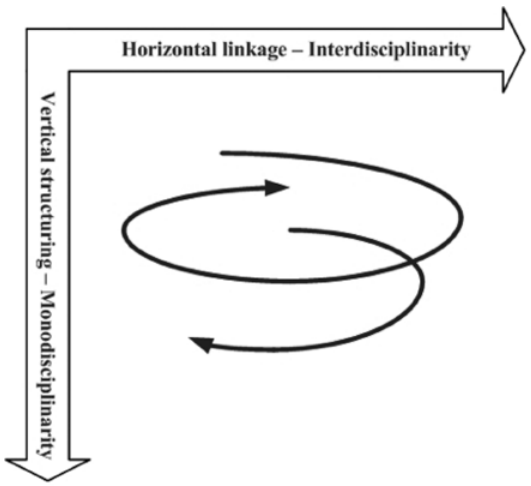
SRQ1. What is the effect of this change of paradigm on the students' understanding and skill development?

SRQ2. What is the effect of this change of paradigm on the didactical framework of linking teaching in Mathematics and Physics?

1.4. Theoretical framework

For modelling activities, centred around symmetry, we are inspired by Michelsen's model (Michelsen, 2015). It consists of an educational framework (Figure 1) for coordination and mutual interaction between mathematics and science. It is operative by two phases: horizontal connection and vertical structuring. In the horizontal phase, thematic integration is established to connect concept and process skills of mathematics and science.

Figure 1.
Michelsen's model: the spiral shape illustrates
the repetitive movements between horizontal and vertical phases.



The horizontal linking is characterized by process of modelling activities in an interdisciplinary context. In the vertical phase, conceptual anchoring of the concepts and process skills from the horizontal phase is used to create languages and symbol systems that allow the pupils to move around logically and analytically within mathematics and science.

According to this model, we have designed the teaching-learning progression considering the vertical increment by developing the concept of symmetry and the transversal dimension by using the sameness within the change to interpret different materials and aspects of these contexts. The vertical and horizontal progression occurs from

iterative improvements in which pupils develop the habit of using different articulations of ideas to understand the behaviour of and changes in materials.

Once the concepts and skills in search of invariants are conceptually anchored in pupils at primary school for the respective subjects, they can evolve in a new interdisciplinary context as part of a horizontal linkage. In this way we expect to identify pupils' conceptions and the persistence of these conceptions and to focus the attention on difficulties that children might have in mathematizing physical situations.

2. EXPERIMENT DESIGN

2.1. Classroom-based sample group

A sample of 96 pupils (N=96) meaning that all fifth-grade classes (10 years) of the primary school (I.S.C. "Annibal Caro") in Montegranaro (Italy) participated in the study. The VF and VG classes, in total 41 pupils, were making up the check group that had to answer the same questionnaire at the beginning and at the end of learning and teaching sequence. The inquiry also concerned all the mathematics teachers, who were in charge of answering pre-course and post-course questionnaires and keeping the logbook of the whole experiment.

Table 1.
Scheme of sample group.

Classes	N° Pupils	Gender	Pre-Course Test	Course	Post-Course Test
V A	16	6 F – 10 M	No	Yes	Yes
V C	19	7 F – 12 M	No	Yes	Yes
V D	20	8 F – 12 M	No	Yes	Yes
V F	20	11 F – 9 M	Yes	Yes	Yes
V G	21	10 F – 11 M	Yes	Yes	Yes

2.2. Activities and materials

The set of materials and learning artifacts address providing motivation for students and exhibiting the power of symmetry. The materials and methods should be full of rich pedagogical content and coherent with the educational framework related to symmetries. The design of the educational path is based on the novel of the Little Prince (De Saint-Exupéry, 1945). The use of metaphorical perspective helps to introduce the topic during the first activity. At the same time, it engages the students in making connections between the abstract concept of symmetry and the context of dialogue between Little Prince and the Rose. The metaphor plays a fundamental role in the social and personal constructions of knowledge (Martinez, Sauleda, & Huber, 2001). The structure of 5 activities is divided into three stages of 2 hours in sequence. In total the duration is 6 hours where the researcher proposes various activities and the teachers participate in the lessons as observers.

Table 2.
Series of Activity in TLS.

Activity	Type	Title	Duration
A1	Brainstorming - Writing - Drawing	If I say the word symmetry, what are you thinking about?	2 h
A2	Solving Problems	Boxes and lids	1 h
A3	Listening - Watching	Lesson	1 h
A4	Task Game in group	Strange boxes and lids	2 h
A5	Homework task	Hunting for symmetries.	/

Figure 2.
Activity A1: After the reading of the dialogue between Little Prince and the Rose about Symmetry, pupils write on a post-it note the answer to the following question: Of course, you have already studied symmetry, what do you know about it?

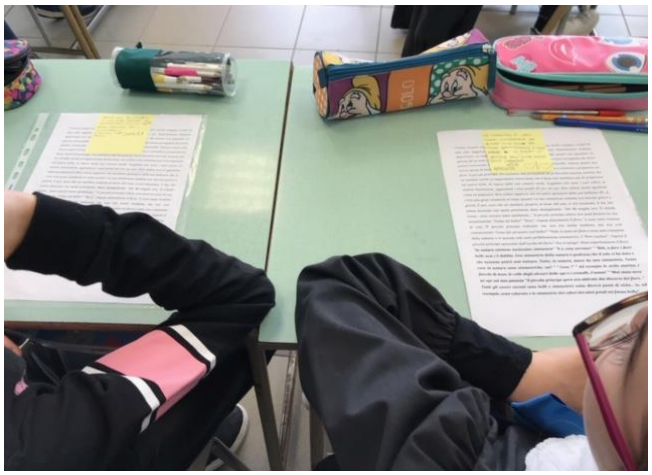
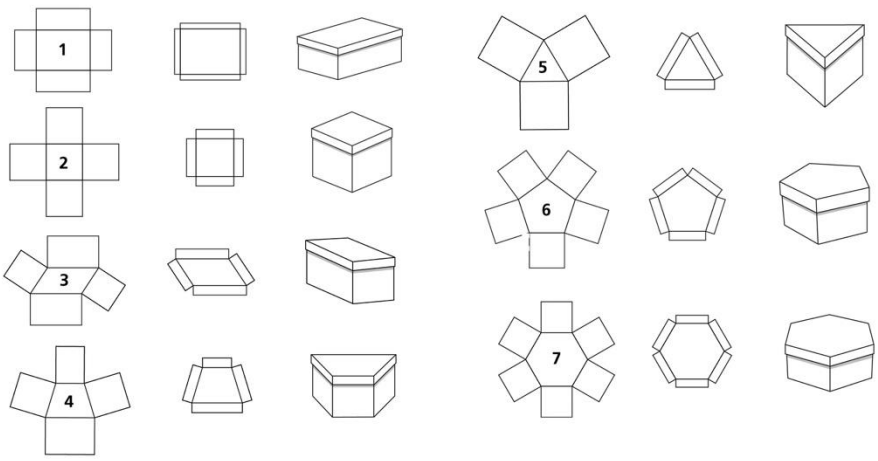


Figure 3.
Activity A4: The pupils, divided into small homogeneous groups of 4/5 pupils chosen by the teacher, will carry out manipulative work following the instructions and filling out the questionnaire of the task game.

The main activity is centered on the task game consisting of closing cardboard boxes, which pupils have to create from the distributed models, and filling out the questionnaire of the task game. This approach implies emphasis on laboratory activities. The manipulative work consists of folding and taping these cardboard models to obtain boxes with their covers. The covers are designed in such a way that they can only be rotated. The task game is to find in how many ways it is possible to put the cover on each box. This game refers to the rotation symmetries of the differently shaped lids.

Figure 4.
Models of cardboard boxes and covers of 7 shapes.



The questionnaire (see Attachment) is made up of four questions of increasing difficulty, linked with the activities carried on during the teaching learning course in order to help the students to propose more accurate and precise answers.

Table 3.
Pupils Questionnaire.

Question	Type	Aim
Q1	Dichotomous Choice Open Justification	To verify the way the concept of symmetry is perceived in the adopted didactical frame.
Q2	8 Items Text	To evaluate and measure the level of knowledge and ability of the tasks and/or specific scopes of the learning unit.
Q3	Narrative Text	D1: Emotional and affective dimension. D2: Cognitive dimension of learning. D3: Possible presence of a cognitive conflict
Q4	A Task Open Justification	To verify to what extent the students are controlling the skills in a (task) exercise of higher cognitive difficulty.

The logical order of the questions is also aimed at stimulating the students in thinking about the whole personal formative process. By asking them to justify their answers, we evaluate the pupils' learning gain and the skills acquired, such as those indicated in the National Guidelines for the Curriculum of the first cycle of education. The time at disposal for answering is of about 45 minutes and it cannot exceed one hour.

3. METHODS

3.1. Research procedure

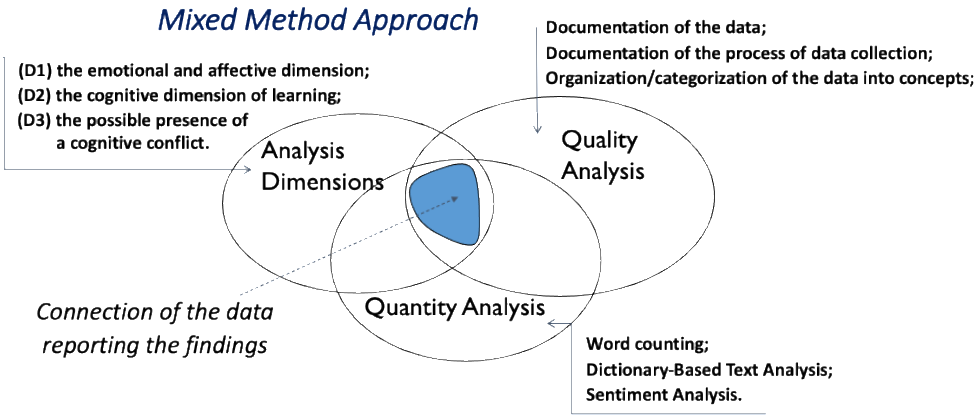
Research conforms to pre- and post-test design with a control group. The educational project proceeded to implement the TLS on symmetry between the two assessments.

3.2. Data collections and analysis

The task was carried out through multiple levels of development. The research data were selected over several sessions from class observations, audio and video recordings, pupils' drawings and test, and teachers' logbooks and questionaries. Our present work focuses on pupils' pre- and post-test and teachers' logbooks. We assess the effectiveness of the TLS by analysing the learning changes in the level of pupils' knowledge of symmetry resulting from the teaching-learning session. The pupils' answers to the questionnaire with the reflections and observations from teachers' logbooks should trace the effectiveness of teaching tools. The resulting data collection was analysed through a mixed method in conformity with the aim of the study. The study is structured mainly in three domains devoted to cognitive, affective, and psychomotor dimensions. We consider quantitative data by applying appropriate statistico-psychometric models. The investigations incorporate qualitative data with Text Analytics statistics to identify and extract information from

pupils' narratives. The multidimensional approach for empirical investigation aims at broadening the level of understanding of the study dimensions and reducing errors of interpretation as much as possible. The connection of the data enhances the trustworthiness of findings.

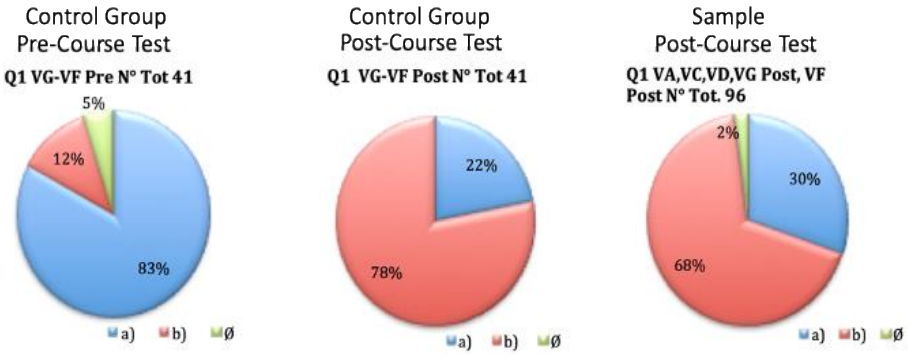
Figure 4.
Integration of different methodological approaches in the workplan analysis of data.



3.3. Findings

In order to answer SRQ1, the analysis of the data shows that the great majority (about 70%) of the students in the sample has chosen the modern concept of symmetry. As for the students of the check group, they too have preferred the modern concept of symmetry (about 80%) in the final questionnaire while having chosen the line symmetry in the initial test (about 83%).

Figure 5.
Comparison of the answer to the question Q1 between pre- and post-test.



Therefore, the experiment seems to have a very positive effect in changing the view of symmetry linked to the search for invariance in the geometric transformations. However, these results are of little relevance if one does not ask how students have interpreted, experienced and assimilated the new concept during the teaching-learning unit. To make a qualitative comparison, we give some relevant examples of answers proposed by the pupils of the VF-VG classes at the beginning and the end of the cycle of lessons.

Pupil VG17, at the beginning, answers the question Q1 in the following way: *"I have chosen the (a) option because it is the most simple and right way to make the Little Prince understand what symmetry is."* In the final questionnaire he offers the following reason of his choice, which at this stage is b: *"I have chosen the (b) option because if one observes his surroundings, one can see that although there are plenty of symmetries, if you turn them it sometimes happens that it is as you wouldn't have."*

Pupil VG19 answers as follows at the beginning: *"I choose (a) because it is clearer than (b)."* She answers at the end *"I choose (b) because if for instance I take a square and I turn it in different ways, the figure remains always the same."*

Pupil VF16 at the beginning: *"I made this choice (a) because it offers a simple and right explanation that makes the Little Prince understand what symmetry is."* At the final test: *"I have chosen (b) because it is true that there exist so many symmetries, as the rotation, that transform a figure, and this transformed figure is really coincident with the original one."*

In order to answer SRQ2, we have picked out the most frequent keywords, the most recurrent and significant arguments that appear in the justifications in order to classify them in thematic groups according to the aims of the TLS. The expressions *"many symmetries"*, *"movements"*, *"transformations"*, *"palindrome"*, *"coincidence with the original"* occurring in the answers to the final questionnaire are almost absent in the answers to the initial one.

This result means that the TLS helped the students to take an active part in acquiring a new lexicon and also that they became able to cognitively elaborate, at least to some extent, the new concepts, and to review the concepts they had already acquired. The ability of some pupils to shape the experience can sometimes result in metacognitive skills developing original and unexpected explanations. Very interesting is the answer of VF4, which shows the ability to extend the meaning of symmetry because VF4 interprets the palindromic characteristic of the short film entitled *"Palindromic Film"* by association of thought with the argument a certain symmetry of time. The pupils' answers to the fourth question (Q4) reveal an improved mastery of skills in the exercise of higher cognitive difficulty. Data show that 55% of the students in the sample (about 53/96) have given a correct and pertinent answer to the question. The pupils in the check group gave a correct answer for 27% (about 11/41) to the initial questionnaire while 51% of them (about 21/41) to the final questionnaire, which constitutes an important increase (about 25%).

Table 4.
Data from answers to the fourth question (Q4).

	N° Students	Pertinent A.	Not Pertinent A.	Confused A.	Not Answered
VF-VG Pre	41	11 (27%)	28 (68%)	0 (0%)	2 (5%)
VF-VG Post	41	21 (51%)	20 (49%)	0 (0%)	0 (0%)
Whole Sam.	96	53 (55%)	36 (38%)	4 (4%)	3 (3%)

The effectiveness of the educational activities is recognized not only in the knowledge and skills transferred, but also in the positive and authentic attitudes towards a training process of integration and innovation of the operational and abstract meaning of symmetry in the entire educational context. In this regard, the VF-VG class teacher shows that she feels *"more confident and trained"* in the contents and teaching practices *"thanks to the explanations and reflections made with the teacher"* during the activities.

The project offered broad space for reflection and renegotiation of the consolidated pedagogical-educational practices on the concept of symmetry (e.g., folding papers, mirror images) and new stimuli for future educational experiments. In her logbook, the teacher reports that *"the project turned out to be an excellent incisive training course for her personal experience."* These results bring into light that the teaching learning sequence (TLS) constitutes a promising step along the path to application of the modern concept of symmetry.

4. CONCLUSIONS

The data analysis shows that the pupils were in the regime of competence for grasping the changed view of symmetry linked to the search for invariance. Nevertheless, it does not permit to evaluate how deeply the students have elaborated the contents nor how conscious they were of the whole process. However, the triangulation of information derived from different assessment methods suggests that students can elaborate on the experience. It also provides fundamental ideas that symmetry and invariance concepts will allow building the architecture of more extensive scientific knowledge. The evidence shows that manipulation game experience grants intense spatial reasoning work besides the vision of line symmetry associated with the traditional materials.

Diversifying the consolidated symmetry application gives interesting information in the students' cognitive structure to build abstract and formal knowledge. The opportunities to apply representations and challenging them to explain phenomena in different descriptions can lead to a more reaching learning scientific and mathematical concepts inherent to symmetry. Thus, the study of transformations and invariants facilitates in the pupils the acquisition of cognitive procedures and processes that can be extended to many areas, modelling and generalization processes. Based on such consideration, it would be interesting to implement combined symmetries of different designs and movements associated with new covers of cardboard boxes. For this reason, we plan to carry on with the project regarding the results of the present work.

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ENDNOTE

1 The principle of legality or regularity registered at the level of nature, physical constants or specific natural properties points towards the existence of "forms" in nature. The transformations in the material world refer not only to an "efficient causality" but also, necessarily, to a "formal causality". It is explicitly demonstrated that some physics laws not only reflect such order but can be derived directly from it (Knuth, 2016).

ATTACHMENT

Pupils Questionaries

Q1) If you were the "Rose" trying to explain symmetry to the "Little Prince", which of the following sentences would you use?

a)There is symmetry when you can see that, if a line divides a figure in two parts, these parts reflect each other like in a mirror.

b)Among the many symmetries that exist there are also the movements that transform a figure so that the resulting figure coincides with the original.

Write the reason of your choice.

Q2) After you helped Paul in closing boxes of various forms, write in how many ways it is possible to put the cover on each box, and draw the symmetry lines (axis), if any.

Q3) Tell the "Little Prince" the activities carried out in the classroom, what you liked, what you learned the most about symmetries and if you had any difficulties.

Q4) The “Rose” told the “Little Prince” that there exist also colour symmetries. By decorating a figure with colours, one can change its symmetry. Do you agree? Explain what happens to the symmetry of the square when from completely white it becomes coloured in the following way.

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Section 3
Projects and Trends

Chapter #18

SELF-PRODUCED VIDEOS IN A FLIPPED CLASSROOM FOR ENGINEERING STUDENTS AND NURSING STUDENTS

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ABSTRACT
The study investigates the differences in nursing and engineering students' perceptions of videos made by the teachers as part of a flipped classroom, and whether these videos contribute to a good learning environment. The sample consists of 21 engineering students, 17 nursing students and 17 pre-engineering students. Overall, all three student groups are satisfied with the quality of the videos. The nursing students watched videos more before the learning sessions than the other two groups. All students think videos produced with simple tools are technically satisfactory and make it easier for the students to understand the material, which leads to increased learning outcomes. They express that videos are more motivating, and that they learn more from watching a video than reading course material. Nursing students expressed a higher degree of agreement with replacing traditional lectures in other subjects with videos. All student groups think the learning environment has been good. The results indicate a connection between the learning environment being good and the videos working satisfactorily.

Keywords: inverted classroom, teaching videos, learning outcomes, learning environment.

1. INTRODUCTION

Campus Førde at the Western Norway University of Applied Sciences (WNUAS) offers nursing education, engineering education in electrical engineering and a one-year preparatory course for engineering education (pre-engineering course). This study investigates the difference in the use of self-produced videos as part of a flipped classroom in three different subjects. These subjects are Control Systems on engineering education, Communication and Norwegian on the pre-engineering course, and Anatomy/Physiology on nursing education. Control Systems is taught in the fourth semester of the engineering education. Teaching has traditionally been classroom-based, with classes of 30 - 40 students and a lot of blackboard teaching. Learning sessions have been a combination of problem solving and review on the board. Communication and Norwegian largely consisted of presentations and related exercises. Anatomy/Physiology is part of the course in Anatomy, Physiology, Biochemistry and Microbiology that is taught in the first semester of the nursing education. Lectures have traditionally been the most widely used teaching form in this topic, but the number of lectures has been reduced in favor of learning sessions in smaller groups.

2. BACKGROUND

2.1. What is a flipped classroom?

The concept of a flipped classroom, also called an inverted classroom, is used in different ways and has varying content, and it is difficult to point to a common model (Bachnak & Maldonado, 2014). A flipped classroom means that what has traditionally been done in the classroom is done at home, and what has traditionally been done at home is done in the classroom, but it also means more than this (Sams & Bergmann, 2013). A review article by Bishop and Verleger (2013) examines a number of studies of the flipped classroom method, and they chose to describe it as a form of teaching that consists of individual computer-based learning outside the classroom and student-active/group-based learning in the classroom, but not all concepts referred to as a flipped classroom include these elements Common to the models referred to as flipped classroom, however, is that the learning that takes place outside the classroom is a preparation for student-active learning in the classroom. For the model to work, the students must have worked with the subject matter beforehand. The guidance in the classroom is based on the understanding that the students bring with them when they come to the learning session, on the basis that activating pre-understanding is important for constructing new and meaningful knowledge (Pettersen, 2005). This means that the students prepare, preferably by watching one or more videos before the learning session in the classroom. The learning session is spent on task solving and group work, and the teacher goes from being a lecturer to becoming a supervisor (Blair, Maharaj, & Primus, 2016; Sams & Bergmann, 2013). In a flipped classroom, the teacher is also more available to communicate with the students, which makes it easier to use teacher immediacy behaviors. This, combined with a good teacher-student relationship, has also been linked to motivation in learning (Estepp & Roberts, 2015).

2.2. Students' perceptions of the flipped classroom

A large review of research on the inverted classroom concluded that students are generally positive about this form of learning, but that opinions are somewhat mixed, and some are negative (Bishop & Verleger, 2013). Students may also find studying subjects on their own challenging and therefore prefer learning from the instructor inside class (Cabi, 2018). Many also prefer a mix of a flipped classroom and traditional lectures (Zappe, Leicht, Messner, Litzinger, & Lee, 2009). One study showed that students on a mathematics course were more satisfied with a flipped classroom model than with traditional lectures. One reason was the emotional safety of the learning environment. The students also felt that the peer and instructor relationship was better and that they were recognized as individuals (Steen-Utheim & Foldnes, 2018). The flipped classroom model has a positive effect on the performance of the students and seems to be useful for all disciplines. However, the effect seems to be stronger for the engineering sciences than the health sciences (Strelan, Osborn, & Palmer, 2020). A comparison of the flipped classroom approach and lectures showed that engineering students obtained better results with the flipped model. However, students with average and lower grades did not like this model (Kanimozhi & Rabi, 2019). A survey of engineering students at Texas A & M International University who used the flipped classroom on a course in electronics, showed that 67% wanted to continue with the flipped model, while the rest would rather have traditional lectures (Bachnak & Maldonado, 2014). Another survey of engineering students showed that flipped classrooms meant that lecturers could cover more and that the students did just as well as students who had more traditional classes. Initially, the students struggled with the new program, but mastered it quite quickly (Mason, Shuman,

& Cook, 2013). A review of flipped classroom teaching models in nursing education showed great variation in conceptualizing and operationalizing the model, as well as in student perceptions. The students' concerns were increased workload and distancing from the instructor. However, several of the studies included in this review showed increased course satisfaction (Njie-Carr et al., 2017). A study of students in a psychotherapy class found that 2/3 of the students preferred the flipped model to conventional teaching (Røe, Rowe, Ødegaard, Sylliaas, & Dahl-Michelsen, 2019).

2.3. Use of videos in the flipped classroom

Students who receive videos as a supplement come better prepared for the guidance than those who only get text material in advance (De Grazia, Falconer, Nicodemus, & Medlin, 2012). In a study of nursing students at Hawaii Pacific University, 85% thought it was extremely or very useful to watch videos (Critz & Knight, 2013). Videos can be recordings of whole lectures or short clips (Kay, 2012). Students want short videos that engage them (Long, Logan, & Waugh, 2016). Under Cognitive Load Theory, videos should be short and focus on one learning goal, followed by learning activities (Fyfield, Henderson, Heinrich, & Redmond, 2019). A large study from the United States showed that what engages students most is informal, short video recordings with tablet teaching, as well as videos like those at Khan University. They appreciate these videos even more than pre-recorded high-quality lecture videos (Guo, Kim, & Rubin, 2014). However, a study from Norway (Nielsen, 2020) shows that long videos are watched, but in several rounds, not in one.

Video clips are an important resource for teaching the Internet generation, taking advantage of students' different learning strategies so that each student's results improve (Berk, 2009; Johnston, Barton, Williams-Pritchard, & Todorovic, 2018). There are many digital lectures on the Internet, but each lecturer has their own style and it may take a long time to find suitable videos. The time it takes to find a good video online can be as long as the time it takes a lecturer to make their own (Raths, 2014). They can start with simple tools and become more advanced over time (Sams & Bergmann, 2013).

A study from Denmark found that 82% of the students on an anatomy course watched the assigned videos before class. 97% of the students agreed that watching the videos was a good preparation for class activities (Mikkelsen, 2015). 89% of the students in an engineering class watched videos prior to class (Garrick, 2018). Students in a science class were somewhat positive to pre-class videos, but also showed some strongly negative attitudes. The students could not ask questions and they had to spend more time studying outside class than before. These videos varied in length from 20 minutes to 40 minutes (Xiu, Moore, Thompson, & French, 2019).

3. OBJECTIVE

The objective of this study is 1) to investigate the differences in students' perceptions of teacher-produced videos as part of a flipped classroom in nursing education and engineering education, and 2) to investigate whether these videos contribute to a good learning environment.

4. METHOD

4.1. Self-produced videos

The study was conducted in the spring semester of 2016 for the engineering students, and in the autumn semester of 2016 for the nursing students.

There are nine major topics in Control Systems, with two or three videos for each main topic, about 20 videos in total. The students were to watch the videos before the teaching and learning sessions and review the theory, followed by solving problems in the classroom with access to guidance.

In Communication and Norwegian, the students received short videos they watched at home or at the start of the class. During the class, the students worked on different tasks, oral and written, in both Norwegian and English. There are four main topics in the subject, and each topic had three to five videos.

In Anatomy/Physiology, "The senses" was selected as the theme and 18 short video clips replaced four hours of lectures. After watching the videos, the students met in groups for two hours of guidance. The teacher who met the students for guidance was the same teacher who had produced the videos.

Some of the videos were made using software that captures the PC screen, while the lecturer talked. The tool that was used is called Screencastomatic (Screencastomatic, 2021) which can record both audio and video, combined with PowerPoint. Screencastomatic and a camera were used to record the preparation of notes on paper. Other videos in the project were recordings, most often of blackboard teaching, made using a rotating camera. We used a Swivl robot (Swivl, 2018), which is a tool that, in combination with a device such as an iPad, records videos. The Swivl robot is rotatable and can follow the movements of the lecturer, who wears a marker that the Swivl robot follows. A built-in microphone records what the lecturer says. The Swivl robot produces mp4 files, a format that is compatible with most platforms, including smartphones. All the videos used in Anatomy/Physiology were made this way, except for one video made using an animation program. The animation video was made with a Bamboo drawing board with SmoothDraw and recorded using a program that captures what is on the screen. This video was saved as a WMV file, and all the charts used were in versions that are available online for free.

4.2. Statistical analysis

To evaluate the project, students answered a questionnaire designed for this study (Table 1). The sample consists of 21 engineering students, 17 nursing students and 17 pre-engineering students. Of these, one engineering student and one student on the pre-engineering course only answered the first three questions, so the sample size for these student groups is respectively 20 and 16 students.

All statistical analysis was done using the *Stata 14* statistical program, except for correlations and graphs which were processed using the *R* statistical program version 3.3.2. Descriptive statistics have been used for all questions. A binomial test has been carried out on the answers to question 4 of the questionnaire, where the students responded to several statements (shown in Table 2). Furthermore, the interrelationship between the various statements in question 4 is examined using Spearman's rank correlations, where the students' response to one of the statements is compared to the response they provided for each of the other statements. Spearman's rank correlation is based on the ordinary properties of a variable, and uses the Spearman's rank correlation coefficient.

The Kruskal-Wallis test was used to investigate whether there are differences between the answers the different student groups gave to questions 1, 2, 3, and 4 in the questionnaires. In this test, the students' answers are ranked together, and the results show the average ranking for each of the student groups. Fisher's exact test was used to analyze the question of whether the students want to replace lectures with videos/guidance on other topics (question 5).

Table 1.
Questionnaire to the students.

1. **How many hours do you spend on your studies per week? (including time in class, this semester)**
Response options: Less than 20 hours / 20-30 hours / 30-40 hours / More than 40 hours / Don't know
2. **To what extent have you used the videos before the learning sessions?**
Response options: To a very large extent / To a rather great extent / To a rather small extent / To a very small extent / Not at all
3. **To what extent have you used the videos after the learning sessions?**
Response options: To a very large extent / To a rather great extent / To a rather small extent / To a very small extent / Not at all
4. **Below are several statements. Please state to what extent you agree or disagree with these statements. If you have not used the videos, do not respond to the rest of the questionnaire.**
Response options: Totally agree / Partly agree / Indifferent/ Partly disagree / Totally disagree

a) The videos were easy to understand.
b) The videos worked technically satisfactorily.
c) The videos made it easier to understand the subject matter.
d) The videos made me well prepared for the learning sessions.
e) The model with videos and learning sessions is more motivating than lectures.
f) The model with videos and learning sessions gave me greater learning outcomes than lectures.
g) I learn more from regular lectures than from the model with videos and learning sessions.
h) The learning environment during the hours with learning sessions was good.

5. Do you want to replace lectures with videos and learning sessions in other subjects?
Response options: Yes / No / Don't know

6. **Suggestion for improvements** (Free text reply)
7. **Other comments** (Free text reply)

4.3. Ethical considerations

Norwegian Center for Research Data (NSD) found that the project was not subject to ethical review. The students received information in writing and/or orally about the project. The questionnaires were answered anonymously.

5. RESULTS

Table 2 shows the combined responses of the groups to questions where the answers are easy to put together. The "completely agree" and "partially agree" responses are combined as "agree", while the "completely disagree" and "partially disagree" options are combined as "disagree". Students who answered "indifferent" or "don't know" are not included.

Table 2.
Student responses.

Questions.	**Agree % (n)**	**Disagree % (n)**
The videos were easy to understand	100 (51)	0.0 (0)
The videos worked technically satisfactory	98.0 (49)	2.0 (1)
The videos made it easier to understand the subject matter	100 (47)	0.0 (09
The videos made me well prepared for the learning sessions	97.6 (40)	2.4 (1)
The model with videos and learning sessions is more motivating than lectures	79.4 (27)	20.6 (7)
The model with videos and learning sessions gave me better learning outcomes than lectures	76.0 (19)	24.0 (6)
I learn more from regular lectures than from the model with videos and learning sessions	60.7 (17)	39.3 (11)
The learning environment during the hours with learning sessions was good	100 (41)	0.0 (0)

Table 3 shows the differences between the groups. A Kruskal-Wallis test has been performed by grouping the students' responses. For example, for the variable "The videos were easy to understand", "totally agree" has the lowest weight and "totally disagree" the highest weight, and then the average weights shown for the different student groups. As before, the students who answered "indifferent" or "don't know" are not included.

There is a significant difference in how much time students spend on their studies ($p = 0.002$). A p-value less than 0.05 indicates a significant difference. The nursing students spend the most time, the engineering students the least. There is also a significant difference in the use of the videos before learning sessions ($p = 0.000$). Here, the nursing students use the videos more than the two other groups. However, after the learning sessions, the engineering students use the videos more than the other groups, but this difference is not significant ($p = 0.069$). The nursing students are most in agreement with the rest of the statements, with the exception of "I learn more from regular lectures than from the model with videos and learning sessions". The differences between the student groups are significant ($p < 0.05$) for all statements, except for "Videos made it easier to understand the subject matter".

26.7% of the engineering students, 94.9% of the nursing students and 71.4% of the pre-engineering students want to replace lectures with videos and learning sessions in other subjects. *Fisher's exact test* shows that there is a significant difference between the groups for this question ($p = 0.001$). In this test, "do not know" answers are ignored.

Table 3.
Comparison of the different student groups' responses to the questions.

Questions.	**Group, mean rank.** Lower number values indicate a higher degree of agreement.			**Kruskal-Wallis test.** A p-value less than 0,05 is a significant difference.	
	Nursing	Engineer	Pre-course	Chi-squared	p-value
Time spent (hours/week)	24.0	17.8	33.8	12.47	0.002
Use of video before learning sessions	12.7	35.0	32.3	23.69	0.000
Use of video after learning sessions	30.9	20.9	30.5	5.35	0.0069
The videos were easy to understand *	19.0	27.7	33.4	10.79	0.005
The videos worked technically satisfactory *	20.4	29.2	29.8	6.46	0.040
The videos made it easier to understand the subject matter *	21.3	28.7	29.5	4.63	0.099
The videos made me well prepared for the learning sessions*	15.7	30.5	30.6	14.53	0.001
The model with videos and learning sessions is more motivating than lectures *	19.1	32.6	26.7	7.92	0.019
The model with videos and learning sessions gave me greater learning outcomes than lectures *	19.7	31.9	25.7	7.11	0.029
I learn more from regular lectures than the model with videos and learning sessions**	31.2	18.5	28.9	8.90	0.012
The learning environment during the hours with learning sessions was good **	20.4	24.9	33.2	6.69	0.035

Table 4 presents the interrelationships between the statements in question four. They can tell us something about which aspects of the learning model relate to each other, such as whether there are associations between technically satisfactory videos and learning outcomes.

Even though the numbers show that the majority of the students wanted to replace lectures with videos and learning sessions in other topics, it is important to note that there is not a significant majority for all student groups together ($p = 0.121$). The most significant difference between the nursing students and the engineering students is that the number of nursing students who want to continue with the flipped classroom model is much higher. *Fisher's exact test* shows that there is a significant difference between groups for this question ($p = 0.001$). Students who responded "do not know" are not included in this test.

Table 4.
The interrelationship between the statements about the learning model in question 4 of the questionnaire.

Pairing statements together		**Spearman's rank correlation coefficient**
The videos were easy to understand	Technically satisfying videos	0.66 *
The videos were easy to understand	Videos made it easier to understand the material	0.75 *
The videos were easy to understand	Video made me well prepared	0.58 *
The videos were easy to understand	Video / learning sessions more motivating	0.19
The videos were easy to understand	Greater learning outcomes than lectures	0.28 *
The videos were easy to understand	Learn more from lectures	0.07
The videos were easy to understand	Good learning environment	0.49 *
Technically satisfying videos	Video made it easier to understand the material	0.79 *
Technically satisfying videos	Video made me well prepared	0.63 *
Technically satisfying videos	Video / learning sessions more motivating	0.42 *
Technically satisfying videos	Greater learning outcomes than lectures	0.35 *
Technically satisfying videos	Learn more from lectures	-0.12
Technically satisfying videos	Good learning environment	0.58 *
Video made it easier to understand the material	Video made me well prepared	0.71 *
Video made it easier to understand the material	Video / learning sessions more motivating	0.24
Video made it easier to understand the material	Greater learning outcomes than lectures	0.45 *
Video made it easier to understand the material	Learn more from lectures	-0.03
Video made it easier to understand the material	Good learning environment	0.53 *
Video made me well prepared	Video / learning sessions more motivating	0.45 *
Video made me well prepared	Greater learning outcomes than lectures	0.51 *
Video made me well prepared	Learn more from lectures	-0.30 *
Video made me well prepared	Good learning environment	0.55 *
Video / learning sessions more motivating	Greater learning outcomes than lectures	0.65*
Video / learning sessions more motivating	Learn more from lectures	0.047*
Video / learning sessions more motivating	Good learning environment	0.25
Greater learning outcomes than lectures	Learn more from lectures	0.44*
Greater learning outcomes than lectures	Good learning environment	0.39*
Learn more from lectures	Good learning environment	-0.05

**Indicates significance of at least 5%.*
Each line in the table shows the Spearman's rank correlation coefficient for the relationship between the students' responses to two of the statements. The Spearman's rank correlation coefficient is between -1 and 1, where -1 means that the students provide completely opposite responses to two questions, 0 means that there is no association between the responses to the two questions, while 1 means that there is full correspondence between the responses to those two questions. All correlations calculated are for the 52 participants who answered all the above questions.

6. DISCUSSION

The objective of this study is to investigate the difference in students' perceptions of teacher-produced videos as part of a flipped classroom in nursing education and engineering education, and to investigate whether these videos contribute to a good learning environment.

First, not all topics provide suitable content for an educational video. In the end, teachers must decide what could work in a video for their students. The technology must not be in control (Sams & Bergmann, 2013). As regard the scientific usefulness of the videos, our study found that the students thought the videos were easy to understand and that they made it easier to understand the subject matter. They also believed that the videos were good preparation for the learning sessions. This result corresponds with earlier findings (De Grazia et al., 2012; Garrick, 2018; Mikkelsen, 2015) The length of the videos may have contributed to their increased usefulness, as they were rarely longer than six to eight minutes and usually dealt with only one theme. For example, in anatomy, one video was about the sense of smell and another video about the sense of taste, each being about three minutes long. Students prefer short videos, preferably about just one topic at a time (Fyfield et al., 2019; Long et al., 2016). However, long videos are watched, but not in one go (Nielsen, 2020).

Technical issues are one of the main reasons why videos are not used (Kay, 2012). The videos must be easy to play and in a format that works on different platforms, including smartphones (Garrick, 2018; Heimly & Bertheussen, 2016). Our study shows a clear correlation between the videos being technically satisfactory, easy to understand and making it easier to understand the subject matter. This does not mean, however, that it is necessary to strive for a flawless recording. Our opinion is that the videos must be of sufficient quality, but they do not need to be perfect. Teaching situations are not usually perfect either; a lecture is not streamlined, errors are made, and some time is wasted (Heimly & Bertheussen, 2016). The videos in our study were made with easily accessible tools that a teacher can operate without the assistance of others, and the students, overall, clearly stated that these videos were technically satisfactory. This is in line with what previous research and experience have shown (Guo et al., 2014). Expensive and advanced equipment are not necessary for making videos that work well technically (Sams & Bergmann, 2013). Videos recorded with simple and inexpensive equipment and where the teacher has good eye contact with the viewer can be more engaging for the students than videos produced in a professional studio (Guo et al., 2014).

A flipped classroom is not primarily about the videos themselves. The relationship between teacher and students and how time is spent in the classroom are crucial factors (Blair et al., 2016; Estepp & Roberts, 2015; Sams & Bergmann, 2013). This means that the learning environment in the classroom is important for how well the model works. A significant majority of the students in our study agreed that the learning environment during the learning sessions was good. None of the students disagreed. We must be cautious about discussing the reasons for this, as we did not ask the students why they perceived the learning environment as good. However, for the nursing students, one reason may be that the class was divided into smaller groups, which may have led to a better relationship between the students and instructor and lowered the threshold for speaking and asking questions. According to earlier research, these are reasons why students favor this model over traditional lectures (Steen-Utheim & Foldnes, 2018).

The connection between the videos and the classroom context is important, and it is interesting to look at how the videos affect the content of the learning sessions. Success is not about the videos alone, but how they operate in combination with sessions in class (Steen-Utheim & Foldnes, 2018). For all the student groups in our study, there are significant links between the videos being technically satisfactory and easy to understand, and how the videos provide the students with good preparation for the learning sessions. Our study also showed correlations between a good learning environment and the videos being satisfactory, both academically and technically. These factors may contribute to the videos functioning in symbiosis with the in-class sessions. Our study also showed that students felt they had better

learning outcomes if the videos were easy to understand, technically satisfactory, and helped the students understand the material better. Other studies show that use of videos is motivating (Berk, 2009; Kay, 2012) and the students in our study who believed that video is more motivating were largely the ones who experienced greater learning outcomes through using videos than by attending lectures.

Although all student groups provided good feedback, there are significant differences between the groups. The nursing students were more likely to watch videos before the learning sessions than the engineering students were. It is therefore not surprising that more nursing students expressed that they felt this was a good way to prepare for the learning sessions. This is consistent with earlier studies which show that nursing students thought it was very useful to watch videos before class sessions (Critz & Knight, 2013; Mikkelsen, 2015). When it comes to the engineering students, our findings contrast with Garrick (2018), who found that 89% of engineering students watched videos prior to class (Garrick, 2018).

Video clips can make a difference to the students' motivation and attitude to the subject (Berk, 2009; Johnston et al., 2018), and a clear majority of nursing students in our study thought the use of videos was more motivating than lectures. The nursing students were also generally the most satisfied with the videos, and more likely to agree that the videos were easy to understand and technically satisfactory than the other two student groups. The nursing students also expressed a higher level of agreement with the videos and learning session model providing better learning outcomes than lectures, while only a minority of engineering students agreed. This contrasts with earlier studies that showed that the benefit of a flipped classroom model may be greater for engineering students than for students in health sciences (Strelan et al., 2020). Unlike the nursing students, only a minority of engineering students believed that the model in our study was more motivating than lectures.

The nursing students reported that they were more likely to watch the videos before class than the other students were. One explanation may be the way the videos were made, which is linked to the specifics of the subjects (Kay, 2012). Anatomy is a visual subject, with many illustrations that can work well in a video. The anatomy videos for nursing students were short and made using a camera to record tablet teaching. The satisfaction of the students in our study with this video format corresponds to a major review of flipped teaching in the United States, which showed that short, informal tablet recording videos are the most engaging (Guo et al., 2014).

The engineering students were generally more inclined to have lectures than the other student groups, and there are a range of reasons why students prefer lectures rather than videos (Kay, 2012; Njie-Carr et al., 2017; Xiu et al., 2019). One reason why many of the engineering students in our study preferred lectures may be that they are most accustomed to blackboard teaching, and that the videos do not reflect the usual teaching situation. Working with control systems includes many mathematical calculations, and most videos were recordings of calculations on paper without the video showing a picture of the lecturer (talking head). The students want to both see and hear lecturers, so that the videos become more similar to other teaching situations (Guo et al., 2014; Sams & Bergmann, 2013).

The nursing students, more than the engineering students, wanted to replace more of the lectures with videos. The difference between the student groups is significant. We theorized that the engineering students, who are more technically oriented, were more accustomed to finding and using videos in their studies. There are many videos on YouTube about most technical topics, and videos support multiple learning strategies (Berk, 2009). Based on this, we assumed that the engineering students would prefer their study material in video format. Previous studies have found that engineering students preferred videos (Garrick, 2018) and that the effect of the flipped classroom seems to be stronger for

engineering sciences than the health sciences (Strelan et al., 2020). The results of our study, however, were different. If we see the students' responses to this question in association with their responses to other questions, this is not as surprising as it might be at first glance. One explanation could be how technically satisfactory the videos are; while all the students were satisfied with the technical level of the videos, the nursing students were more satisfied than the engineering students. This could be because of the technical differences between the videos, but it could also indicate that the engineering students, with their technical competence, have higher expectations for technical quality than the nursing students. Another potential explanation could be the format of the videos. As mentioned previously, engineering students are mostly accustomed to blackboard teaching, while most of the videos showed recordings of computer screens or notes. Videos should therefore look more like the usual teaching situation and visualize the material in a good way (Guo et al., 2014).

6.1. Limitations of the study

The size of this study is a limiting factor. Another factor that creates uncertainty is that participation in the learning sessions for engineering students and nursing students was not compulsory, and we do not have exact figures for how many people participated. Therefore, we do not have exact figures for the number of questionnaires received in relation to how many people participated in the actual learning sessions. 41 engineering students and 76 nursing students were enrolled for the final exam, but the response rate cannot be calculated based on these figures because the classroom teaching was not compulsory. Another weakness is that we did not use a questionnaire that had been previously validated.

7. FUTURE RESEARCH DIRECTIONS

The experience from this study will provide a platform for our future work. We will make videos that will better support the learning process and we will experiment with new tools to further increase our experience. For engineering education, more visual videos with talking heads will be made, corresponding to previous experiences. Expanding the project with professors and student groups from other programs may be relevant, as well as establishing an interdisciplinary research group with participants from all the university's campuses. Future research should investigate ways of producing videos in the engineering sciences and health sciences which, in combination with classwork, enhance the learning process.

8. CONCLUSION

In this study, we have investigated differences in students' perceptions of teacher-produced videos as part of flipping the classroom for nursing students, engineering students, and students on a preparatory engineering course. We have also investigated whether these videos contribute to a good learning environment.

The results indicate that there is a connection between the standard of the learning environment and the satisfactory functioning of the videos, both academically and technically. Motivation affects learning, and the students who thought that the model with videos was more motivating than lectures are largely the same as those who experienced greater learning outcomes.

All student groups perceived the learning environment as good, although there were differences. The nursing students were more satisfied with the videos and learning sessions than the engineering and pre-engineering students. Compared to the other student groups, the

nursing students believed that the flipped classroom model provided greater learning outcomes and was more motivating than normal lectures.

The nursing students watched videos before learning sessions to a greater extent than the two other student groups and wanted to replace more lectures with videos. One reason for this may be that the nursing students watched more visual videos than the other student groups.

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Chapter #19

HOLISTIC EDUCATIONAL APPROACH: COOPERATIVE LEARNING AND MINDFULNESS IN THE TRAINING OF FUTURE TEACHERS

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ABSTRACT
Traditional educational instruction is being replaced by new, more holistic paradigms requiring both a methodological change and a new definition of the role of the teacher and students. This study proposes a new education paradigm based on active teamwork methodologies (such as cooperative learning) and mindfulness techniques. Cooperative learning is a well-known strategy that has obtained very positive results in the development of competences and skills. Mindfulness techniques favor the development of attitudes and values as well as increased inner-calm, resulting in lower levels of stress and anxiety among both students and teachers. The proposed paradigm was implemented in a course of the master's degree program for Secondary School Teachers at the University of Almeria (Spain). The results show that students were more engaged with the learning process and developed a greater sense of responsibility and empathy, not only towards their own learning but also to their classmates' learning. The procedure included the application of the Mindful Attention Awareness Scale (MAAS) at the beginning and at the end of the course to measure the evolution of the students in different items related to mindfulness.

Keywords: cooperative learning, mindfulness, conscious and holistic education, competences and skills.

1. INTRODUCTION

At all educational levels, more and more teachers are aware of different attitudes and behaviors among their students, such as low motivation, propensity to lose attention during class, lack of comprehension of theoretical contents, difficulty relating what is being studied to the real world and, in general, a reluctant attitude towards studies overall (McKeachie & Svinicki, 2006). To a large extent, these problems could be due to the methods typically used in teaching, mainly traditional instruction, whereby teachers spend most of the in-class time giving lectures and students rarely have opportunities to apply knowledge or even interact with their peers. Therefore, it is more evident than ever that there is a need to innovate and use new and disruptive tools capable of capturing the attention of students and maintaining it during different activities (MacManaway, 1970; Gallifa, 2019).

These new educational models involve switching from an instruction based on knowledge, in which the student is a passive agent that receives information, to an education based on competences (Gil, Baños, Montoya, Alías, & Montoya, 2011). This new system requires that students learn by doing and, therefore, they must be active and completely attentive. In this regard, active learning methodologies, alternative evaluation systems and an education based on values and competences represent some of the most important tools for developing a holistic education model that makes it possible to achieve the methodological change.

Active methodologies stimulate students not only when studying the content of a given subject but also by helping them to acquire skills that are beneficial for their personal and future work (Gil, Montoya, Herrada, Baños, & Montoya, 2013). As for other trends, the consolidation of ICTs (Information and Communication Technologies) in teaching-learning has resulted in powerful communication tools between teachers and students. They can eliminate temporal and spatial barriers associated with traditional teaching-learning models, to the extent that ICTs have stimulated the consolidation of active methodologies (Gil et al., 2018). Furthermore, the proposals of the so-called "Integral Approach" (Gallifa, 2019) defend the need to connect the cognitive, affective, moral and spiritual dimensions in teaching-learning processes, based on an active teaching methodology that promotes the (self) awareness of the participants. These approaches make it necessary to modify content and, above all, the way classes are taught. This ultimately affects teachers and students equally (Montoya, Herrada, Gil, Montoya, & García, 2009).

In this context, the current student profile must be characterized by the following qualities: active, attentive, autonomous, strategic, reflexive, cooperative, responsible and empathetic. Undoubtedly, such a profile demands a significant shift in mentality in the dominant culture among students and requires special training and attention. Mindfulness represents a means to develop these qualities and other skills (Montoya, Mañas, Gil, Herrada, & Franco, 2012). With regard to the teacher, one of the essential keys is the instructor's identity as a role model. On the one hand, their attitude of awareness will encourage this same attitude among students. On the other hand, the teacher exchanges their role as the only person who possesses the subject knowledge for that of an instructor who acts more as a knowledge manager. With this new function, communication, empathy, group management and individual attention are vital aspects for the teacher if they wish to promote motivation, student involvement and, ultimately, effectiveness in the learning process. Their job would be based on using strategies that allow students to learn to learn, while also creating a suitable environment for the development of students' personal autonomy, promoting critical thought and reflection on their own learning process (Gil et al., 2013).

Literature related to contemplative practice in higher education is very limited and primarily focuses on the wide range of available practices and their outcomes at individual and programmatic levels (Mañas, Franco, Montoya, & Gil, 2014; Flores, 2017). As previously mentioned, the ultimate aim of engaging in contemplative practices in classrooms (i.e. mindfulness) is to foster students' self-awareness, a type of critical reflection recognized as a crucial component of transformative learning (Kasworm & Bowles, 2012).

This project presents a new proposal, which only a few published works have addressed to date (Montoya et al., 2012). This study aims to show how disruptive and innovative active methodologies, together with ICTs and mindfulness techniques (Kabat-Zinn, 2016) promote a holistic education approach, providing a more meaningful and long-term learning experience. An additional goal is to promote the development and consolidation of this new education model in training at all educational levels and, more specifically, in the training of future teachers.

2. BACKGROUND

The methodology utilized in the classroom is based on learning the subject using the same teamwork methodologies that the students are meant to learn. A brief description of these methodologies is as follows:

2.1. Cooperative learning

Cooperative Learning (CL) is a philosophy of interaction and a way of working that involves both the development of knowledge and individual skills and the development of a positive attitude of interdependence and respect for contributions. Cooperating means working together to achieve shared objectives. In cooperative activities, individuals seek results that prove beneficial for themselves and, at the same time, for the other members of the group. This process normally involves the use of small groups that allow students to work together to improve their own learning and that of the other members. Learning is not limited exclusively to the content of a given subject. Instead, learning encompasses various skills or competences, such as communication skills, responsibility or resolving conflicts (Smith, 1996). In today's world, when facing problems of any kind, it is necessary to combine the efforts of everyone to achieve solutions. Nevertheless, simple group action is insufficient—strong intra-group and inter-group cooperation relationships are required to address problems.

Cooperative learning allows the teacher to achieve various key goals at the same time. First, it helps to improve the performance of students, both those that are especially gifted and those that have difficulties learning. Learning involves creating neuron connections (Jensen, 2009). When we listen, our brain only retains 10% of the information we hear. If we carry out an activity on our own, we retain 70%. And, if we explain what we have learned to a classmate as if we were the teacher, we retain 90%. For this reason, cooperative learning is such a powerful tool. Secondly, CL helps to establish positive relationships between students. Encouraging, motivating and enabling classmates strengthen personal commitment to others. In turn, this positive interaction favors group commitment in which the success of each member is the success of the group. Thirdly, this approach provides students with the experience they need to achieve social, psychological, cognitive and, therefore, holistic development. In cooperative situations, students experience a stronger sense of being able to attain success and they consider it more important than in competitive or individual situations. The struggle for mutual benefit creates an emotional link: the collaborators begin to appreciate each other, they want to help others to achieve success, and they also commit themselves to the well-being of others. The opportunity that cooperative learning offers for simultaneously addressing these three areas makes it superior to other teaching methods (Johnson, Johnson, & Smith,1991).

Figure 1.
Ingredients for cooperative learning.

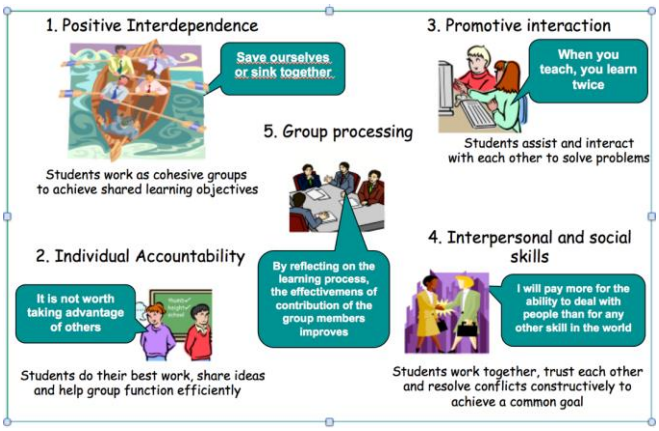
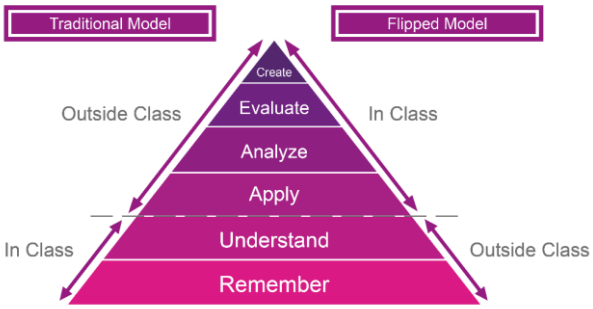


Figure 1 graphically illustrates the five ingredients that make cooperative learning successful in comparison to traditional group work (Johnson, Johnson, & Holubec, 1994).

2.2. Flipped learning

Flipped learning is a blended learning approach where content delivery and direct instruction are scheduled for individual space activities before class, whereas face-to-face group activities in class are designed to be active and carried out in a wide range of high-level cognitive tasks (Bloom's taxonomy). Flipping a classroom requires that activities which have traditionally taken place in the classroom now take place outside the classroom and vice versa (Lage, Platt, & Treglia, 2000). In the traditional learning model, students receive new material during class meetings and perform high-level work, such as application, synthesis and evaluation of said material through individual unsupervised activities after class (See Figure 2). In these traditional class meetings, instructors do not know the knowledge level of the audience and, thus, the lecture may be too difficult or too easy for the students. Flipping a classroom typically relies on networking and computing technologies, such as suitable learning management systems and mobile applications, to meet the needs of students in the twenty-first century. A large body of research from the last two decades supports the benefits of this pedagogical approach (Akçayır & Akçayır, 2018).

Figure 2.
Bloom's Taxonomy in a Flipped Classroom.



2.3. Gamification

Gamification is an instruction trend whereby incentives are used to motivate individuals to perform specific tasks in exchange for a reward. It can also be defined as a set of activities and processes to solve problems by using or applying the characteristics of game-design elements and game principles in non-game contexts. This approach involves using activities or dynamics taken from the world of games to increase competitiveness and cooperation in teams for the purpose of obtaining greater motivation towards the subject material. Gamification combines very well with cooperative learning and offers assessment tools that add an extra measure of motivation (Burke, 2014; Santiago & Rodríguez, 2015).

2.4. Clickers

Clickers are devices that use communication software to obtain information from an audience both quickly and reliably. The first systems that used clickers consisted of a set of specific devices that included numerous commands and an infrared sensor that could emit and receive answers. In recent years, whether on webpages or as instant messaging tools,

they have become very popular as they allow identical activities to be carried out by clicking on any electronic device with Internet access, including computers and mobile phones, without the need for a large number of remote controls to emit responses (i.e. Kahoot (Wang, 2015)). Regardless of their implementation, the use of clickers allows the teacher to solicit opinions or ask questions of students regarding a given topic, and students can include any additional details they deem relevant (Gil et al., 2018). These devices are used for the purpose of fostering more participation from students, increasing levels of attention and motivation and obtaining the ability to carry out training assessments, which would provide students with feedback, for example. In addition to pursuing these objectives, clickers are also useful in the context of the flipped classroom and cooperative learning.

2.5. Digital group portfolio

The development of the e-Portfolio implies not only documenting student achievements, but also self-evaluations, applied strategies and analysis of learning experiences (Gil et al., 2011). Therefore, e-Portfolio is more than a simple collection of tasks. One of the main advantages of the digital group portfolio is that all the information is available to all students. As a result, they can: 1) learn how they carry out their work by learning with their classmates; 2) assist other groups when questions are raised about their activities; and 3) participate in the process of co-evaluation. All the activities conducted by each group are made visible in the group portfolio, as well as the reflections of the group after each activity, including their experiences with mindfulness. Figure 3 shows an example of the professors' digital portfolio developed in the Moodle platform.

Figure 3.
Example of a digital group portfolio (professors) in Moodle platform.

2.6. Mindfulness

Mindfulness is considered both a philosophy of life and a series of practices or specialized training that allow people to improve their attention skills. They may become increasingly more attentive to the present moment, both in terms of what occurs inside them (thoughts and emotions) and around them, whether it be in their personal lives or their own daily experiences (Gunaratana, 1991). Intrinsically, mindfulness is a state of consciousness that involves paying attention to the experience in the present moment. This state is cultivated and developed through the practice of meditation (formal and informal techniques), self-inquiry and compassion (Kabat-Zinn, 2016). This regular practice offers a method by which individuals react less compulsively to what happens to them in the current moment.

Mindfulness equips educators with resources like patience, flexibility and equanimity, which help them to cope with adversity. Cultivating positive states -calm, relaxation, and peace- builds our inner strength to take on daily challenges at school. In this sense, only with a relaxed mind is it possible to see how things truly are in reality, and it is this clear vision which allows individuals to transform the present and find a suitable solution to whatever problem they may have at any given moment (Kabat-Zinn, 2016). Mindfulness practice is a powerful way to develop a deeper sense of connection with both ourselves and others. Building our capacity for empathy supports us in effective communications, collaboration and leadership. Therein lies the objective of this work: to train students' attention skills through CL aided by mindfulness techniques.

Germer (2005) proved that the use of this method produces changes in the cerebral structure and optimizes potentials that human beings have but do not use or use inefficiently. Several applications in the education system have shown that it improves attention and reduces student failure and demotivation in the classroom—quite remarkable considering the wealth of current evidence of high stress levels at schools (Mañas et al, 2014). Studies have demonstrated that students experiencing stress are not able to learn; their level of anxiety is so high that it is impossible for them to concentrate in class. Meditation reduces students' stress levels, inducing a change in brain waves and provoking more states of calm, i.e., a brain that functions better (Flores, 2017; Leon, 2008).

3. METHODOLOGY: INTEGRATING COOPERATIVE LEARNING AND MINDFULNESS

The proposed paradigm was implemented in a course of the master's degree program for Secondary School Teachers at the University of Almeria (Spain). This course was part of a "Conscious Teaching Project" (García et al., 2019) at the same university and included the participation of five other educators specializing in different fields. All the educators involved share a commitment to the use of contemplative practices in education. More specifically, these contemplative practices are all based on the use of mindfulness, both on a personal growth level and as a pedagogical resource. With this project we intend to validate the transforming potential of certain didactic activities that can offer a more enriching learning experience to our students.

For our specific course, we have combined mindfulness practices with active methodologies, such as cooperative learning, flipped classroom and digital group portfolio.

3.1. Goals of the project

This innovative and holistic teaching project has these main goals:

- To test forms of didactic interaction based on a greater awareness of the elements involved in teaching/learning situations, such as:
  A. Presence: Activate full attention, active listening and the joy of sharing rewarding learning experiences with groupmates.
  B. Reflective Dialogue: When you want to speak, reflect on how your contribution will deepen the conversation. Do not just talk to make a point or to have your special idea heard. Be willing to both raise your hand and not raise it.
  C. Inquiry: Continually inquire into your own experience and be reflective of how you are reticent and/or open.

- To empower students to be more aware of what they think, feel and do when they are in the classroom and how these elements influence the quality of their learning. Learn to distance oneself from external events – learning to relativize them as a strategy for improving communication and opportunities for cooperation with other classmates.

- To combine cooperative learning and mindfulness strategies to promote greater interaction between students so that they can learn with others not only the contents of the course but also learn about themselves when they interact with their peers.

- To analyze how well teamwork methodologies match with mindfulness practices. Most of the works published to date include mindfulness practices individually (Flores, 2017; Park, Long, Chose, & Schallert, 2018), as something separate from the methodologies used to learn the contents and competences of a certain course.

3.2. Teaching intervention

The practical experience in this study was part of the "Active Teamwork Methodologies" course, which was attended by 65 students. This course took place during November and December of 2020 and lasted six weeks, with five hours of class per week. The students who attended this course had finished their degrees in different fields, such as mathematics, history, economics, biology and so on. During the 2019-2020 academic year, they were studying a master's degree to be secondary school teachers. Our course belongs to this master's degree as an elective subject to learn teamwork methodologies, and the number of students who choose it rises every year. All students were assigned to a formal cooperative group. All students engaged in in-class cooperative and mindfulness activities but only 33 students took part in the complete out-of-class mindfulness program since it was not mandatory. We will analyze the study in three parts in order to explain the methodological aspects.

3.2.1. Teaching using teamwork methodologies

Teamwork methodologies were used to teach the course contents. For this purpose, we combine different active methodologies and ICT tools:

- Cooperative learning: Most class-activities featured cooperative organization. Students learned cooperative methodologies by working together, using the jigsaw technique (Aronson, Blaney, Stephan, Sikes & Snapp, 1978), research groups (Johnson et al., 1991), gamification through team tournaments (Santiago, 2015; Burke, 2014) and problem-based learning for the final project (McKeachie & Svinicki 2006).

- Flipped classroom (Lage et al., 2000) was used to learn the theoretical knowledge.

- Clickers: At the beginning of the subsequent face-to-face session, clickers (Wang, 2015) were used to determine whether the students had watched the videos that had been previously assigned. For this purpose, we applied a tool called ZquizUALbot (Gil et al., 2018) developed by our research group and based on the message application Telegram. Clickers were also used to evaluate groups after performing certain activities.

- The digital group portfolio (Gil et al., 2011) was the medium to make the activities carried out by each group visible, along with their reflections, group regulations and the self-evaluation and co-evaluation within each group.

- Problem-based learning: each group did a final project about a subject for their future secondary school students. This project must be organized according to some of the active methodologies studied in our course. The groups presented orally their projects and the rest of the groups evaluated them (co-evaluation) using the corresponding rubric.

- Different rubrics were also used for the evaluation of transversal competences (teamwork and oral communication). The results were evaluated using the co-rubric tool.

3.2.2. Mindfulness program

A six-week mindfulness program was implemented along with the above methodologies. This program included short meditations sessions in class (in the middle of the class and sometimes at the end) and formal and informal exercises to practice outside the classroom. The main activities of the program were the following:

- Formal mindfulness exercises: These included meditative exercises focusing on attention to breathing (week 1), attention to the body (week 2), exploring the senses (week 3), attention to thoughts (week 4), attention to emotions (week 5) and open monitoring meditation (week 6). The time dedicated to each exercise in class was 5 minutes. Outside of class, it was suggested that the time be gradually increased to 15 minutes.

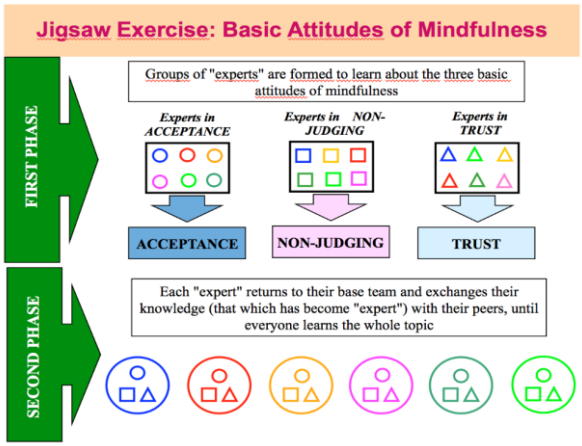
- Informal mindfulness exercises: These included exercises to bring attention to any daily-life activity, paying attention to breathing and body sensations. For example, while eating, showering, washing hands, driving or walking.

- Emotional development and self-inquiry exercises: These included exercises to recognize automatic and reactive patterns. For example, practicing "active listening" when working in cooperative groups. Another exercise was "observing mobile phone dependence", counting and being aware of the number of times students *need to* look at their mobile phone (including social networks and message applications). Another exercise involved becoming aware of the reactions that arise in us when someone criticizes our ideas —observing what judgements, emotions and thoughts emerge in these situations.

3.2.3. Integrating cooperative learning and mindfulness

The proposal for basic integration consists of teaching and training students in mindfulness while the teacher simultaneously uses the methodology of cooperative learning so students may acquire certain knowledge or content related to the subject content. After a meditation exercise, students share their experiences with their groupmates. On other occasions, after a cooperative activity about contents, they do a short meditation to quiet their minds. An example of this integration is a jigsaw activity (Figure 4).

Figure 4.
Example of learning mindfulness attitudes through a jigsaw exercise of CL.



The jigsaw exercise served to determine whether the students were familiar with mindfulness and what attitudes are essential in its practice (Kabat-Zinn, 2016).

We hypothesized that integrating teamwork methodologies and mindfulness exercises would be associated with potentially higher commitment to a group. Training in mindfulness develops certain skills, attitudes and competences in the individual (such as attention, memory, self-knowledge, emotional regulation, patience, flexibility, acceptance, tolerance, empathy and social skills). Therefore, it is expected that if the students are trained in mindfulness, they will learn faster and more easily, not only the content proposed through CL methods, but also skills, attitudes and competences on both a personal and social level.

Group efforts towards achieving positive interpersonal relationships and psychological health are reciprocally related (Johnson et al., 1994). In cooperative situations, these relationships are always bidirectional, and mindfulness improves and develops these types of cognitive and communication skills, self-knowledge, emotional regulation and, ultimately, psychological health.

Most of the qualities and characteristics inherent to cooperative learning —its competences, attitudes and skills— are shared with the concepts, attitudes and components of mindfulness. When utilized together, mindfulness can contribute to the development of these competences, attitudes and skills and can help individuals to delve deeper into these aspects to achieve an even higher level of interiorization.

In short, we hypothesize that mindfulness training can produce and strengthen greater efficiency and effectiveness in cooperative learning techniques.

4. RESULTS/DISCUSSION

This course had 65 students, all of whom were assigned to a cooperative group. It should be noted that this course was taught before the pandemic restrictions, and the results can be compared with those of previous years. The results were evaluated using different indicators.

The first indicator was the number of students who passed the course, 99% in the 2019-2020 academic year, compared to 97% the previous academic year. Although not highly significant, we consider it important to consider this result positive, mainly because

the numbers of students taking this course increases each year. More specifically, in the 2020-2021 academic year, the number of students in this course increased by 30% compared to the previous year. Thus, we also consider that this holistic approach has increased interest in this course.

Another indicator was a specific survey with different items and questions about the methodologies of the course. As Table 1 shows, the students rated the use of different active methodologies of teamwork very positively, such as cooperative learning, flipped classroom and gamification. They also positively assessed the use of computer tools such as e-portfolio to improve teamwork, reflection and self-evaluation, and using clickers in flipped classroom to monitor the learning of the main concepts. They also considered that mindfulness techniques allowed them to pay more attention and remain less stressed in class.

Table 1.
Survey on the methodologies used in the subject.

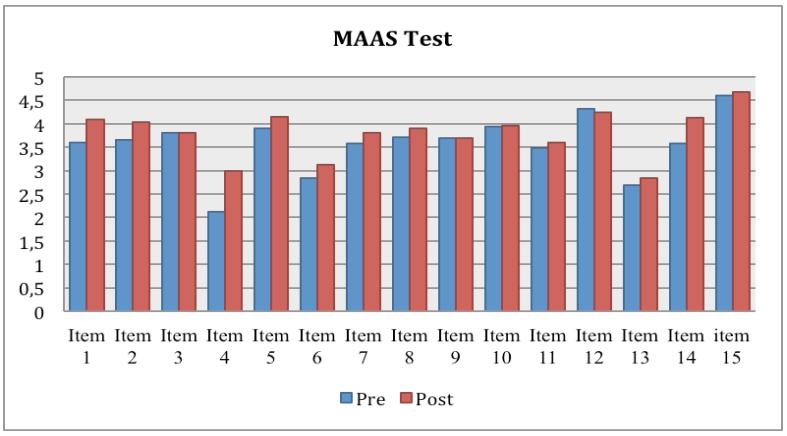
Item	True	False
Active methodologies have increased my interest in the subject	60	5
I do not like it because some teammates do not collaborate	1	64
The use of the group e-portfolio in the follow-up of the subject has not resulted in considerable improvement in learning	0	65
My teammates make me waste my time	6	59
The use of mindfulness techniques has allowed me to pay more attention and be less stressed in class	63	2
Using clickers has allowed me to ask questions and dubts	65	0
This methodology gives me more motivation to study	64	1
My overall assessment of teamwork and flipped classroom (including e-Portfolio and Clickers) with Mindfulness is favorable	65	0

The next indicator analyzed during this course was the mindfulness experience itself. All students who attended classes completed formal mindfulness exercises in the classroom. Mindfulness exercises outside the classroom were not mandatory, but more than half of the students completed them. The Mindful Attention Awareness Scale (MAAS) (Brown & Ryan, 2003) was used at the beginning and at the end of the course to measure the evolution of the students in different items related to mindfulness. MAAS is a scale that globally evaluates and records the ability of an individual to be aware of the experience of the present moment in everyday life. The survey introduces this 15-item scale as follows: "Below is a series of statements about your everyday experience. Please answer according to what truly reflects your experience rather than what you think your experience should be." The items are scored according to a Likert scale ranging from 1 (almost always) to 6 (almost never). Some examples of the items in Figure 5 are the following (Brown & Ryan, 2003): Item 1: *I could be experiencing some emotion and not be conscious of it until later*. Item 3: *I find it difficult to stay focused on what's happening in the present*. Item 9: *I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to reach my aim*. Item 12: *I drive places on "automatic pilot" and then wonder why I went there.* Item 15: *I snack without being aware that I'm eating*.

The final result is obtained from the arithmetic average of the total items. Figure 5 shows these results for 33 students, those who completed the entire program (as it was not mandatory, some students did not do all out-of-class mindfulness activities). Lower scores show lower levels of mindfulness (related to higher levels of stress or anxiety) and higher scores show high levels of mindfulness. An increase in the average values of mindfulness is observed in 12 of the 15 issues, with an average increase of 21%.

Some improvements were observed such as decreased stress perceived by students and increased satisfaction with the integration of the mindfulness program. Above all, students recognized that mindfulness could help them greatly, both in their daily lives and in their work as future teachers. The exercises of mindfulness and learning in cooperative groups also offered experiences that allowed students to see themselves in their partners (mainly their impulsive reactions), thereby giving them the opportunity to know themselves better and to improve their communication and empathy skills.

Figure 5.
Average results for the MAAS test (pre and post) for the 15 items.



As a final indicator, we considered it important to highlight some aspects that the students commented on in their mindful-diary (as part of their e-portfolio) concerning their progress in the mindfulness program:

Student-A: "The group was agitated that day, but following the meditation guidance by the teacher, after a few minutes, the feelings of agitation had disappeared. My groupmates commented that they felt much calmer and focused, confirming these effects in my own body and mind. It was very important to be able to share the experience with my partners in the cooperative group because, that way, we could compare experiences, difficulties and some discoveries".

Student-B: "The benefits of mindfulness are more and more evident, and by sharing experiences with my groupmates, we've seen that we all have a stronger capacity to concentrate on our breathing and to focus and distance ourselves from thoughts that return to our minds again and again. As the weeks go by, I realize that using this methodology is beneficial for my performance and simply carrying out my daily life, allowing me to relax more easily, see problems from another perspective, like something not connected to me, something that must be confronted, but from a point of view of something that can be faced more easily since it is manifested outside the body, but most of all outside the mind".

Student-C: "Informal practices provide me plenty of benefits because, since I'm aware of the tasks I'm doing at a given moment, I can perceive different sensations. For example, when I'm showering or eating something. With this practice, I could realize that by paying attention to the task I was carrying out at the moment, my senses were heightened a certain extent. Today I ate macaroni with tomato sauce and I think I've never enjoyed them so much in my life! Wow! I was never aware of just how much I love them!"

Student-D: "Today is the presentation of the final project, and we had another session of attention to breathing in the classroom prior to the presentation. Honestly, it was of great help when the time came to face the presentation. I could feel the beating of my heart more than on other days, and I could even hear my partner's breathing. On a final note, I'm grateful to the teacher who taught us this technique, not only for us to use as teachers in class, but to use in our day-to-day lives".

Student-E: "With regard to the activity involving mobile phones, I enjoyed this little moment of calm before doing such a routine and repetitive action throughout the day as answering or looking at the phone. In fact, I'm now more aware of just how many times I have to grab the phone for work and I've acquired a conscious attitude towards this action which had always been so automatic".

After analyzing all the *mindful-diaries* containing the project experiences of the students who successfully completed the holistic education program, feedback was provided to all the students regarding the difficulties that arose during the practice of mindfulness.

The key contributions of integrating the techniques of cooperative learning groups with mindfulness can be summarized in the following aspects:

Attention: We believe any improvement made in this aspect to be of utmost importance given that, in the digital era and with an excess of information and overstimulation, our capacity to maintain attention is weakening (Carr, 2010). During this experience, we observed that attention and concentration were the areas where students perceived the most improvement, not only during classes but also in the presentation of their final project, where they reported less anxiety and stress. When working in groups, members pay complete attention to the person they are interacting with and both the past and future are removed from this relationship, except for practical purposes.

Positive effect on motivation: Different studies highlight the impact that cooperative learning has on motivation in learning (Panitz, 1999). On the one hand, we observed that cooperative learning increases the value of acquiring certain skills in a context of participation in which the students are the protagonists (including ICT tools). On the other hand, mindfulness facilitates the feeling of having an innovative experience, mainly when they use guided meditations such as those available through apps, that generates curiosity and proves particularly appealing to generations that have grown up in environments increasingly dominated by digital technology.

Adaptative skills and attitudes: It is necessary to develop certain skills and attitudes that promote and facilitate teamwork, collaboration and learning (Johnson et al., 1994). The aspects which the students discuss include improving self-awareness, improving aspects such as active listening, the correlation of emotions in order to distance oneself from situations by learning to relativize them, which fosters empathetic communication with groupmates they interact with every day. We also observed states of well-being and resiliency, cognitive capacities including creativity and focus, and mental calmness ―aspects that promote more creative, motivating and meaningful learning (Rechtschaffen, 2014). This type of learning is based on knowledge, skills, (patience, flexibility and equanimity), collaborative competences and especially values, namely empathy, tolerance, compassion and kindness.

5. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

It is important to remark that although there may be obstacles to implementing more conscious education using strategies like those proposed in this study, there are also many potential benefits. We hope that advances in practice and research in the years to come help to avoid these obstacles and limitations, and progressively allow contemplative pedagogy to enrich our education system.

This study relied on student self-reports (*mindful-diaries*) to understand the relationship between mindfulness and cooperative learning and outcomes such as content learning and skills development.

As this was the first time the holistic approach was applied, it was decided that the out-of-class mindfulness activities would be voluntary. In this regard, it would have been interesting to compare the results obtained in relation to the general perception of a group of students who had done the complete program with a group that had not done the out-of-class mindfulness activities, using the latter as a control group.

Therefore, incorporating a control group into the same project in the future could provide a great deal of information that would help to improve the program and even include certain aspects related to emotional self-regulation in the teamwork exercises.

Of course, following the implementation of this holistic approach, which is part of a project in conjunction with other subjects or courses that apply mindfulness using other more traditional methodologies, we will analyze the complete project. This will involve an assessment of the strong and weak points according to the professors who participated in the project and a detailed study of the overall effect on the students, in terms of both academic results and their general quality of life. In addition, we will analyze which teaching methodologies adapted best to the use of mindfulness.

Also, future studies should examine the process by which compassion to the self and others is related to issues of motivational and group conflicts.

6. CONCLUSIONS

Both teachers and students often become overwhelmed by their daily workload –the result of the numerous requests, demands, tasks and distractions that arise. Such a challenging routine provokes a disconnection with one's own emotions and needs, and this becomes evident in the academic field (lack of attention and creativity, demotivation), social aspects (lack of collaboration and empath among partners) and in personal life (health problems associated with stress, burnout, mobbing and frustration).

The practice of meditation allows people to acquire heightened awareness of themselves. With this insight, they can then start to respond to their needs and stressful situations using adaptative skills, rather than reacting to them automatically.

Mindfulness can also help to improve strategies and techniques involved in cooperative learning. Also, cooperative learning can be utilized to teach and train in mindfulness. This proposal is novel and implies a reciprocal relationship between both fields. The integration of cooperative learning and mindfulness can offer a series of advantages in terms of research, theory and methodology, and it has not been explored enough in the literature.

This study also shows how an integration of active methodologies (cooperative learning, gamification and flipped learning aided by ICT tools) and mindfulness can transform the way students learn, by placing the student at the core of the learning process. This holistic educational approach can be applied at any level, including primary school, secondary school and university.

Cooperation and mindfulness represent a way of life, and they are not acquired overnight. It is necessary to develop certain skills and attitudes that promote and facilitate teamwork, collaboration and observation. In this sense, cooperative learning combined with mindfulness constitutes an educational key, both from the perspective of academic results, as it fosters the practice of social and interpersonal skills. At the same time, students (future teachers/educators in our course) are given tools to improve stress management and coping skills, both for themselves and so that they can offer them to their future secondary school students, helping them to cope with adversity and build their inner strength to face the daily challenges of school.

The results obtained in this work highlight the need to apply mindfulness programs combined with active teamwork methodologies, within the educational context to improve states of well-being among students, and increased community, connection and awareness among partners, which also directly influences their academic performance.

We conclude by openly inviting those educators with some meditation experience to find ways to share this gift with their students. For those educators who are not familiar with any mindfulness practice, we strongly recommend exploring it as an option for their own well-being and growth, as well as for the growth and well-being of their students.

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Chapter #20

INTERDISCIPLINARY INNOVATION CAMP FOR NURSING AND ENGINEERING STUDENTS AT WNUAS

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ABSTRACT
Western Norway University of Applied Sciences (WNUAS) in cooperation with Junior Achievement Sogn og Fjordane, organizes interdisciplinary innovation camps for nursing and engineering students. The student assignments are given by local businesses and organizations. This study's objective is to evaluate and develop new programs for innovation camps, as well as to share ideas with educators working with this type of learning activity. A qualitative method was used, and a focus group interview was conducted involving nursing and engineering students (n=8). The students were satisfied with innovation camp as a method for learning, and the learning outcome was good. They regard innovation camp as a diverging learning method. The students are lacking a common understanding of innovation and entrepreneurship before participating at the event, the assignments were too limited, and they were not challenging enough for creative thinking. This study leads to several conclusions to improve upcoming innovation camps at WNUAS. The improvements can be separated into two categories: 1. The students need to be better prepared for the event. 2. The assignments need to be more open.

Keywords: innovation, entrepreneurship, higher education, pedagogical model, innovation camp.

1. INTRODUCTION

This article describes nursing and engineering students at the Western Norway University of Applied Sciences (WNUAS), Campus Førde and their experiences from participating in innovation camp in higher education. We want to look particularly at how the student experiences can improve future innovation camps.

The universities and university colleges in Norway educate graduates who are familiar with innovative thinking and innovation processes, and the institutions are developing innovative educational programs. Candidates should be able to use their knowledge and skills in a self-contained way and master change and uncertainty. The education sector also facilitates interprofessional collaborative learning in education programs, and this leads to better collaborative practices in the professional world (EU, 2013; Gilbert, Yan, & Hoffman, 2010; Ministry of Education and Research, 2008, 2012, 2017). The professional education programs the students in this study represent have requirements for interprofessional proficiency throughout their educational programs (Ministry of Education and Research, 2008, 2011).

To respond to the challenge of educating competent and change willing graduates who are trained to work interprofessional, WNUAS in collaboration with Junior Achievement Sogn og Fjordane (JA) has since 2014 organized interprofessional innovation camps for nursing and engineering students at campus Førde.

2. BACKGROUND

2.1. Entrepreneurship as a phenomenon in the Norwegian education system

From the latter half of the 1990s, there was a broad political debate in Norway that entrepreneurship should become a focus area for the entire educational process, where pupils and students should work on real issues across subjects. Various governmental documents have, over the years, facilitated entrepreneurship as a strategy for learning in where the local community is used as a learning arena in collaboration with local companies and organizations (Ministry of Education and Research, 1997, 2004, 2009).

2.1.1. Entrepreneurial learning

The European Commission defines entrepreneurship as follows:

> Entrepreneurship is a dynamic and social process in which individuals, alone or in collaboration with others, identify opportunities and does something about them by transforming ideas into practical and purposeful activities. This could be in either a social, cultural or economic context (Ministry of Education and Research, 2004).

Ødegård (2014) views entrepreneurship as a multidisciplinary phenomenon. The different scientific traditions have different approaches to the phenomenon, something that has led to wide variations in both the practice and the perception of the concept of entrepreneurship. Schumpeter (1934) is one of the classics of entrepreneurship research. He characterizes an entrepreneur as an innovative force and an exponent of a multidisciplinary approach to entrepreneurship. Schumpeter's ideas are easily identifiable even in today's research on the phenomenon of entrepreneurship in education (Ødegård, 2014).

Ødegård defines educational entrepreneurship as action-oriented teaching and training in a social context with the individual as an actor of its own learning where personal qualities, abilities, knowledge and skills form the basis and direction for the training (Ødegård, 2003).

Central to this thinking is experience-based learning in interaction with external actors outside the education system. Ødegård and Ask (2014) define these actors as local, regional, national and international. One of the main objectives of implementing educational entrepreneurship as a learning strategy is to build up the student's ability to master transition and change in a future perspective related to occupational practice and participation in society (Ødegård, 2014). Educational entrepreneurship is, on the one hand, pedagogy with long traditions in education, socialization, knowledge, motivation and learning, and on the other hand it is grounded in economic tradition with business development, personal initiative and risk (Haara & Jenssen, 2016).

In general, there are four different motives behind the initiative for entrepreneurship in education: *The founding of businesses motive* is based on the schools being able to develop job creators and establishers. *The district policy motive* emphasizes that young people should be involved in developing and utilizing the resources in the local community, as well as ensuring settlement in the districts. *The labor market motive* is based on educating students for tasks in the working world that require change and action skills. From a business and economical perspective there will also be a need for better understanding of finance, administration and management. *The general educational motive* is based on the challenge to make the students creative, enterprising and able to do a good job in the future (Ødegård, 2000).

Educational entrepreneurship has a general educational perspective that aims to make students assets for participation in a future social and working life that is constantly changing (Leffler, 2006). Entrepreneurial learning can be enhanced by factors as experience-based learning, problem-based learning as well as learning to see opportunities. The sociocultural learning approach emphasizes a learning process where all participants are on an equal footing (Dysthe, 1999). This learning can be further enhanced through a network-oriented approach with access to extensive information and resources for the student. It creates a learning arena that is close to the real world (Järvi, 2012). Former students can be used as a resource in such a learning process and then be portrayed as "peer students" (Harland, 2003).

A lack of common understanding of the phenomenon educational entrepreneurship among employees in the educational institutions may lead to uncertainty associated with learning outcomes using entrepreneurship as a strategy for learning. Earlier studies have shown that more research is needed to meet the need for knowledge about entrepreneurial approaches to learning (Haara, Jenssen, Fossøy, & Ødegård, 2016).

2.1.2. Junior Achievements (JA) role in the educational system

JA defines itself as a bridge builder between the education system, business and industry. The main focus of JA is learning through the use of entrepreneurship as a strategy. One important element in this is the expanded value creation perspective. According to Lackéus (2018), an expanded understanding of value creation in an entrepreneurial context will contain five important factors: economic and social value creation, influence, harmony and joy in creating something new. In an educational context, creating value for oneself will be as important as creating value for others. Influence is mentioned as a particularly important value creation factor for students. By using the local community as an arena for learning, where one expands the educational institution's learning and action space, one will be able to provide the student with skills that otherwise would be difficult to acquire through what can perceived as traditional teaching.

2.1.3. Innovation camp in higher education

Innovation Camp is a program within the JA system witch focus on innovation and creation of new ideas. The program can be conducted as an idea competition for students where the assignment to be solved is the central part. The assignment is given by a company or an organization from the private or public sector. The challenge stated in the assignment must be an experienced and real challenge for the assignment provider. It is crucial that the students will perceive the work with their solution to the innovation camp assignment as an important contribution to the assignment provider in retrospect. Hence, that their solution might be implemented in the assignment providers future strategies and practice.

While executing the program, the assignment provider actively participates by being present and presenting the assignment. They also join and follow the students through the entire event as student advisors. At the end of the camp, while the students are presenting their assignment solutions, the assignment providers will participate on giving the students feedback. Hasleberg and Hagen (2016) point out that the use of peer students is useful in conducting an innovation camp. These are students who themselves has been through the program, and then used as specialists and advisors for new students who participate in the program. Students who find it difficult to go outside their comfort zone, and who does not like surprising moments in the teaching program, are referred to as "security seekers". Surprising moments are part of the teaching methods for this kind of events, and this is something the students must learn to deal with on the go (Hasleberg & Hagen, 2016). A Danish study investigated whether interdisciplinary innovation camps contributed to gain hands-on experience in the field of creativity, innovation and entrepreneurship (Ringby

& Duus, 2017). The students, most of them from nursing and physiotherapy programs, were used to interdisciplinary work. Student facilitators and lecturers were present during the camp.

2.1.4. Cross curricular collaborative learning (CCCL)

CCCL is seen as facilitated situations where two or more professional groups learn with, by and about each other to improve collaboration and quality of service (CAIPE, 2019). To learning *with* contains elements of engagement, learning from each other based on trust and respect for other persons knowledge. Learning *about* is about knowing professions other than their own. This can be seen as activities that give students a common frame of reference and identity (Bainbridge & Wood, 2012) and that strengthen the knowledge of teamwork (Stewart, 1989). Boge (2012) found that interdisciplinary innovation camps where students from different disciplines work together is functional for the purpose of CCCL. Students do not need to know each other from before, and the goals of learning outcome may differ. It is important that the learning process is well organized. Taking students out of the school situation can be effective in building teams and fostering creativity and innovation (Bager, 2008).

2.2. Innovation camp at WNUAS - Engineering and nursing students

Innovation camps have been facilitated at campus Førde since the autumn of 2014. The initiative came from the teachers who wanted to create a common learning arena for engineering and nursing students. The background was to make a response to the requirements in the national qualification framework for education (Ministry of Education and Research, 2014), and to create an understanding of each other's professional areas. One important goal was for students to build new skills by learning from each other. It was equally important to make them understand that in the future they will depend on each other's expertise and competence for the best for patients and users. The innovation camp program is being implemented at several higher educational institutions throughout the country, but the innovation camp at campus Førde is unique in the matter of nursing and engineering students working together.

The professional content at the innovation camp in the fall of 2017, with around 80 participants, consisted of training in creativity, work in groups and presentations in plenary. The day before the camp, the students received a brief review of what innovation and entrepreneurship is. They were given examples on technical innovations and innovations within health care. The groups met the next day and started with blank sheets. One large health institution was the assignment provider for all the groups at the camp, and the students received two different assignments. The first assignment was to develop a hospital bed that reduces the risk of patients falling and injuries because of falling. The second assignment was to reduce the risk of falling in the shower and to improve the working situation of the health care workers. The students should create a sketch that explained the functionality, design, production and marketing of a hospital bed or shower chair that would meet specific requirements from the assignment provider. During the innovation camp the assignment providers were available for guiding the students throughout their working process. Two of the main criteria on evaluating the students were innovative and user-friendly solutions. Emphasis was also placed on focus, interaction and how the students divided the task among the group participants.

2.3. Purpose

The study's objective is to evaluate and develop new programs for innovation camp, as well as to share knowledge and ideas with educators who are working with this type of learning activity.

3. METHODS

A qualitative, exploratory approach was chosen to study this phenomenon in depth, and a focus group interview was conducted involving nursing and engineering students (n=8). The study was conducted among students who participated in the Innovation Camp in the fall of 2017. In this way, it allows us to describe and explore human experiences, perceptions and qualities. By using this method, diversity and detail in the material can be presented in a good way. A qualitative approach is often chosen when the researchers are developing theories or when there are no ambitions to achieve results to be generalized (Kvale & Brinkmann, 2015).

The inclusion criteria for participation in the study were that the students should have participated in the innovation camp in the fall of 2017 as one group. An open-ended interview guide with four questions was used. Two of the researchers in the group conducted the interview, one of the authors acted as moderator, while the second author took the role of assistant. The moderator's job was to introduce the interview topics and to facilitate a good exchange that would allow everyone to voice their opinions. The third researcher transcribed the material so that everyone gained close knowledge of the material that emerged in the interview.

3.1. Informants

A group of eight students that participated in the camp in the fall of 2017 were asked if they would like to participate in the evaluation study and all of them agreed to do so. Two of the students were prevented from meeting, and the interview was conducted with six informants. Of the six participants, three were women and three men, five of whom were undergraduate students in nursing, and one was undergraduate students in engineering. The big difference in numbers of students from the two student groups may affect the result. At the same time, the number of nursing students is much larger than the number of engineering students, so that the composition of the focus group was approximately equal to the ratio between the two student groups. The informants received the interview guide before the focus group interview so that they had the opportunity to prepare. Audio recordings of the interview were made using digital audio recorders.

3.2. Analysis

The material is processed and interpreted within a phenomenological-hermeneutic tradition (Polit & Beck, 2018) and is inspired by Graneheim and Lundman (2004). The analysis process started at the interview stage. Following the interviews, the moderator and assistant discussed potential conversation outcomes and made notes of these discussions. After transcription, we read the transcripts multiple times and compared them with the sound recording to make sure that the content had been fully understood. Together, the researchers went through the transcribed material and data were systematically based on the research questions. We extracted quotes and studied these to identify the meaning units. At the next stage of the process, we condensed the meaning units without changing their content. Further in the analysis process, we proceeded to subject the meaning units to analysis and abstraction while we were maintaining the original sense. We allocated codes to the various units. In this

way, we could encode the text and go through the material and put together the text sections that said something about the same, common theme.

Finally, there were categories created. The latent content of the material was formulated in three different themes: 1) The students lack a common understanding of the concept of innovation. 2) Interdisciplinary collaboration is challenged by lack of knowledge of the other profession's competence. 3) The assignment at the innovation camp encourages creativity too little.

The latent content implies an interpretation of the message in the text, while what is directly expressed in the text is called the manifest content (Graneheim & Lundman, 2004).

3.3. Ethical considerations

The study was approved by the Data Privacy Officer, at the Norwegian Centre for Research Data (NSD), project number 57470. The storage of data and the conduction of the study was completed in accordance with ethical guidelines and Declaration of Helsinki (WMA Declaration of Helsinki, 2013). The informants received both oral and written information about the study, and all of them signed a personal form of informed consent. In the text, the informants are anonymized, and they cannot be recognized in the material presented.

4. RESULTS

The findings presented in this chapter are based on a focus group interview with nursing and engineering students who participated in the innovation camp in the fall of 2017. Three main themes were analyzed: 1) The students lack a common understanding of the concept of innovation. 2) Interprofessional collaboration is challenged by lack of knowledge of the other profession's competence. 3) The assignment at the innovation camp encourages creativity too little.

4.1. The students lack a common understanding of the concept of innovation

The informants talk about an educational program in which they to a small extent work on real issues that concerns innovation and entrepreneurship, this problematizes the students from both nursing and engineering. In the professional life, engineering students come up with a different approach where it comes to keeping up with the development: "If there is something new, you have to change it right away." The informants also point out that you cannot do things the way you always have done it, and the programs at the university should be restructured in line with the changes in society.

The nursing students were to some extent afraid that innovation would entail additional work that goes beyond other important tasks: “When it comes to studying nursing, new input is often more work into a very busy workplace, and people may suffer from burnout where they work. Then it is difficult to get new things done." The students also say that they see several factors that can make it difficult to create innovation in the health care organizations; this is finances, time, knowledge and willingness to change.

4.2. Cross-professional collaboration is challenged by lack of knowledge of the other profession's competence

The informants are looking for more opportunities to collaborate across the fields of nursing and engineering. The students see that the severe need in connection to the technological developments within the health care services: “There will be more cooperation

between both engineers and nurses. Things change and one gets more technology and things like that."

The students experience the days as students as busy and do not wish for more teaching or more subjects, but rather that innovation and entrepreneurship may be included and coordinated with existing subjects: "If you could have taken something existing and co-operated there, it would have been better. Then I agree. It was fun for us. But I don't think I had the energy to do so much more." They agreed that it was important to have a day when the students could work interdisciplinary and discuss together. They meant it was good for students in both engineering and nursing.

Another possible collaborative arena that the students mentioned was an interdisciplinary bachelor project. Then the nursing students could work on ethical and human aspects of the project, while the engineering students could look at the technical solutions: Then you need those who are in the nursing field to look at possible ways in which you can go under the regulations and how it affects people and things like that, the more human-like part of the regulations. While the engineers are successful with calculation and how to design a system. Then you can combine this.

The nursing students were unsure of their own role in the innovation camp and some of the informants thought that the engineering students could solve the task alone. However, it was clearly stated that the nursing students' contribution was significant in the design of the assignment, with their skills and knowledge that the engineering students did not have: "It was a great advantage that the nursing students participated ..."

4.3. The assignment at the innovation camp encourages creativity too little

The informants pointed out that the creativity session at the start of the innovation camp could be challenging. At the same time, they stated that there were little room for creativity exercises in the school system in Norway and that this may have been something they had received too little training in. One of the students was very negative about the creativity session and had received feedback from fellow students on this, but the student saw that it worked for other participants.

The students were also clear that the assignment they worked on could advantageously be less detailed. In this way, their creative skills would be more challenged, and they would find it more meaningful to work on the assignment: "It might have been better that less specifications were given in advance, and that we were encouraged to find the specifications ourselves." The informants stated the importance of a learning process related to working with innovation and innovative ideas, one could rather emphasize that they came up with ideas themselves organized as a project:

"We discussed the idea. The group of nursing students should look at what the idea contained. How it will affect all human factors, ethics, etc. The engineering students should investigate possible technical solutions. In the end, the two groups of students came together, and took into consideration the possibility to realize the idea and a final product."

5. DISCUSSION

The study was conducted to evaluate and further develop existing innovation camp programs, as well as to share experiences related to this type of learning activity.

Entrepreneurship and innovation camps as a strategy for education aims to bring students and local businesses closer together to create a learning arena for innovation and entrepreneurship (Junior Achievement Norway, 2017; Ministry of Education and Research,

2009; Ødegård & Ask, 2014). These intentions can be difficult to achieve when students do not have a common understanding of what innovation and entrepreneurship are. Innovation camp as a form of work with open assignments will challenge students to be creative. This may seem to be difficult for some students. Hasleberg and Hagen (2016) indicates that some students find it difficult to step outside the comfort zone and work in a creative and innovative way. Even if the students are not used to being challenged on creativity, it turns out that the assignments at the innovation camp were not open enough. They were too detailed and did not inspire to creativity in a good enough way.

Personal characteristics of an entrepreneur are initiative, motivation, self-confidence and risk-taking (Schumpeter, 1934). In entrepreneurial learning processes, emphasis is on student-active learning, where counselors and students instead of providing answers ask open-ended questions. Harland (2003) recognizes that in problem-based learning, the counselor is not a counselor in the traditional sense, but more a mentor who goes on a par with the students in a development process. Former students who themselves have been through innovation camps can be used as mentors, so-called "peer students" (Hasleberg & Hagen, 2016). Most student peer facilitators contribute to create a good learning environment (Ringby & Duus, 2017). Students with experience from innovation processes help to increase learning outcomes.

The room for learning should be based on the socio-cultural view of learning. In such a system, learning takes place in a community where all participants are equally valuable with their unique competence. In this way, knowledge is constructed through interaction where not only one right answer exists (Dysthe, 1999). The innovation camp should create a good learning environment that promotes student activity. Nursing students and engineering students, in principle, do not have a common language. An engineering student automatically thinks in a technical way, such as the measurement principle of a fall sensor, should it measure pressure, acceleration or height. This is a language that nursing students do not understand. The nursing students are the users who see the final product. Through the innovation camp, the students gained greater insight into the knowledge of each other. The fact that the students worked together in the nursing laboratory to better understand the problem shows that learning takes place in a social practice community (Dysthe, 1999).

The students do not have a clear understanding of what innovation and entrepreneurship are. One example of this may be nursing students who think it is development of new technology making nurses redundant. They are concerned that the technology will get in the way of the interpersonal relations in health care (Gjelsvik, Gjerstad, & Nødland, 2016). Nevertheless, they believe that technology is the future, and that those who work with medical-technical equipment are important. One barrier to innovation in health services is that it takes a long time to make changes because approval procedures take a long time. The students' experiences from different internships show that work tasks are performed in the way they have always been done. It is the desire of the students to be able to have an interdisciplinary bachelor thesis. Today, the two programs differ in terms of number of credits and the design of the thesis. Another barrier is that nursing students are very much in practice, so it can be difficult to get continuity in work. Despite this, the students believe that an educational offer combining engineering and health care could have become popular.

The informants had made up their minds about the actual implementation of the innovation camp. Among other things, they think that one can start by having a brainstorming session, and then dividing them according to educational direction where they still work for themselves in their field of study. The nursing students can look at the human factors, while the engineering students work with the technical solutions. After a while, the groups can meet to discuss common solutions. Not all need to be the same day; it can rather be put up as a

project work. A good group process can generate many ideas, which means that every participant gets better because there are other participants present. Interdisciplinary innovation camps can work well without the students knowing each other beforehand if the activity is well organized (Boge, 2012). Tuckman and Humphreys (1965) theory of group work, with the phases of "forming, norming, storming and performing" can be used in this context. When a group first meet, most are polite and positive, some are nervous because they do not know what to do while others are excited. In the next phase, there may be conflicts because the members have different ways of working. Questions will be asked about the assignment itself; some may think it is too much work and will not take responsibility. After addressing these questions and inequalities, members learn to appreciate each other's strengths. They are now able to ask for help and provide constructive feedback. Only now is the group coming in at that stage that it can start producing to reach the goal.

The introduction session did not emphasize group processes, all the phases mentioned by Tuckman and Humphreys (1965) had to be gone through in a short time. This led to a short period of productive phase. To get a better group process, you may want to give the groups a few minutes to tell about their work midway through the innovation camp, to inspire each other. In this way, all the groups become involved in the learning room (Dysthe, 1999).

6. CONCLUSIONS

The informants were essentially well satisfied with innovation camp as a form of work. They do not wish for mandatory attendance, but experience shows that participation then becomes worse (Hasleberg & Hagen, 2016). They will therefore recommend compulsory attendance at this type of event to ensure multidisciplinary participation and appropriate group size. The students have understood that one of the purposes of the day is that they should learn to work in teams and gain insight into the knowledge and competence of each other. Creativity and innovation can be promoted by taking students out of the ordinary school situation (Bager, 2008) and facilitate interdisciplinary cooperation where one invites external collaborators.

Innovation and entrepreneurship should be a more integrated part of the course of study for both programs, to ensure a common understanding. Bachelor theses can be interdisciplinary, even in so different programs as engineering and nursing study. One way to do this is to let several groups work on different assignments within the same theme. This requires that the professors collaborate on the collection and design of assignments.

Introduction to the innovation camp proves to be more important than we have thought. The introductory session should also be a review of expectations, and a clarification that everyone has something to contribute, and be organized in a way that prepares students for the academic content. Innovation and entrepreneurship are important in all professions, and everyone needs training in creative thinking. It can turn out to be uncomfortable and challenging for some, and therefore some students often opt out of the process as "security seekers." It then becomes important to work for these to come out of their comfort zone (Hasleberg & Hagen, 2016). The professional knowledge the students use in a creative process is what creates something new. An innovation at the intersection of technology and health care can be presented to students before the innovation camp, showing the interdisciplinary work is what is important in this context, not the technical one.

The assignments themselves at the innovation camp must be more open, something that corresponds to the socio-cultural learning view and entrepreneurial learning (Dysthe, 1999; Leffler, 2006). Example on such an assignment can be what sensors to put into the home of elderly people who want to stay at home as long as possible. Another assignment may be that

a room in the hospital can be designed to be the best possible for the patient, relatives and those working there.

To capture changes and developments in social and working life, this type of event should be under continuous evaluation and improvement. Innovation camp in higher education is one of several contributions that will increase competence within innovation and entrepreneurship. These are competences that are in demand in today's working life, and which are becoming even more in demand in the future.

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Chapter #21

TODAY'S HIGHER EDUCATION AT A *CROSSROADS*
The *critical point* and *paradigm shift* in the educator's role

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ABSTRACT
Observing the different progress rates of the available data, information and knowledge (on one side) and human capacity to process these available data, information and knowledge (on the other side), the author becomes aware of the higher pace of the first – in the midst of impetus of new communication and information technologies – and argues that, at this point in time, we are eye-witnessing a real education paradigm shift. The education system is at a critical point in time (call it critical point in education – CPE) when the educator's role must change from knowledge repository to skilled, expert knowledge explorer and identifier, switching from teaching the subject to teach students how to pick the right and relevant information related to the subject – from the ocean of available data.
The current corona-crisis – which started by the time when the ideas for this chapter were put together – made this question more acute, asking for re-thinking the education system and educator's role.
This chapter launches the thesis of the education paradigm shift – in that respect of the educator's role in the predictable future, to provoke a discussion, and to open a research path, for higher education strategists, policy makers, scholars and educators.

Keywords: higher education, educator's role, education paradigm shift, critical point in education (CPE), corona-crisis as accelerator, digital acceleration.

1. INTRODUCTION

The education system is part of the society as a whole, evolving and transforming together, in principle addressing the needs of the society. Nevertheless, the higher education immediate environment is currently under the pressure of several forces that induce challenging transformations as well as rapid changes: uneven increase of the world population (population growth in the less developed countries, parallel to declining number of higher education candidates in the developed economies); exponential development of technology (as well as new information and communication technologies); increasingly competitive economic globalization (stimulated itself by the technology progress that makes distances less relevant by faster transportation means and new telecommunication technologies); new educational technologies (e-platforms included); and all these, unfortunately, in addition to climate change (as result of global warming) and political conflicts (as results of changes in power balance and economic interests) – to name just a few. All these forces and influences are interlinked, and all of them influence or are influenced by the [higher] education systems and processes – on all their dimensions: students, educators, teaching infrastructure and methods.

Our position is on the educator's side, aiming to focus on the educator's role, amid mostly desirable changes and undesirable turbulence.

Education, in general, (and the higher education, in particular) has to answer to the corresponding challenges: How to cope with the discrepancy between the best universities and decreasing population in the developed countries (on one side) versus (on the other side) relatively less and not-so-good universities targeted by a booming population in the less developed countries? How to keep the pace with the best sustainable compromise (of economic development) between new technologies development and climate change? How to answer to the latest needs of the global economy, while careers change themselves (Pascadi & Scarlat, 2016)? How to rapidly adapt to the continuously and fast changing requirements of the new jobs associated to the state-of-the-art technologies? Ultimately, how will the education-related jobs of the future change?

Different evolving paths open controversial yet creative discussions on hot subjects like: virtual university *versus* 'bricks-and-mortar' traditional university; entrepreneurial *versus* classical university; long-life learning *versus* formal education; free *versus* paid education; mass (uniform) *versus* elite (differentiated) education; e-books and virtual libraries *versus* paper books and traditional libraries; high-tech online platforms *versus* traditional teaching methods; virtual *versus* on-site educational tours, and the list is open (Burke & Shay, 2016). However, the common sense should prevail and answers gravitate around getting the best compromise (in terms of effectiveness and efficiency) between apparently opposite elements (traditional *versus* modern).

Some answers are commonsensically trivial – as seen above – while other solutions lie in the technology itself. Still some answers generate new questions. The technology progress (namely quasi-instant internet communication) offers some solutions in terms of making the distance irrelevant – in that respect of blitz-access to information. However, in spite of faster and faster transportation means, distance is still an obstacle for people and material resources. If the blended learning seems to be a balanced solution applicable in several instances (education infrastructure, teaching materials and methods), a particular question stands still: If the source of information (source of knowledge, ultimately) can be almost instantly accessed, then how to cope with this tremendous amount of data? An example is illustrative for the immensity of available data: On 20 May 2019, looking for "communication technology" keyword, Google search engine offered 2,380,000,000 results in less than one second (0.59s); at a pace of 1 item/sec, the non-stop reading will take a lifetime (75 years)!

Computers and artificial intelligence (AI) algorithms may help (and will be of more and more help) but still ... In addition to this, to make things more difficult, this amount of data develops exponentially in time. About two decades ago, there were published hundreds of thousands new books yearly which corresponds to an amount of information (new data) of more than 1 million bits/sec (Hawking, 2001). According to the same source, the number of scientific papers published has increased exponentially, 10 times each half-century, as follows: 9,000 (in 1900), 90,000 (1950), 900,000 (2000).

Realistically speaking: How can the educator cope nowadays with such tremendous deal of information (impossible to be processed by a single person)? How could the educator ask students to do what s/he cannot do? What should be the educator's role in the foreseeable future? Should we call him/her still educator? Ultimately, will the educator have any roll of any kind? As higher education has to answer to the current needs of economy and society at large, then which is exactly the role of the educator (university professor's in particular) under these circumstances?

It seems that our society is at crossroads, not necessarily as technology management but as information management in education. *We currently are eye-witnessing a real paradigm shift in education, related to the educator's role.*

The author's opinion is that education system is currently at a critical point in time when the educator's role must change from knowledge repository to skilled, expert knowledge explorer and identifier. S/he has to switch from teaching the subject to teach and guide students how to pick the right information related to the subject from the ocean of data, literally; to distinguish the true from false information, and eliminate the fake data.

In the future, as part of the human society as a whole, the education system will continue to play its role and answer to the newer and newer needs of the higher and higher technologized society. The humans – both educators and students – will change themselves. Will humans change incrementally yet remaining humans, or will they change radically, becoming more and more cyborg-likes aiming at immortality? To answer this question is beyond the goal of this chapter. The main objective remains to launch the *thesis of education paradigm shift* – in that respect of the educator's role in the predictable future – in order to provoke a discussion on this subject, and, eventually, to open a research path, for [higher] education strategists, policy makers, scholars and educators.

Consequently, the remaining of this chapter is structured as follows: middle age universities as shapers of the modern higher education; the evolution of the educator's role, and the paradigm shift in its evolution (the higher education at crossroads), followed by an inset about the impact of current corona-crisis on education, and conclusions.

2. UNIVERSITIES: THE OLDEST AND MOST ENDURING ORGANIZATIONS

As compared to other types of organizations, the *educational institutions are among the oldest*. Some precursors of traditional universities are still active (as *The King's School*, Canterbury, England, since 597). The oldest, still functioning universities are considered: *Al-Azhar University* in Cairo, Egypt (970/972); *University of Bologna*, Italy (1088); *University of Oxford*, England (1096/1167); *University of Salamanca*, Spain (1134) – on top of others that have followed. The middle ages universities have not emerged from scratch (Courtenay & Miethke, 2000); it is generally accepted that modern universities have the roots in the mid-age Christian tradition (Rűegg, 1992) and their precursors were religious (cathedral or monastic) schools, dating back in the 6th century (Riché, 1978).

Evolved from the religious schools created by cathedrals for the clergy education in the Middle Ages, the proper universities were established in towns and defined as 'communities of teachers and students' (in Latin: *universitas magistrorum et scholarium*) – similar to professional guilds – awarding degrees in a range of academic disciplines. They were self-regulated and neatly organized, their constitution (academic charts) providing clear admission procedures (like in guilds). The origin of the *academic freedom* the European students enjoy these days is a nine-century-old document issued at University of Bologna in 1155/1158: *Constitutio Habita*. In spite of the university autonomy and academic freedom, the clearly admission and functioning rules as well as the professionalism of its members (high respect for their profession included) – all made universities very well organized and managed, apparently rigid institutions (Tolar, 1980).

The universities always were cultural and educational focal centres, the place where leading scholars continuously educated the elites for the next generations.

As Tolar (1998, p.161) observes, "Universities are homes to vast technological information and talent. Universities are repositories of knowledge. Academic research continues to be a leading contributor to new technologies and methodologies. … When university faculty receive the requisite training, they can become potent technology transfer agents." University faculty and students are excellent candidates for investigating new

ideas: “Academic freedom and exposure provides certain openness not found in other institutions … Academic tradition encourages the tolerance and study of new ideas, even if faculty do not rush to embrace them. The ability to investigate new ideas in the pursuit of greater knowledge is a major strength of the university system.” (*Ibid.*, p. 160).

Universities are among the oldest as well as *enduring institutions*. They prevailed over wars, famine, plagues, extreme natural adversities, or dramatic changes of political regimes: “Many of the higher education institutions of the former communist countries … have outlasted communism itself. Although universities (in any part of the world) are not known for rapidly embracing change, once they do expend the effort to incorporate new philosophies, change has a lasting effect.” (Tolar, 1998, p. 161)

The enduring paradox (most advanced ideas and top research *versus* rigidity) is explained exactly by the freedom of creative spirit – allowed by the framework of precise (not rigid) internal rules. Universities do not change themselves but *they change the environment*.

Well-understood why the universities were so enduring, yet it is important to understand how was the education before the emergence of universities – specifically *before* inventing *printing* and even *writing*, by the time early humans used to communicate by (oral) articulate speaking only (*language*). Therefore, the *educative role of the wisdom literature and proverbs* (Scarlat, 2015; 2019; 2020a) has to be emphasized. However, this issue is beyond the objectives of this short chapter.

3. THE EDUCATOR’S ROLE: FROM THE *WISE MAN* TO *MAGISTER* TO UNIVERSITY PROFESSOR. WHAT AFTER?

Besides family education (in general basic), the role of school educator has shifted in time from magister teaching disciples (Greek-Roman antiquity) to professor *encyclopaedicus* (middle age’s Erasmus of Rotterdam) to contemporary university professors mastering (at their best) a single subject. Today, new sciences and deeper areas of knowledge are established in each sector of science, because of unprecedented volumes of information in each of them – so that it is almost impossible that a contemporary university professor to master more than a single subject, a very few or a narrow knowledge area. It seems that our society is about to reach a *critical point in time* (or, maybe, it already experienced that point); not necessarily as technology management but as *information management in education*. This happens when the *amount of available information* is larger than the amount of necessary knowledge *homo sapiens* needs (actually limited to the amount of information his brains are able to process or the *brains’ processing capacity*).

Both figures – the amount of available information (A) and the brains’ processing capacity (B) – display positive dynamics, yet the first one (A) features a lot higher, accelerated pace: undoubtedly, the volume of available information is the result of the accelerated progress of science/sciences and technology/technologies (currently, IT&C – that includes internet communication, social technologies, artificial intelligence, cloud and quantum computing – but also genetic engineering, biotechnology).

On the other hand, the amount of information that human brains are able to process (B) – in order to turn it into knowledge – is related to the human DNA. According to Hawking (2001), the complexity of DNA improved over time, as measured in bits of information: from 1 bit/100 years (during first two billion years since emergence of life on Earth) to 1bit/year (during last few million years) – as result of random mutations and natural selection. The relatively low pace of improving the DNA complexity suggests a relatively linear increase in brains capacity to process the information. In this matter,

following to earlier studies (Hick, 1952), Moscoso del Prado Martin (2011) estimates the human reaction time at maximum 60 bit/s, observing that it depends on tasks to be fulfilled, and it possibly be higher (yet not claiming any upper limit). To note that *invention of writing was crucial exactly because it made possible to transmit information along generations* without expecting the slow progress of the DNA complexity.

Obviously:

60 bit/s (Moscoso del Prado Martin, 2011) << 1 million bit/sec (Hawking, 2001)!

In other words, the pace of (B = amount of information the human brains are able to process) is a lot inferior to the pace of (A = amount of information generated globally). In addition, the gap is going to enlarge (an exponential increase is superior to a quasi-linear increase) – as long as human processing capacity is not boosted by processing capacity of supercomputers of the future, in one way or the other. Therefore, it is natural to assume that, at a certain point in recent times, the curve (A) crossed the curve (B). To note that it is hazardous – if not incorrect – to turn this analysis into a sharp-value-calculation of this point of intersection, as long as history of humans covers many thousands of years (since writing was invented), during which only simulations are fairly possible.

Define this intersection point of the two curves above as *critical point in education* (CPE). It means that *homo sapiens* is not able to cope anymore with exponentially increased volumes of available data and information produced by novel technologies. Of course, computers with their processing power and larger and larger memory devices help to a certain extent to enhance and amplify the human capacity. However, realistically, the question stands still: How can the educator cope nowadays with such tremendous deal of information (impossible to be processed by a single person)? How could the educator ask students to do what s/he cannot do? What should be the educator's role in the foreseeable future? Should we call him/her still educator? Ultimately, will the educator have any roll of any kind? *Here's the paradigm shift*! *We currently are eye-witnessing a real paradigm shift in education, related to the educator's role.*

4. HIGHER EDUCATION AT CROSSROADS: A *PARADIGM SHIFT* IN THE EDUCATOR'S ROLE!

The author's opinion is that education system is currently at a critical point in time when the educator's role must change from knowledge repository to skilled, expert knowledge explorer and identifier. *The educator will continue to exist in the near future at least, but with a different role.*

First and foremost, s/he has to be familiar with new teaching technologies (not only e-learning platforms but also diverse devices for AI – artificial intelligence, VR – virtual reality, AR – augmented reality) and teach students how and when to use them. Then, the educator has to switch from teaching the subject to teach and guide students how to pick the right information related to the subject from the ocean of data, literally; to distinguish the better from poor quality, the true from false information, and eliminate the fake data.

In the near, foreseeable future, the role of educator is not going to be diminished; exactly the opposite is the case: the educator's role becomes more complex, to teach how and when to wisely manage the technology tools in general; how and when to use the newer technologies as online and mobile teaching, AI, AR and VR devices; to promote experiential teaching together with students in order to effectively guide them to achieve the educational objectives. Pacansky-Brock (2017) explains how educators need to understand the applicability of the new educational technology-based tools (as social media and web 2.0 technologies) that are currently transforming the learning trends and

preferences of students as well. The public web and open educational resources are going to replace the traditional learning management systems and technologies that no longer exist; and their mastering should be on the educator's list of competencies – in order to enhance "communications with and between students, and cultivating participatory, student-centred learning activities".

Understandably, the new teaching technologies produce subsequent changes in both education process and organizational structure; these changes might be subject of further research.

Acknowledging the changes in the student body from *Millennials* to *Gen Z* or *iGen*, Fleck and Kakouris (2019) propose the use of adequate experiential teaching innovations (such as use of music and art to teach; use of art to trigger critical reflection; use of the superhero to stimulate creativity; use of alternative media such as film and TV to engage students) in that particular case of entrepreneurship education – based on their observation that "entrepreneurship education has often pursued experiential learning pedagogies in order to engage students and inspire them toward business venturing". Other educators' experience demonstrates that experiential learning (Kolb, 1984) is applicable to various areas of teaching (Itin, 1999; McCarthy & McCarthy, 2006; Breunig, 2009; Stremba & Bisson, 2009; Smith Budhai & Brown Skipwith, 2017). Bartels and Wagenaar (2018, p. 191) describe "three pedagogical practices for recognizing and tolerating affective resistances to experiential learning and finding creative solutions to emergent research problems". Yet the methods for qualitative social research are themselves an area of research during the digital age (Waller, Farquharson, & Dempsey, 2016).

The advantages of using VR, while teaching in the classroom, over traditional teaching methods are palpable in cases as: (i) working in groups; (ii) virtual field trips; (iii) virtual labs; (iv) design and art; (v) exploring history (Wess, 2020). Among concrete examples of applying VR in education are the following: The *VRChat app* makes educational group work easy in a virtual classroom; The *Discovery Education app* helps 'transportation' of students to faraway and/or inaccessible parts of the planet; *Labster* lets students choose chemicals from store-room shelf and use them as required. Taxén & Naeve (2002) consider VR an effective way of teaching difficult concepts to learners; they present *CyberMath*, "an extendable avatar-based shared virtual environment for teaching and exploration of non-trivial mathematics that allows further study of these issues."

Slavova and Mu (2018) found that immersion of students in a virtual environment can improve students' attention; they conducted a comparative study on students' performance when course content is delivered using VR (as compared to conventional lecture slides) and found improved social interaction and "productivity tools in VR are essential for its greater impact in higher education."

Through AR, educators are able to improve learning outcomes through increased engagement and interactivity. AR maximizes students' ability to spend their time learning curricular subjects while minimizing the time spent learning how to use the new technology.

As compared to VR, the AR improves understanding of abstract, spatial geometric concepts through manipulation and multi-angle observation of virtual 3D objects, and offers some cost-friendly options (ViewSonic Library, 2019). Based on their qualitative research conducted in schools from rural and suburban areas of North-Western Greece on diffusion of AR technology, Tzima, Styliaras, and Bassounas (2019) concluded that "teachers are the common element in every different educational system and play a key role in the integration and acceptance of technology in education." As far as concrete practical applications, there are two companies that have produced AR applications for several

disciplines: *DAQRI* created *Elements 4D app* (chemistry) and *Anatomy 4D app* (anatomy) and *Arloon* produced *Arloon Plants* (botany), *Arloon Menthal Math* (arithmetic), *Arloon Geometry* (geometry).

The idea of combining the real and the virtual (Tavangar, 2014), by use of VR and AR technologies and their tools in education, is opening unlimited horizons.

AR along VR will be among the key educational technologies over the next decade (Becker et al., 2018). Nevertheless, a report issued by the global market research firm Technavio (2018) predicts that AI market in the USA education will grow by 48% from 2018 to 2022.

Considering the advantages but also challenges that come with the growth of AI, Harasim (2017) regards *connectivism* as a learning theory and renames the theory of online collaborative learning as *collaborativism*.

Collaboration between teacher and AI is actually one of the main areas of AI practical applications in education – beside universal access for all students, automate administrative tasks, tutoring and support outside the classroom (Marr, 2018). Companies *Content Technologies* and *Carnegie Learning* have developed digital platforms that use AI to provide learning, testing and feedback to students. As AI develops, it will be possible to get customized curriculum for every student's needs. And Marr (2018) concludes: "Even though most experts believe the critical presence of teachers is irreplaceable, there will be many changes to a teacher's job and to educational best practices."

Starkey (2012) examines the teaching with digital technologies, exploring the perspective of knowledge transfer and pedagogy within digital context, and underlies the importance of critical thinking during digital age – while considering both online and face-to-face interactions. Based on faculty interviews, Ko and Rossen (2017) focus their research on teaching massive open online courses (MOOCs) using open educational resources, learning analytics, and online tools (multimedia and mobile devices among them).

The issue of sustainability is studied in case of mobile technologies (Ng & Cumming, 2015), which are one of the fastest growing areas of technology used in education: the main challenges are the significant investments in mobile devices and associated technologies that should be made by the university, time and training required to initiate mobile learning programmes, and the fast pace of technology changes (associated with new rounds of investments). On the other side, the easy access of larger number of students, regardless of location, is an important advantage.

About three decades ago, Wiener (1989, p.58) observed that people "spend what may amount to forty per cent of this normal life as a learner, again for reasons that have to do with physical structure. It is as completely natural for human society to be based on learning as for an ant society to be based on inherited pattern." Nevertheless, only a generation later, we acknowledge the principle of LLL (Long Life Learning) – under certain aspects, at least.

Counter-intuitively, *the technology progress is not going to shorten the duration of learning* (as compared to the life span) for at least two reasons: increased complexity of [science and technology] knowledge, and higher pace at which volumes of data outpace the learning capacity of human brains. The solutions are on all sides: automatization of the education process and making it more effective and efficient; use of more advanced, technology-based education methods, as seen above; use of working machines (robots) able to learn at a higher pace than humans do. Hence, a new category of challenges for scientists: developing learning languages for other than inter-human communication:

but for man-to-machine, machine-to-man, and even machine-to-machine communication, dealing with both phonetic and semantic aspects of language (*Ibid*., p.74).

Consequently, *there is a need for more educators, for longer periods of time, able to play a newer, more complex role.*

In addition, suitable online teaching programmes have to be developed, in line with the university mission (King & Alperstein, 2014).

Summarizing, the near-future-educator should:

- Master new education technologies.
- Be able to use new teaching technologies.
- Be able to teach students how to use the new learning technologies.
- Know to discern between: true *versus* false, fake or misleading information; relevant *versus* not relevant for the discussion; important *versus* not important information.
- Be able to teach students how to discern themselves.
- Mentor and guide rather than simply teach the students.

Therefore, the *education system as well as training programmes of the future educators, at all levels, have to change and adapt entirely*, from objectives to methods.

On the other side, the people will live longer (de Grey & Rae, 2007) and, eventually, think about becoming immortal (Fossel, Blackburn & Woynarowski, 2010; Cave, 2012; Popescu & Scarlat, 2017; Watson, 2010; 2018). Other than trivially enjoying the life, living longer means more time to cope with larger and larger volumes of information and to learn more (i.e. *more time for education*), to have more time to apply the acquired knowledge, and, ultimately, build real or virtual legacy to be passed to next generations.

The idea of living longer and even immortality (Geddes, 2010; Popescu & Scarlat, 2017) might be also perceived as an universal concept, applicable not only to humans but also to machines (technical durability), economic systems or the whole society (concept of durable development) – which might be an interesting conversation as well as a further research path to explore.

Strictly, in terms of education, other questions arise, linked to the idea of living longer: Will people retire later? Will higher education studies be distributed in time? How will education look-like in the longer run and how its components will evolve? What would be the next communication revolution and/or education revolution? Would they be telepathic education and educators with telepathic features?

To answer all these questions is beyond the goal of this chapter. The purpose is just to draw attention and to raise the general awareness on this *critical point in the education's history*, and to *advance the thesis of the paradigm shift in education* (in that respect of educator's role in the predictable future), to provoke a discussion on this subject, and, ultimately, to *open a research path*, to the benefit of higher education strategists, policy makers, scholars and educators alike.

5. COVID-19 PANDEMIC: A THREAT, AN ACCELERATOR, AND A FUTURE RESEARCH AVENUE FOR EDUCATION

The COVID-19 pandemic generated "the largest disruption of education systems in history, affecting nearly 1.6 billion learners in more than 190 countries and all continents" – according to a United Nations report (UNO, 2020, p.2); to-date (February 2021) the corona-crisis is affecting 219 countries and territories (WHO, 2021).

In response to numerous school closures (universities in many counties included), UNESCO (2020) recommended use of distance learning programmes, educational e-platforms and open educational applications – in order to limit the effects of social

distance administrative measures (*i.e.* disruption of the education process). Diverse negative influences on the education system are also reported by Schleicher (2020) in his OECD report.

However, the unexpected threat of the coronavirus pandemic and its subsequent corona-crisis made the question the author stated in the title of this chapter more acute. And, willing or not, the [higher] education dilemmas remained, although with a positive note: the process of distance learning, using newer communication technologies is gaining momentum and speed. Rightfully, the corona-crisis could be qualified as an *accelerator of the process of higher education reform*, re-thinking its elements at a crisis pace.

The current corona-crisis contributes to the acceleration of the contemporary digital transformation of education system and society entirely, announcing an era of *digital acceleration.* If this is a good or bad outcome, only the future, longer term impact studies will offer undisputable sentences. This really is a future research avenue in [higher] education area!

The *Critical Point in Education – CPE* might be for long-time gone …

6. FUTURE RESEARCH AVENUES

This chapter is an essay with reflections on the role of the educator in higher education, facing the changes caused by accelerated digital transformation of society and, implicitly, of the education system – in particular. As a current discussion, it helps to understand these changes.

However, as any provocative discussion, it also has limitations, yet each of them bearing the potential of further research ways – already mentioned along this chapter: (i) empirical research on the performance of teachers, while dealing with new technologies, specifically under pandemic; (ii) development of a suitable set of performance indicators in this respect; (iii) further studies regarding the impact of educational technologies on both teaching-learning process and organizational structure.

The prospect of living longer – as an opportunity for LLL – might also be a further research path to explore and exploit.

7. CONCLUSIONS

In the near, predictable future, the education system (as part of the human society as a whole) will continue its mission and address the needs of the increasingly technologized society, while the educator's role is undergoing a *paradigm shift: from educator to master of new technologies as well as students' mentor and guide to discern the right information from the available ocean of mixed information.*

A major conclusion of identifying and emphasizing the paradigm shift related to educator's role is to bring in discussion the need of re-thinking the education system as well as training programmes for the future educators, at all levels, in order to better answer to the current challenges and crises.

On longer run, a multitude of questions arise, depending on future technologies and their impact on the human society, but mostly depending on future decisions made by humans. Therefore, the education system and educator's role will significantly depend on how the future humans (both educators and students) will evolve – either still *homo sapiens* or different species adapted to the radical technology changes – becoming more and more cyborg-likes.

The human race suffocation or extinction as result of wrong technology decisions is an extreme possibility (Wiener, 1989; Martenson, 2011; Harari, 2016). In other words, is the humankind going to cope with sustainable technology development as *homo sapiens*? Is it going to be a different community of *homo networkingus* or *homo cyberneticus*?

Today, the higher education is at a crossroads – as its future is intimately inter-linked with the future of human society as humankind. The humans are actually in front of largely spread options: within the angle between *wise-man* and *cyborg*, the common sense must prevail.

Nevertheless, in line of the common sense, *the proverbs are a solid element of continuity* in mass education and/or in formal education systems as teaching aids, as long as the humankind will last (Scarlat, 2015; 2019; 2020b).

It is up to contemporary educators, it is their educative mission and mentoring role to steer younger generations to make the right decisions for the future.

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Chapter #22

THE EDUCATIONAL AND THERAPEUTIC BENEFITS OF "CONTENT-FOCUSED ACCESSIBLE E-LEARNING MATERIAL" FOR VISUALLY IMPAIRED UNIVERSITY STUDENTS

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ABSTRACT
The idea of "educational therapy" is quite different in Japan compared to foreign countries, especially in the US, where educational therapy is quite advanced. Therefore, this study determines the educational therapeutic benefits of the author's "Content-Focused Accessible E-Learning Material" for English self-learning, based on the concept developed in the US, particularly focusing on visually impaired students. These students experience various difficulties in higher education, such as 1) the absence of learning materials in braille, 2) commercial unavailability of magnification-capable learning materials and digital materials, and 3) lack of text-to-speech function in many learning materials. To study whether the material had any therapeutic benefits for these students, the author obtained feedback from 33 students. The feedback was based on the following questions: (1) technical aspects: Did the material reduce/rid the load/concern they felt; and (2) mental aspects: Did the material increase the willingness/autonomy or decrease anxieties and did they feel accomplished or motivated to improve their longitudinal English self-study? The findings show that the material was beneficial to them in five ways. The goal of this study was accomplished to a considerable degree; the use of this material reduced students' mental burden in learning based on both qualitative and quantitative feedback from visually impaired students.

Keywords: "content-focused accessible e-learning material", educational and therapeutic benefits, english learning, visually impaired university students.

1. INTRODUCTION

In this article, the author uses feedback from visually impaired university students to determine the educational therapeutic effectiveness of "Content-Focused Accessible E-Learning Material." Their comments indicate that they felt they had received significant benefits from this material's existence, and that the absence of or inconvenience of using accessible learning materials had caused hardship for them.

According to previous studies (Abe, 2013; Inagaki et al., 2017; Muto, 2013; Uchida, 2018), "educational therapy" conducted in Japan is defined as in-school interventions designed for mentally and physically disabled children who attend appropriate schools. The main therapy method is movement education and therapy, where teachers sing songs, encourage body movements, and draw pictures with students, along with other therapies.

In domestic studies, the keyword educational therapy does not exist. Movement education and therapy is the Japanese equivalent to the phrase educational therapy and is the primarily teaching method for children or students in special schools in Japan.

Meanwhile, the keywords "educational therapy" and "educational therapeutic" exist in many studies conducted overseas (Hewett, 2019; Kashdan, Robby, & Cecilia, 2005; Marek, 1999; Radecki, 1984; Wiazowski, 2000). As it is presented in these studies, educational therapy could include many of the concepts incorporated in Japanese schools; the phrase educational therapy may simply be more common overseas, particularly in the United States. In the US, some national and private organizations offer educational therapy.

Educational therapy as it is conducted in the US is closely related to the educational therapeutic effects found in the study of "Content-Focused Accessible E-Learning Materials" which the author created and then used with visually impaired university students. Students with visual impairment often struggle when learning English. For example, some question patterns which are typical for sighted students are difficult for visually impaired students to solve or even grasp. They also lack learning materials in higher education levels, such as braille versions of English exercise books. Some students also are unable to utilize technical accessibility options, such as operating a computer screen reader or braille display, especially when their visual impairment is suddenly or gradually acquired.

This article demonstrates how the author's "Content-Focused Accessible E-learning Material" creates an educational therapeutic effect for visually impaired university students. The quantitative assessment was conducted based on the number of students' answers in each derived category, and the results are shown in Table 1 in Section 4.4.1. The qualitative assessment was conducted based on the participants' comments, which are shown in Section 4 .4.2 (a summary chart has also been provided).

2. THE DEFINITION OF "EDUCATIONAL THERAPEUTIC EFFECT" IN THIS STUDY

In this section, the author defines the educational therapeutic effect regarding "Content-Focused Accessible E-Learning Material" based on educational therapy. As mentioned in the introduction, the US contains several organizations, both national and private, which offer educational therapy. The Association of Educational Therapists (AET; http://www.aetonline.org/) defines educational therapy as:

> *What is Educational Therapy?*
> Educational therapy is the practice of providing personalized remedial instruction to children and adults with learning challenges, including but not limited to dyslexia, ADHD, executive functioning deficits, and language, visual and auditory processing issues. The ultimate goal of educational therapy is to foster development of self-confident, independent individuals who feel positively about themselves and their potential as lifelong learners.
> Educational therapists understand the social, behavioral and emotional factors that can impact learning. They have extensive training and experience in administering academic assessments, developing intervention plans, and implementing strategies to addresses challenges with reading, writing, spelling, math organization, and study skill. […] (http://www.aetonline.org/).

As mentioned above, educational therapy has an important role in supporting challenged people and realizing an inclusive society, which is a current global aim. For example, SDGs' fourteen goals also aim for inclusivity and equity among people with

various backgrounds. AET similarly has a strong social mission to improve these ideals among such people as follows:

> *Mission Statement*
> The Association of Educational Therapists (AET) is the national professional association for educational therapists.
> Founded in 1979, AET defines and sets standards for the professional practice of educational therapy. Educational therapists provide a broad range of individualized educational interventions for children and adults with learning disabilities and other learning challenges. (http://www.aetonline.org/).

Other organizations in the US which focus on educational therapy include the National Institute for Learning Development (hereafter "NILD"). NILD's website describes the organization as:

> *NILD Educational Therapy is Research-Driven and Research-Proven*
> Research-Driven? Our Practices? are Evidence-Based Research validates NILD educational therapy interventions that have helped students with learning challenges for over 40 years. Every student is unique. NILD's research-based, individualized approach is unique too (http://nild.org/).

> *Hallmarks of NILD Educational Therapy*
> Teacher's questions and student discussion are critical components of research-based instruction and […] effective teachers… ask students to explain the process they used to answer the questions, to explain how the answer was found. Builds the competence and confidence of students with learning challenges. (http://nild.org/)

Another organization also offers their mission as follows: The similar definitions or missions by private organizations regarding Educational Therapy are also mentioned well. (For example, Ann Martin Center, which unfortunately closed May 2019 after 56 years of providing mental health services to students. (https://piedmontexedra.com/2019/05/after-56-years-of-providing-mental health-services-to-students-ann-martin-center-announces-closure: The year of reference was 2020).

The kinds of benefits that students would obtain through educational therapy are explained below in the explanation by NILD, with a focus on adults. It is important to note that students in higher educational levels are preparing for their futures, including by making progress in English proficiency. Significant indicators for adults who would benefit from educational therapy include the following: (http://nild.org/).

* The adult is experiencing difficulty with learning expected tasks in the workplace.
* The adult notes a need for complicated compensatory strategies to camouflage difficulties with reading and writing in the workplace.
* The adult never attained skill levels needed to function in a workplace that requires reading and writing.
* The adult has difficulty organizing tasks and managing time efficiently. (http://nild.org/)

In this study, educational therapeutic effect based on educational therapy regarding "Content-Focused Accessible E-Learning Material" is defined as follows;

1) to provide remedial instruction to visually impaired students with challenges in studying English.
2) to reduce negative emotions (e.g., wanting to avoid learning English, or experiences of anxiety, anger, frustration, etc.) due to visual impairment through studying "Content-Focused Accessible E-Learning Material."
3) to encourage students to raise their self-esteem regarding university performance.
4) to inspire students to be willing to be a longitudinal learner of English, depending on their career path.
5) to foster development of self-confident, independent individuals who feel positively about themselves and their potential as lifelong English learners.

In this article, these kinds of effects are referred to as educational therapeutic benefits for visually impaired students that can be achieved by studying "Content-Focused Accessible E-learning Material."

3. THE COMMON DIFFICULTIES FACED BY VISUALLY-IMPAIRED ENGLISH LEARNERS IN UNIVERSITY SELF-LEARNING

Students with visual impairment usually use assistive technology which enable them to access learning materials: braille, enlarged characters, text-to-speech function, and PC magnification, among others.

However, none of these devices are perfect for all students, even those with high technical skills. For example:

a) braille
   - There are fewer learning materials for higher education levels. For example, learning materials for TOEIC preparation do not exist, other than a few very old versions on Sapie Library, the bibliographic database for visually impaired people which provides digital talking and braille materials. Visually impaired students have long-standing difficulties in self-learning for TOEIC.

b) enlarged characters
   - For students with severe low vision, using a magnifier for a long time can cause physical and mental exhaustion.
   - Magnification-capable learning materials and digital materials for higher education are not commercially available.
   - Students are required to request that self-learning materials be created.
   - Although several publishers produce online language learning materials, as Adobe Flash Player is used for screen transitions, it is impossible to magnify screens using screen magnification software.

In either case, students must wait for a long time for the materials to be completed. As a result, many students are in peril of losing out on important opportunities during the period in which they are motivated and interested to learn, and need to engage in learning activities.

c) text-to-speech function

・ For many learning materials, the screen reader does not support the text-to-speech function.

In essence, a self-learning environment for students with visual impairment has not been fully developed. In many cases, sufficient progress cannot be made only through "technical accessibility to information". The author has therefore developed what she named "Content-Focused Accessible E-Learning Material," which could solve the problems often faced by visually impaired university students to a considerable degree.

4. EDUCATIONAL THERAPEUTIC EFFECT ACQUIRED BY CONTENT-FOCUSED ACCESSIBLE E-LEARNING MATERIALS BASED ON FEEDBACK COMMENTS FROM THE STUDENTS

4.1. Participants

The author assigned 25 first-year and 8 third-year university students who were visually impaired to study "Content-Focused Accessible E-Learning Material." To study whether the material had any therapeutic benefits for these students, the author obtained feedback from the students.

Students' visual impairment is as follows (total number respectively): blind (4 students), almost blind (3 students), severe low vision (6 students), loss of most of visual field (4 students), low vision (10 students), narrowed visual field (3 students), central scotoma (1 student), night blindness (3 students), and light aversion (1 student). Many cases had combined symptoms of visual impairment.

These students can also be classified into five categories as follows: users of braille (6 students), users of text-to-speech function (6 students), users with almost complete loss of visual field (4 students), other users (low vision, narrowed visual field, central scotoma, night blindness, light aversion) (18 students), users who can read printed learning material without major difficulties (5 students).

These students can also be classified into five categories as follows:

1) users of braille (6 students)
2) users of text-to-speech function (6 students)
3) users with almost complete loss of visual field (4 students)
4) other users (low vision, narrowed visual field, central scotoma, night blindness, light aversion) (18 students)
5) users who can read printed learning material without major difficulties (5 students)

4.2. Pedagogic dimensions of the intervention

First, it might be inevitable for us educators to consider suitable pedagogical interventions when we efficiently manage students' feedback. According to Arimoto (Arimoto, 2017a; Arimoto, 2017b), based on the ERIC database (Arimoto, 2017a; Arimoto, 2017b), there are numerous types of pedagogical interventions for an assessment system.

The following items are in the ERIC database which the author paid special attention: feedback, growth models, sustainability, needs assessment, formative evaluation, home study, instructional material evaluation, participant satisfaction, experiential learning, affective objectives, student-centered curriculum, instructional development/effectiveness/ improvement/innovation, creative teaching, diagnostic teaching, educational therapy,

special classes, teacher effectiveness, student development, student participation, educational needs, educational objectives, outcomes of education, student rights, evaluative thinking, active learning, discovery learning, theory of mind, and, best of all, self-efficacy, self-esteem, and so on, which are especially important factors in teaching visually impaired university students.

Among these educational items, the author paid special attention to educational therapy in this study, which leads to self-efficacy and self-esteem. To teach university students with visual impairments, special teaching methods and careful attention are critical since they have various kinds of difficulties in English learning, as mentioned above. Educational therapy is defined as "Educational practices that contribute to the treatment of students' organic or functional disorders" (e.g., remedial reading instruction that improves self-esteem).

"Content-Focused Accessible E-learning Material" has been proven to have educational therapeutic benefits from students' feedback. For this reason, educational therapy is focused on in this study.

4.3. Feedback questions

Feedback questions to 25 first-year and 8 third-year university students who were visually impaired as mentioned above are the following;

1) Pick up one of the "content-focused accessible e-learning materials" which you think is necessary for you and study at least ten grammatical items
2) Provide feedback both on what is effective and what needs to be improved/revised
3) About this learning material 1
   3.1) Provide the reason(s) why you chose the learning material(s)
   3.2) Did you feel that the learning materials were effective, and did they affect your sense of achievement?
   3.3) Did this material develop your autonomy and fluency for self-learning English?
4) About this learning material 2
   4.1) Has this material reduced your difficulties, anxieties etc. in self-learning English and other things? If Yes, which points were reduced, and how were they reduced?
   4.2) Does this learning material reduce your difficulties, anxieties etc. in longitudinal self-learning English to the future?
5) (voluntary disclosure)
   5.1) What kinds of difficulties and anxieties etc. have you ever experienced due to visual impairment?
   5.2) What kinds of devices and effort have you made to accommodate your visual impairment?
   5.3) Do you think special kinds of accessibility to information in English learning are required? If Yes, what type(s)?

In the author's opinion, Questions 3, 4, and 5 have the closest relationship to educational therapeutic effects.

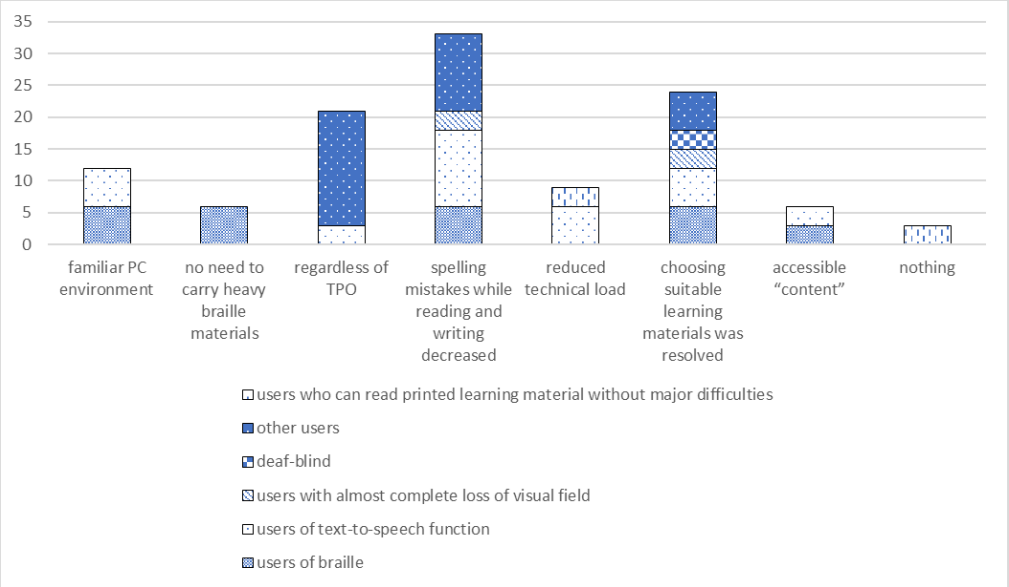
4.4. Findings

4.4.1. Quantitative findings

The quantitative assessment was conducted based on the number of students' answers in each category. The findings show that the material was beneficial to the students in the following ways (Table 1).

The students' feedback comments, which reflected that they were convinced about the educational therapeutic effects caused by "Content-Focused Accessible E-learning Material," were generally categorized into the following five groups: 1. The students could use familiar PC environments, 2. As this material did not focus on technical accessibility, but rather more accessible "content" supported many kinds of visual impairment, it enabled students to study more efficiently. 3. They did not have to carry braille materials, 4. They could study regardless of TPO (e.g. via iPad), and, 5. Spelling mistakes while reading and writing decreased. Additionally, since the students' difficulty in learning English was mainly due to the visual impairment itself, this material reduced their anxiety. The reduced technical load (i.e. creating digital and braille data, physical and mental exhaustion caused by long use of magnifiers, lots of visual line movement) led to a feeling of accomplishment/willingness. The major concern of choosing suitable learning materials was resolved as the learning material was created by the teacher, which motivated them to study English.

Table 1.
Results of the feedback (%).



What it is worth mentioning is that students using braille and those who had no major visual difficulties commented that both could share the same learning material, enabling them to study together. This comment would lead to inclusive education, which has considerable significance for a future society that focuses on inclusivity and equity.

4.4.2. Qualitative findings

The qualitative assessment was conducted based on the students' comments. Comments to Questions 3 through 5 above (pp. 8-9) are as follows.

◆s represent positive comments, and ■ represent negative comments.

◆For us, to get any kind of printed books for English learning is difficult. Although some official HPs like the STEP association prepare past tests, they usually are PDF files, which the screen reader could not accept, and files could not be downloaded by some browsers.
Since this learning material can work on web pages, we can use familiar PC environments like browsers. In addition, this learning material enables us to check correct answers and explanations immediately after answering, different from printed books. These aspects reduce our load. (2 braille users, 1 user of text-to-speech function)

◆We can share exercise questions with users of printed letters, which enables us to study with them.
This aspect benefits us. (1 braille user)

◆I learned how to operate Moodle, which is suitable for learning English. I felt accomplished in my studies with this kind of e-learning materials. (1 braille user)

◆Printed learning materials are too heavy to carry. This learning material got rid of this long-time concern. (1 braille user)

◆Since printed learning materials in braille are often too enormous, I was not willing to look up words in the dictionary, which led to me not learning English. This learning material got rid of this long-time concern. (1 braille user)

◆It becomes possible for me to create comfortable environments using the function to enlarge characters etc. of computers or by using iPad. We do not have to prepare learning materials in enlarged characters by ourselves. This increases efficiency and willingness in learning English. (5 with low vision)

◆I think it very revolutionary for users of text-to-speech function. For those who with low vision, mental and physical exhaustion induced by prolonged use of equipment such as roupe, magnifying device etc. (1 who can read printed learning material without major difficulties)

◆As compared to commercially available learning materials, which are exhausting where letters are too small, mistakes in reading spelling (ex. taking "rn" for "m", "j" for "i") have decreased when using screen magnification. When I could answer many questions correctly, I felt accomplished. (4 with low vision, 1 with severe low vision with almost complete loss of visual field, 2 users of braille, 2 users of text-to-speech function)

◆Though writing task questions are often difficult to answer, we can choose the correct sentence in this material, which provokes a feeling of accomplishment. (1 with low vision)

◆The biggest difficulty in learning English has been caused by visual impairment. Now, as it has been solved by this material, other anxieties have been reduced. (1 with low vision)

◆The digitalization of learning materials which are difficult to purchase personally helps me reduce difficulties and efforts I have long experienced. (1 with low vision, 1 braille user, 1 user of text-to-speech function)

◆Easy access through PC and smartphone, and perfectness of accessibility enables me to develop longitudinal study. (1 with low vision, 1 with severe low vision, 2 users with almost complete loss of visual field, 1 user of text-to-speech function)

◆Easy to use (ex. many links related to questions, explanations), which provokes me to actively challenge myself. (1 deaf-blind user)

◆Enlarged copies of printed materials are difficult to handle and cause asthenopia, and handling magnifying device is sometimes difficult because of visual impairment, which has decreased my autonomy for independently learning English. However, as this material can accept text-to-speech as alternative option even though I feel asthenopia, my autonomy increases. (1 user of text-to-speech function)

◆Special preparation for learning English is not needed when using this material, and having no difficulties related to visual impairment when checking to see if my answers are correct reduces my anxiety. (1 user of text-to-speech function)

◆Since there are various types of questions, I would like to do longitudinal study. (1 braille user)

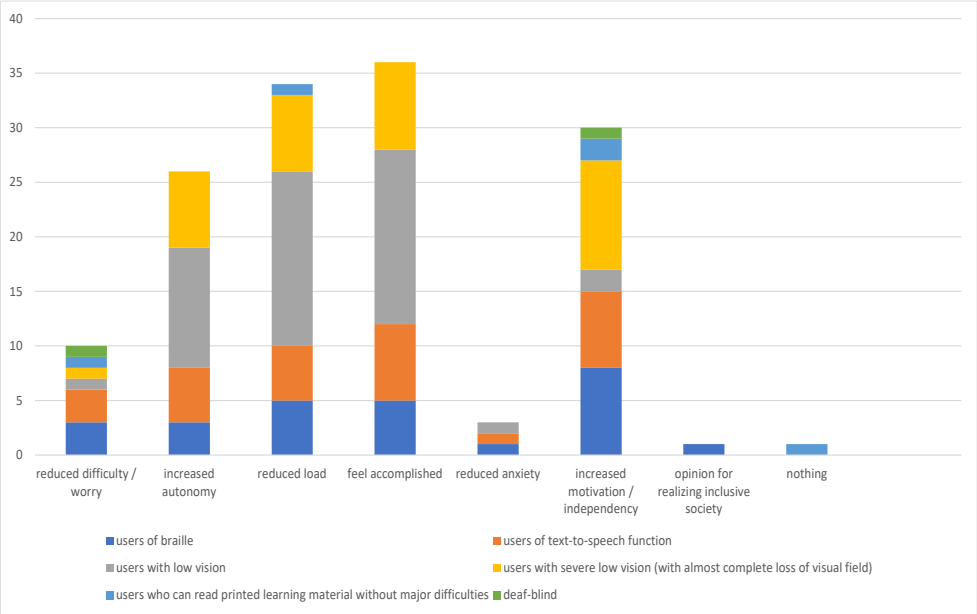
◆Long passage reading comprehension is difficult since it took me a long time to find parts related to questions. This learning material solved this difficulty. (1 braille user)

◆After studying grammar, I could continuously study word lists, which was very useful. (1 with severe low vision with almost complete loss of visual field)

◆For us with visual impairment, the most difficult thing has been the choice of learning materials. I have long worried which materials are the most suitable ones for me, and which ones are the most effective learning materials to master English. This learning material reduces this worry as I can easily access the internet tool created by my teacher. This has become my motivation to study English. (1 with severe low vision with almost complete loss of visual field)

■Nothing. (1 who can read printed material without major difficulties)

Table 2.
A Summary Chart of the Numbers of Students' Feedback Comments (Categorized According to the Factors Related to Educational Therapeutic Benefits).



In conclusion, the goal of this study was accomplished to a considerable degree; accessible learning material that enabled visually impaired students to study English efficiently was created, and the use of this material reduced students' mental burden in learning. Additionally, it is worth mentioning that students using braille and those who had no major visual difficulties commented that both could share the same learning material, enabling them to study together. Students are hoped to continue carrying out a longitudinal self-learning after graduating, as they build their careers.

5. DISCUSSION

Jindal-Snape (2005) tried to train visually impaired students to appropriately evaluate their social behaviors and to solicit feedback from their sighted peers. Jindal-Snape covered social interactions between visually impaired students and sighted students. A similar social interaction with willingness is often seen between visually impaired students. As we can easily imagine, visually impaired people have tight limitations regarding social behavior. However, it is worth mentioning that one trend that is often seen is that visually impaired students acquire awareness (in Japanese, "kizuki") of their new identity in interacting with their visually impaired peers and reconstruct a new self-image. For example, students with low vision naturally assist blind peers even though no teachers have encouraged them to do so. Students assist their peers in managing the things that they can do but their peers cannot. This social behavior corresponds to Jindal-Snape's (2005) conclusion, "it was found that peers were better at giving feedback when prompted by Sameer [= peer], rather than when they were reinforced by me [=Jindal-Snape]" (D. Jindal-Snape, 2005). Jindal-Snape calls this "the process of self-evaluation" by visually impaired students. The author regards

visually impaired students' awareness at her university as "self-image" or "self-esteem" (Hattie, 2012, p. 50). According to Jindal-Snape, this process could be adopted for training for other important actors, that is, teachers and peers, who give feedback to visually impaired students in this kind of environment. The author thinks that visually impaired students' autonomous awareness, as mentioned above, could also be used as feedback for sighted teachers. That is, while sighted teachers tend to regard visually impaired students as "visually impaired students" as a whole, especially as compared to sighted students, in actuality, the students are aware of their new identity and a "change of paradigm" occurs among visually impaired students.

As Chan and colleagues suggested, "the purpose of feedback is to move the student from where he or she is currently performing to where he or she should be performing […]" (Chan, Konrad, Gonzalez, Peters, & Ressa, 2014, p. 125). It has been observed that visually impaired students are aware of where they are currently performing; for example, students with low vision levels were regarded as needing help at an ordinary high school, but they were aware that they had a role in helping blind peers at a university where all of the students had visual impairments. This kind of students' awareness of the "change of paradigm" in their identity was found in their feedback comments. This situation produces expected educational outcomes, and it could be said to have the same educational effect as was referred to by Chan et al. (2014), "Feedback is effective only when it produces the desired outcome, that is, when students are able to move their own learning forward" (Chan, et. al, 2014. p.58).

Hattie and Timperley noted that the most effective methods, i.e. tasks, are the most successful, while praise, rewards, and punishment are least likely to influence success (Hattie & Timperley, 2007, p. 84, pp. 102-103). The authors' attempt in this study has focused on the most sufficient type of learning material in English learning for visually impaired students. Referring to the successful feedback criteria shown above, the author's attempt has been effective to a significant degree.

Hattie and Timperley (2007) also mentioned that feedback is most fruitful when focusing on students' successes rather than on their weaknesses (pp. 102-103). As this study focused on reducing students' technical load, mental burden, and anxiety, it can be said to have been successful.

6. OPPORTUNITIES FOR FURTHER RESEARCH

1) It is hoped that an additional longitudinal study (Hewett, 2019, pp. 4-5). can be carried out to discover whether the participants who have developed autonomic attitudes toward learning English and other subjects have become more confident about self-learning and retain this ability after graduating, as they build their careers.

2) It is hoped that this learning experience will enable visually impaired university students to understand their special needs fully and to ask for the consideration and support they need in inclusive educational situations and society as Hewett, Douglas, and Keil (2016, p.3) mentions as self-advocacy skills.

3) Students' comments demonstrate that, when learning English, some of them change the media so that they avoid misreading of spelling (e.g. expansion percentages, changing from printed materials with magnifying devices to text-to-speech). This seems to be because it becomes more difficult to speculate context as English is not their native language.

7. CONCLUSION

In this article, the results showed that visually impaired students found hope in learning English despite their visual impairment; furthermore, they reduced their technical load and mental burden and improved their autonomy and reduced their anxiety after studying "Content-Focused Accessible E-learning Material." The author's attempt seems to have been considerably successful for visually impaired students.

In addition, the comment regarding the ability to study with those who use printed material would lead to inclusive education, which has considerable significance for a future society that focuses on inclusivity and equity, as Hewett (2017, p. 2), and Hewett, Douglas, McLinden, and Keil (2017, p.89) suggested.

One of the tasks in the author's previous studies was to inspire students' motivation for longitudinal study. This material has, to some degree, solved this problem. This is a significant result.

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Chapter #23

INTEGRATING STUDENTS WITH REFUGEE AND ASYLUM SEEKER BACKGROUNDS INTO SCHOOL: TEACHERS' PERSPECTIVES

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ABSTRACT
The critical aspect of refugee and asylum seeker education has become almost a worldwide phenomenon. The difficulties of language, culture, acceptance and resettlement all impact on a school's capacity to support these students and ensure that they access to best educational opportunities possible in many countries which are dominated by neoliberalized education systems. Neoliberalized education systems are dominated by the five Cs (Competitiveness, Conformity, Conservatism, Convention and Commerce) and are the antithesis of the European educational child- centred traditions conceived by Pestalozzi, Froebel, Steiner and others. This writing draws on a research project designed to establish the perspectives of members of a school community about belonging. It was conducted in a primary school in urban Australia which has a reputation for developing inclusive practices and an ethos of belonging for its diverse homeland population and its refugee and asylum seeker population which comprised 40% of the school enrolment at the time of the investigation. The research indicated the importance of the teacher perspectives, values and beliefs and has implications for teachers of refugee and asylum seeker students everywhere. It also has implications for preservice teacher education and the importance of preparation to specifically support these cohorts of students and their communities in addition to being flexible and open to change.

Keywords: refugee, asylum seeker, belonging, pedagogies of care, principal, teachers.

1. INTRODUCTION

At the end of 2019, 79.5 million people were identified as being displaced. 26 million of these were refugees, over half of whom were under the age of 18 years UNHCR The UN Refugee Agency (2020). Of these displaced people, 85% are currently placed in developing countries who have few resources to support them. Of the six most wealthy countries in the world, (US, UK, France, China, Germany and Japan) only Germany has hosted a substantial number of these refugees, supporting 1.1 million people. In other wealthy countries and OECD countries, there has been significantly less resettlement. For those who are resettled in the wealthier and OEDC countries, engagement in mandatory education can be an opportunity for healing, integration and a better future or the context of additional trauma, 'othering' and exclusion (Sellars & Murphy, 2017). While much of the prejudice and bias may be instigated at a personal level, the neoliberalized education systems in these countries are typically not the ideal learning contexts for students with traumatic experiences of displacement, loss and grief (Frater-Mathieson, 2004). This discussion focusses on the perspectives held by teachers and leaders in such a school who had successfully mediated these five characteristics to provide a context of acceptance, care and belonging.

The five C characteristics of neoliberal education are summarised as *Competitiveness, Conformity, Conservatism, Convention and Commerce* (Sellars & Imig, 2020). *Competitiveness* is actualised in the types of 'one size fits all' standardized assessments in which many students with refugee and asylum seeker students do not have the language or other academic skills to compete effectively (Creagh, 2016). *Conformity* refers to the narrow, Eurocentric content and curricula which are determined as 'knowledge' worth knowing, irrespective of other epistemologies and ontologies that these student may bring as their 'capital' (Bourdieu, 1986). *Conservatism* is reflected in the pedagogical practices which are based on economies and efficiencies of a factory model of education espoused in 19th century schools, where the teacher imparts, manages and dictates the content to be learned (Kuhn, 2007). *Convention* keeps students in a chronological, age- based school allocation for the purposes of gathering data and onerous comparisons that act as tools of governmentality (Foucault, 1991), irrespective of the students' prior educational experiences (Brown, Miller, & Mitchell, 2006; Dooley, 2009). These interpolated characteristics work together to serve the solitary purpose of neoliberalized education, to produce adults who are workers and consumers. In this manner students are viewed as human capital trained to sustain the mechanisms of *Commerce* (Ball, 2016; Gary, 2016). In this way, these education systems serve to perpetuate social inequality. The students who are typically most severely impacted, irrespective of their potential, intellectual capacity and other positive qualities, are those from refugee and asylum seeker experiences. This writing discusses the perspectives of teachers and leaders from one urban primary school in Australia who 'pushed back' against the rigours of these five characteristics and developed a learning context that based on pedagogies of love, care and hope, drawing in the early pedagogical practices of Pestalozzi, Steiner and others in the early European tradition of acceptance, pedagogical love and optimism. Incorporated into these practices was an understanding and demonstration of the 'moral purpose' of education so highly regarded by Pestalozzi (Gravil, 1997; Laubach, 2011; Sootard, 1994) and Dewey (1910) amongst others.

2. LITERATURE REVIEW

The notion of pedagogical love is not always well understood in societies where 'love' is narrowly confined, as is the language itself, to the flowers and romantic varieties or the overly sexual inferences. In both these cases, the constructs are not congruent with the adjective 'pedagogical' and may cause much discomfort and dismay (Gidley, 2016). Pedagogical love is more adequately defined as the genuine, deep caring that is based on the needs of the students, and with the moral purpose of modelling, demonstrating and representing that care in all interactions, with peers, parents and students (Noddings, 2005, 2012). The current Covid- 19 pandemic and its resultant global impact may have played some part in the very gradual resurgence of interest in the notion of pedagogical love in academic literature, highlighting, as it has done, the importance of people over profit, the criticality of good citizenship practices and community relationships and the necessity of responsible public behaviours to safeguard others. Wilkinson and Kaukko (2020) discuss the imperative of principals and other school leaders using their positions to promote pedagogical love in relation to refugee education. Kurland (2018) also introduces the nation of leadership as care, indicating that teachers who work in caring environments where they are cared for by the principal, experience greater professional growth, are more disposed to pass the caring attitudes and action on to their students, where the impact is observed to be improved student success. Arar, Örücü, and Ak Küçükçayır (2019) discusses the care that a female principal in

Turkey extended to her Syrian refugee students, noting that her actions were not always understood by her male staff.

The definition of care is intimately connected to its context and culture. Much of the most recent academic work focussed on care in education has been concentrated on the context of early childhood education (see, for example, Delaune, 2017; Page, 2018). Other literature which recommends an increased focussed on care beyond the early childhood years of 0-8years, is offered by Hemerijck (2015) who discusses a finely nuanced version of neoliberalized education whose focus is still firmly on the economy and commercial value of the 'human capital' in schools, and which is critiqued by Delaune (2017) amongst others as perverting the critical purposes of education to support an exercise in biopower (Foucault, 1991). Fielding and Moss (2011) offer a model which challenges the foundational five C characteristics of neoliberalized education. This 'radical 'vision of schooling advocates for the development of schools fit for children and young people. They envision schools which meet the needs of the students, educate for wisdom and justice in democratic common schools which are resources not only for the students but for the communities in which they interact. They propose a future for education that is characterised by pedagogical love and care in creative contexts in which that common caring and mutual acceptance and understanding can thrive and build better societies. This restructured educational context echoes much of the vision for postformal education that is offered by Gidley (2016), whose paradigm comprises four major themes; conscious, compassionate spiritual development, mobile, life enhancing thinking, complexification of thinking and culture and linguistic and paradigmatic boundary crossing (Gidley, 2016 p. 148). Both the explore from Fielding and Moss and that from Gidley are founded on the tenets of acceptance and fairness, both of which are crucial to the successful integration of students with refugee and asylum seeker experiences.

Integration is inherently different to assimilation and to assume that students with refugee and asylum seeker experiences are better to assimilate into their new homelands than to integrate or acculturate is to assume that these populations do not bring with them any ontological knowledge or epistemological beliefs (Sellars, 2020). It also implies that they are prepared to dismiss their own cultural capital in favour of cultural mores and standards of their new homelands, which facilitates ease of adapting to, and integrating into new cultural contexts (Alitolpo-Niitama, 2004; Fruja Amthor & Roxas, 2016; Oikonomidoy, 2009, 2014; Roxas, 2008). Berry (2009) investigates the complexities in integration, indicating that many factors need to be considered, including the relevance of original language, culture and customs. An investigation of refugee youth, often considered to be a group with particular difficulties related to developmental trauma (De Bellis, 2010). Berry, Phinney, Sam, and Vedder (2006) in their investigation of refugee youth found that individuals who had successfully retained their homeland culture in addition to acculturating into the cultures of their new homelands had the demonstrated the highest levels of psychological and social adjustment and integration, despite their traumatic experiences. Trauma related emotions and behaviours are frequently observed to challenge teachers and school management (Burgoyne & Hull, 2007; Hue & Kennedy, 2013; Hyde, Carpenter, & Conway, 2011) as the neurological impacts can interfere with healthy brain growth and inhibit the development of the cognitive capacities of executive function (De Bellis, 2005). The resultant behaviours may be exhibited as inattentiveness, hypervigilance and illogical decisions and actions, all which need to understood by those who interact with them in schools.

3. CONTEXT

The school was located in a suburb of a large Australian city which had an almost exclusively white population, who dominated every aspect of life in the city, in addition to the educational systems which provided the schooling for the city's children. Previously a rundown area populated by many drug gangs and prostitutes, the suburb was slowly becoming more gentrified. In the past, the school had been bypassed by some members of the local community, indicating that the school culture was not one with which they wanted their children to engage. At the time of the appointment of a new principal, the school had approximately 80 students, which was below capacity for its size. These numbers were rapidly swelled by the intake of newly arrived students with refugee and asylum seeker back -grounds and experiences. At one stage the school population increased by 25% due to the intake of two groups of refugee and asylum seeker students whose families were traditionally opposed to each other and had frequently conflicted. The principal and his staff underwent training in trauma- informed strategies, in addition to learning how to protect themselves and constantly monitor for vicarious trauma. Over a period of time, the staff, working with their leadership team, developed considerable knowledge and expertise about sensitively and productively educating these cohorts of students.

4. METHODOLOGY

The principal and his staff were all invited to participate in an online survey, individual, recorded interview and/or a group or individual videoed interview. Ten teachers, the principal and his deputy, the office manager, two teaching assistants and the Indigenous Liaison officer participated in the study, which was a sequential case study, using the initial data from the semi structured recorded interviews and the survey data to guide the semi structured video interviews. These themes included strategies and perspectives of integration, belonging and radical acceptance, in addition to the overall vision and culture of the school. Included in these participants were the staff who had been engaged as part of strategic recruitment strategy implemented by the principal. One of these teachers was a Kenyan teacher of colour, who was unique, not only in the suburb, but in the city itself, both teaching assistants were ex- refugees, one Syrian and one Congolese. Their responses to the semi structed interviews of this sequential single site study are used to demonstrate their perceptions and practices. The individual interviews and surveys were conducted as the first stage and the themes identified by manual and then electronic coding were introduced as the question to commence and continue the discussions that were recorded on the video. These comprised both individual and group discussions around the themes.

5. THE DATA

The data provided evidence of many examples of how the principal and teachers of this focus school responded to these students with acts of pedagogical love and a clear understanding that things would have to change in the process. The notion of flexibility was built into all aspects of school life. As the deputy principal commented;

..flexibility is important. Being inflexible means that the children's needs, educational needs, social needs are not going to be met. Then you have to be flexible, you have to change. It would be foolish, professionally unsounded not to. It's the people business, we've got to make sure that the variety of needs that people bring are met. It's easy if you've got a will to change a system, it's much harder to change a cultural practice or change someone's mind even.

One of the aspects of schooling that needed to change was the understanding and consideration of students and their families with complex trauma. Understanding that the traumatic experiences of the students would impact on their capacities to learn in regular classrooms, in addition to the language communication difficulties and the nature of their previous school experiences (if any). the staff, under the leadership of their insightful principal, devised other educational experiences. The initial school experiences of these students was, as one teacher expressed, 'both educational and therapeutic.'. An experienced art teacher on the staff gently led the students through an arts-based program for the initial months. The purpose was to allow the students both time and context to express what they were feeling and simultaneously learn the names of the colours and other contextually related vocabulary in English as conversational skills. The program leader stated;

And so we started developing programs based around arts making, about communicating through arts, every child can do that, no matter what culture they've come from. That is a fantastic tactile way of becoming familiar with an environment of learning about concentration and success, experimenting with ideas and images. And so for new arrivals, we have a great deal of visual arts hours, 2D, 3D, painting, drawing into the program. And even something like I said, the first oral language sessions I would do with kids was I'd get out coloured pencils and we learn the different colours in ink some would say them in French, Farsi, Arabic, and whatever. Then we use that like a pyramid model of learning colours, how many colours, counting colours. So, it was a way of scaffolding, simple language into more complex outcomes. (Teacher Participant 4).

This was designed with the support of the principal who explains in his own words why this was an experience that was he felt was important for these students and their integration into the school.

It became the vessel of communication in a valuing of the students experiences that brought with them to school, that point became an artwork, being an object of transmission, the transmission of understandings, transmission of values and attitudes, a transmission of what was important in their lives, the transmission of where they're at, and how they are feeling. It also became that transition from the oral languages, the backgrounds of oracy that students had in their experiences, and they could transfer that through the visual system of art making, and have that also relabelled and recast within English and allowed points of attachment in terms of language and moving between languages, but evaluation of valuing of who they were and what they know, and the fact that they actually brought a lot. There have been amazing artworks that were prepared in that context and as a result of that, you then started the shows.

As indicated by the principal, the students with refugee and asylum seeker backgrounds joined the other students from the school in a public exhibition of their work at a commercial art gallery where priced and sold their own work. The revenue they raised was kept by the respective artists.

Acceptance of difference and diversity was actively promoted in everyday activities and interactions in the classrooms. The students enjoyed it, almost expected it from newcomers and appeared very open in their curiosity. The teachers also valued the cultural diversity as an advantage for their own classroom pedagogies and content. One teacher explained;

And the kids aren't afraid to ask the other children what language they speak, what country do you come from, whereas if they hadn't had that experience before being in a classroom with diverse range of children, it might be a bit nervous or embarrassed, or whatever to ask questions like that. But they don't feel that here, they just are friends, and everyone is honest and transparent. And as teachers, we try and cooperate there, obviously incorporate their cultural diversity into the classroom, and it's an asset to the classroom. And it brings a lot of resources into the classroom itself, having a range of kids from other cultures and other countries. (Teacher Participant 6).

The strategic recruitment plan by the principal allowed him to bring a shared vision of caring and compassionate perspectives to his entire staff. All the teacher participants in the survey, when responding to the question that asked, 'Who makes these students and families feel welcome in the school?' indicated that they all do – it was a shared professional and personal responsibility that they modelled, demonstrated and represented their ethic of care in all their interactions with each other, with the students, with the families and with the wider community. This deep consideration for these students and all the others in the school was explained by one of the teachers;

It underpins everything we do. So well-being, and I would say, inclusion fits into wellbeing, because we want all of our students to feel like they belong. And that underpins everything we do. That's our number one priority for our kids and their families. Because, simply, they will find learning more difficult in an environment where they don't feel like they belong. So inclusion is the key to well –being, and therefore the key to the underpinning of academic success of the students. (Teacher Participant 4).

The modelling of care extended outside the classrooms. The principal recalled a situation where six sisters of refugee backgrounds were enrolled in the school. The teachers had noticed that only the eldest ever appeared to have any lunch in their schoolbag. As the students ate lunch in their class groups supervised by their respective teachers, it was obvious that none of the sisters ate anything, not even the sister who had the lunch container. On investigation, it became apparent that the eldest had the lunch in the container for all her sisters and herself and that tradition demanded she serve the sisters, starting with the youngest before she served herself. This was impossible as part of the current school routine, so the sisters had to eat during the playtime at the lunch break. Consequently, the routine was changed, and all the students then sat all together for lunch with the teachers supervising a given area. In that way, the sisters were not distinguished from the others and had time after eating to interact with their friends and peer groups. Conventions around food have historically been the catalyst for exclusion in some schools. But, as one teacher of the very young students pointed out, it created curiosity in her class that led to a simple acceptance of difference;

I'm just thinking about the simplest practical things, you know, I get one kid bringing the same cooked food all the time. And it takes him a long time to eat his food. And so the other kids in class ask "oh, why doesn't his mum just pack a sandwich for him?" And there's all these things about, you know, behind the background on why he's bringing whatever he's bringing to school. And while his mum expects him to finish that food by the time he gets home. She doesn't want to see a full lunch box; she wants to see an empty lunch box. And so, just sitting the kids down and saying, that's how he's been brought up culturally. And his

family has never ever thought of making a sandwich for lunch because that's not how it's been forever. (Teacher Participant 8)

Then the children ask a few questions, and you explain it (Principal)

And now all the other kids expect he's going to have his rice and, beans while the other kids are eating their sandwich. There no big deal, kids just don't notice that after a while. (Teacher Participant 8)

This focus was extended into the interactions that teachers had with parents of the students of the school. Due to the many degrees of cultural difference and expectations, the staff and the principal sought ways to decrease the perceived social distances and to engage without excessive formality in an attempt to demonstrate to the parents that they were engaging with the parents in the same caring, friendly ways in which they interacted with the children. The principal was always professionally dressed, but avoided wearing a suit and tie, preferring to present less formally in shirt with smart trousers, and if needed, a jacket. He joked that even the students knew something official was happening when he arrived at school in a shirt and a tie. As a strategy to extend the foundational tenets of pedagogical love to the parents and care givers, he effectively broke down the perceived barriers of authority figures and those who seek to access them. This conversation between the principal, the deputy principal and the Kenyan teacher explains how this became another strategy to including the parents as part of the school community;

A lot of the times, we'll get parents coming in formal suits, because that's how they think to approach a principal. And they sit down with the principal and find out it's a very informal kind of setting. You know, they don't have to be very formal when they come to see the principal because most of them say "Oh, when we go to doctors, we have to dress formal. We have to be in the suits and ties" (Teacher Participant 8)

So, it was right down to children. It was almost down to like babies wearing suits! (Principal)

When they take the children to get a round of vaccination, everyone's dressed up in their beautiful suits and ties, going to see a doctor was an important person, coming to the school was an important place to be. Speaking to a teacher and principal was speaking to an important community council. But I think we found there was that sort of slight intimidation coming from their cultural background, to which Miss X is a wonderful bridge between the two of having a foot in both cultures, I guess. (Deputy Principal)

The ways in which these teachers and school leaders perceived their professional responsibilities illustrated that wellbeing, inclusion and acknowledgement of the students' diversity were priorities and that these were the way to academic success. The last word comes from the principal, whose understanding of the pedagogies of love and care and innovative strategies that captured small but important details, reflected the work of the original pedagogues and their understanding of the power of love, care and change in the academic context. He stated;

But you don't change just by telling people change! People change the world, and it's really experience before explicit. It's the same thing that happens in that sense that's so important in classrooms. I can talk about the supermarket, but if you've never been into the supermarket, you actually don't have a picture of it. So that's one of the things that I think teachers here

do really well is that they understand that and they give children experiences. They unpack those experiences afterwards when they've got something to label, where they've got something to categorize, where they've got something to apply it to.

This data suggests that further research will be important to establish the range of perspectives that leaders and teachers of refugee and asylum seeker students hold in relation to the importance of pedagogies of care, acceptance, tolerance and working with the mandatory, systemic regulations and restrictions to provide the most caring and welcoming school environments for these cohorts of vulnerable students. It could also serve to inform of the creative strategies and activities that support conversation language acquisition and linguistic confidence.

6. CONCLUSION

This chapter illustrated the perceptions from teachers regarding the inclusion and integration of students with refugee and asylum seeker experiences. They demonstrated an explicit commitment to making lives as secure and emotionally safe as possible by their strategies and understandings of the ways in which regular routines and procedures in schools can and must change in response to the changing landscape of student clientele. They showed considerable sensitivity in their trauma related practices and focussed on the critical elements of belonging, wellbeing, inclusion and respect for other cultural ways of doing and making meaning as the means by which they could authentically support students' academic success. The ways in which they operationalized their flexible thinking and strategies to maximize success for all students is an important consideration for the preparation of preservice teachers, as is the awareness and accommodation of trauma and its possible impact. They not only embraced change, they considered it their professional responsibility and regarded it an opportunity to learn and grow. This study indicates the potential and power in pedagogical love in the everchanging pedagogical world of education, negotiating the dominant culture of neoliberal influences.

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Chapter #24

SCHOOL PRINCIPAL LEADERSHIP IN REMOTE SOUTH AFRICA: A LEADERSHIP AND MANAGEMENT CHALLENGE

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ABSTRACT
To understand the circumstances under which principals in remote areas exercise their leadership and management, an investigation was conducted in the Northern Cape province, South Africa. This province is characterised by small towns with few residents. The infrastructure is not up to par, and in some cases, the socio-economic conditions are extremely poor. Unemployment is a big problem in the villages. The uniqueness of this study lies in the fact that after 1994, with the abolition of apartheid, the farmers withdrew their children from the schools and no longer supported the schools as before. As a result, the principals experienced many more challenges. The study followed a qualitative, phenomenological design from the interpretivist paradigm. The sample consisted of ten principals. Semi-structured interviews were conducted with the principals. The inductive data analysis process was used. The required ethical clearance was obtained from the Research Ethics Committee of the North-West University and the Department of Education of the province. The results reveal that principals in remote areas, in the absence of technology, infrastructure, and support bases, have to use their skills creatively, and they need the support of the community, teachers, school management, and governing body.

Keywords: challenges, communities, educational context, frustration, remote schools, school leadership.

1. INTRODUCTION AND BACKGROUND

> Rural [remote] is a composition of human settlements with agriculture production as the main economic activity. Geographically, rural areas are isolated from urban areas. They are remote places found in the countryside, in forests and or mountains. Typically, rural people lack access to socio-economic amenities such as quality education, good health services, transport, marketing facilities, as well as electricity among others. Rural people often live a nomadic life; they are pastoralist and fishermen. (Chakaninka, Sichula, Sumbwa, & Nduna, 2012, p. 8)

South Africa consists of nine provinces. The project reported on in this chapter was carried out in the Northern Cape province. The Northern Cape is known as a vast, dry, and arid region. The villages are usually far apart, and access to the villages is difficult. In many cases, the only road to town is an impassable gravel road. Given the geographical location and demographic composition of the remote schools visited in this study, the background of the schools should be briefly discussed first. Before 1994 (the apartheid era), all the schools consisted of white principals, teachers, and learners. After 1994, the schools were opened to

all population groups. However, Afrikaans remained as the medium of instruction. Most of the schools are located in farming communities. With the transition to a democratic system, the white people withdrew their children from the schools and sent them to larger schools. Predominantly, all these schools then accommodated brown children (Chrisholm, 2012). Du Plessis (2014) postulates that rural contexts create additional and unique challenges for school leaders, as rural schools experience unique challenges and have characteristics that are significantly different from those in urban areas. In addition, Wildy and Clarke (2009) argue that it is important that principals have prior knowledge of the social, economic, political, and geographical aspects in the school environment, as well as how communities function and how principals can work together effectively and enter into partnerships. They further focus on the challenges faced by principals in remote communities, where they have to be sensitive be in terms of contextual and diverse circumstances (Wildy & Clarke, 2009). Principal leadership in smaller towns or school communities located far from large cities and towns, however, is often overlooked (Hardwick-Franco, 2019).

In theory, it sounds as if the role of the principals has been laid out clearly and they should only comply with these guidelines. However, in practice, this is not always possible, especially when it comes to school leadership in remote areas. In South Africa, many schools are located in remote areas. In this study, only one of the nine provinces in South Africa was used as a sample to learn more about the leadership and management of principals in remote schools.

2. LITERATURE REVIEW

2.1. Principalship in remote schools and challenges

The school is closely related to life within a community. For this reason, good relations with the community are of cardinal importance (Micah, Anthony, & Isaac, 2017). According to Akpakwu (2012), the school-community relationship can be described as the degree of understanding and goodwill between the school and the community. It therefore means that a school-community relationship is one of mutual understanding that the school, people, materials, and other resources needed should be obtained in order to create a favourable school environment for the effective and efficient achievement of educational goals. This relationship will help stakeholders to better understand the challenges of the school and then offer assistance, which can bring efficiency to the education system. This argument is especially true in remote schools where the community and the school are much more dependent on each other. In South Africa, where diversity is common, acceptance of each other and cooperation are of the utmost importance for the education of the children.

The contextual differences encountered by principals of either urban or remote schools determine their leadership and management style and practices. Principals of large schools have more flexibility and the capacity to delegate and share management tasks, but this is a luxury not afforded to their colleagues at remote schools. In other words, the realities of life in small, remote communities create unconventional circumstances for school principals (Miller, 2015). Taking the history of South African education into account, where many schools in remote areas were neglected after apartheid, the principals in these areas usually experience more problems than their peers in urban areas. In addition, South African school principals experience problems in reconciling political and social aspects with the traditional leadership found more in remote areas (Wright, 2001).

Many studies have been done on the challenges experienced by principals of remote schools (Chakaninka et al., 2012; Du Plessis, 2019; Howley, Rhodes, & Beall, 2009). A challenge that comes to the fore is the problem of the long distance between villages or small towns and larger towns. In some instances, towns are hundreds of kilometres apart, and the only way to access many towns is via dirt roads (Disbray, 2016; Van Jaarsveld, 2019). Du Plessis (2014) argues that the lack of a culture of learning, issues of self-management, and insufficient educational resiliency have become increasingly important as challenges facing the education system in South Africa. In another study, Howley et al. (2009) refer to the negative consequences of the outmigration of families living in remote areas. In the past few years, South Africa has experienced severe drought, especially in the Northern Province, resulting in farmers leaving their farms and the number of inhabitants of the villages gradually decreasing. Because of the declining numbers of learners being enrolled in remote schools, these schools are receiving less funding and, with fewer resources, are struggling to function. As outmigration increases, so does poverty. For Preston, Jakubiec, and Kooymans (2013), the ability of prospective principals to understand and fit into the political and social context of the local community is essential. This argument is in line with Van Jaarsveld's (2019) study, where principals of remote schools in South Africa admitted that political interference influenced their leadership and management and that some communities did not accept them if they were appointed from other regions. Preston et al. (2013) continue their argument, stating that parents and community members tend to scrutinise the actions of the school principal and place exceedingly high expectations upon their school leader. When a principal from other parts of South Africa is appointed in the community, the community is more likely to monitor the principal's actions. Moreover, the privacy of school principals is not respected because, as the population in remote communities is small, school principals are considered to be "public property" (Preston et al., 2013, p. 3).

In remote areas, recruiting qualified teachers is difficult because teachers are not eager to move to rural areas (Durksen & Klassen, 2018). This results in teachers who are not trained in subjects such as mathematics and science being appointed, simply to have a teacher on staff. Taking into account the fact that South Africa is one of the worst-performing countries in the Trends in International Mathematics and Science Study, having untrained (mathematics and science) teachers on staff is a big problem for school principals in remote areas. Furthermore, principals face the challenge of integrating digital technology into their curriculum, in addition to the lack of trained teachers and financial shortcomings complicating their task (Kotok & Kryst, 2016). This puts a lot of pressure on principals, who "find themselves caught between the competing demands of the school, the local community and an 'upward accountability' environment, where accountability to the systems they are located within holds the dominant voice" (Guenther & Osborne, 2018, p. 59).

Other challenges experienced by the principals of remote schools are being accepted by the community, power challenges with the school management team and the school governing body, a high workload, and a lack of infrastructure (Van Jaarsveld, 2019). Against this background, an empirical investigation was conducted in the Northern Cape province of South Africa.

3. METHODOLOGY

The overall purpose of the investigation was to gain insight into the challenges facing principals regarding their leadership and management practices. A qualitative approach was appropriate to investigate the leadership of principals in remote schools. The central phenomenon of the daily leadership practices of and challenges experienced by principals was explored. The world of the principal was interpreted through the qualitative approach (cf. Creswell, 2014). The research was embedded in an interpretive, qualitative design, and

the goal was to discover and understand the phenomenon in question, namely the challenges facing principals regarding their leadership and management (cf. Maree, 2016). A phenomenological design was applicable to this study. Maree (2016) explains that interpretivism is strongly influenced by phenomenology, an approach that underpins the importance of considering the interpretations of human beings and their perceptions of their situation as our starting point in understanding social phenomena. The goal of this study was to gain a holistic perspective of principals' leadership and management within the environment in which they interact with people on a daily basis (cf. Leedy & Ormrod, 2013).

4. STUDY POPULATION

The sample in this study consisted of ten school principals, male and female. Some of the principals have been a school principal for many years, and new principals have either been sent to these schools by the Department of Basic Education or they have moved there because of their spouses. The schools were chosen according to the number of residents in the town. Schools in towns with less than 4600 residents in the Northern Cape were identified using Statistics South Africa (2019). The Northern Cape is known for its widespread towns or villages that are located far from major cities. A further feature of the Northern Cape is the large number of gravel roads connecting towns, impeding access to the towns and the provision and maintenance of infrastructure. All of the schools selected were located in communities with very poor socio-economic conditions and an unemployment rate of up to 65%.

> The National Norms and Standards for School Funding (NNSSF) (Republic of South Africa, 2012:3) aimed to improve equity in the funding of education by ranking each school into one of five quintiles. This ranking is based on the unemployment rate and literacy rate of the community in which the school is located, with a Quintile 1 ranking indicating a poor/impoverished school, and a Quintile 5 ranking indicating a wealthy/affluent school. The reasoning behind this notion is that schools serving poor communities (Quintiles 1 and 2) should receive more state funding than schools serving wealthier communities. It was expected that this decision should result in an equal and fair distribution of funds between impoverished and affluent schools (Van Dyk & White, 2019, p. 2)

In the table below, an overview of the sample is given.

Table 1.
Biographical information.

Principal	Gender	Experience	Classification	Quintile	Learners	Teachers
A	Female	1 year	Black	2	414	15
B	Male	2 years	White	4	486	16
C	Female	3 years	White	2	265	8
D	Male	26 years	White	2	200	8
E	Female	5 years	Brown	4	120	8
F	Male	16 years	Brown	2	192	8
G	Female	17 years	Brown	5	250	11
H	Female	5 years	Brown	4	130	6
I	Male	29 years	White	2	550	21
J	Male	6 years	Brown	2	408	13

5. DATA COLLECTION, ANALYSIS AND ETHICAL ASPECTS

Individual, semi-structured interviews were conducted with the principals in their offices at the schools to gain insight into their leadership. The interviews lasted about two hours and were done with the help of audio recorders. During the interviews, it was striking how many times the interviews were interrupted due to staff members wanting information from the school principal. Open-ended questions were posed to give the principals the opportunity to expand on them to provide information that could provide better insight into their daily work and challenges. For the data analysis, an inductive data analysis process was followed. The data were coded and then subdivided into themes, sub-themes, and categories. During this process, patterns, associations, similarities, contradictions, and concepts that emerged from the data were identified. The Research Ethics Committee of the North-West University approved the project, and permission to conduct the research was obtained from the Northern Cape Department of Basic Education. The principals of the ten schools also consented to the research, and the required documentation regarding disclaimer, confidentiality, anonymity, and voluntariness was provided.

6. DISCUSSION AND FINDINGS

Although principals of schools in remote areas experience many challenges, in this study, a few specific aspects are discussed.

6.1. After Apartheid (1994)

After the abolition of apartheid in 1994, demographic change took place in most of the communities in the Northern Cape. All the schools consist of mostly brown learners, and in some schools, there is only one or two black or white learners. Of the original principals (before 1994), only two have remained. In some cases, the schools have merged with others and the principals have resigned or moved to other schools. The other eight principals are new principals appointed at the schools. The two principals who remained after 1994 have been accepted unreservedly by the community. The principals experience no problems with discipline, burglary, or poor academic performance. Two of the principals (Principals A and B), one black (placed there by the Department of Basic Education) and one white, have been appointed from "outside". According to these two principals, they are not accepted by the community. When asked how this affected their position as head, one remarked as follows:

> *I am a Xhosa-speaking female from outside Northern Cape. The community is not ready for me; they don't want a Xhosa*. (Principal A)

The community blames this principal for other teachers not having been appointed and her personally for not appointing Afrikaans teachers. This has resulted in strained relationships among the teachers and between her and the teachers.

For Principal B, his appointment is problematic, as he is a white principal appointed in a school where the learners are brown and black.

> *The cultural differences are just too great. There is a lot of racism between the black and brown learners. It does not stop at the school but is also experienced among the staff and community. As a result, my decisions are often ignored or overruled by teachers, the governing body and parents.*

It is clear that although apartheid was abolished decades ago, some people in the Northern Cape are not ready for acceptance and cooperation.

6.2. Lack of understanding

The biggest frustration the school principals in the Northern Cape experience involves misunderstanding with regard to the Department of Basic Education. The principals regularly receive memoranda indicating that teachers, and sometimes the school principal as well, have to attend meetings.

> *What the Department of Basic Education does not understand is that my school is located 920 kilometres from the town where the meeting will be held. I only heard on Thursday morning that I had to go there. I am a woman and have to face the road alone*. (Principal G)

The complicate matters further, when, for example, cluster meetings are to be attended by all or even only half of the teachers, the school must be closed.

All South African public ordinary schools are categorised into five groups, called "quintiles", mainly for purposes of the allocation of financial resources. Quintile 1 is the "poorest" quintile, while quintile 5 is the "least poor". Over time, the drought in the Northern Cape has forced farmers to leave their farms or continue farming on a smaller scale. The financial aid provided to these schools has dwindled. One principal made clear her frustration with the Department by pointing out that she had been struggling for 18 years to change her school, which was classified as a quintile 5 school, to a quintile 1 school.

> *For the past 18 years, the treasurer has visited my school often, and he agrees that the school must be downgraded to a quintile 1 school, but the Department of Basic Education does nothing about it. I get the minimum school fees from the parents, and yet I still have to provide in all the needs of the children*. (Principal G)

She has to supplement the finances of the school by means of fundraisers, but because the community has become so impoverished, she is fighting a losing battle.

6.3. Undermining of power

Political parties and cultural differences play a huge role in the remote areas of the Northern Cape. The chairperson and members of the school governing body serve as assistants to the principal, especially with regard to fundraising projects.

> *My school's governing body is on paper only. One or two members try something while the chairman is absent. He and I constantly argue because he does nothing. As soon as I try to take the initiative, the chairman reprimands me*. (Principal E)

Often the chairperson of the governing body wants to run the school, which complicates the task of the principal.

> *Once the chairpersons get in a position of power, they do not know how to handle it.* (Principal B)

When decisions are made by the principals, they are opposed by the school governing body. The representatives in the governing body often form a front against the principal with regard to decision making.

> *The former school principal is now the governing body chairman. Now the members of the governing body are too scared to vote against him. The result is that he still wants to run the school his way. This leads to constant conflict and contributes to the fact that the relationship between me and the governing body is not positive*. (Principal E)

For the principals, their main concern is their teachers and learners, but for the governing bodies, it is about how much power they can exercise in the school. In some cases, principals are presented with an ultimatum regarding the appointment of teachers or fundraising ideas. When the principals want to do the "right thing" and do not heed these "instructions", the governing body distances itself from the principals or blatantly opposes the principals.

6.4. Survival

Although the problems facing the principals in the remote areas of the Northern Cape are not new, two principals touched on the crux of the main problem in remote schools:

> *The school system in South Africa has become too easy. The school plan must be adapted so that children who end up at university must be intellectually correct. The school system does not suit the community, and for this reason, we as school principals struggle.* (Principal E)

In yet another remark, one of the school principals reacted as follows:

> *The environment in which the school is located must be looked at, and then the curriculum must be expanded or adapted. Diversify. Tea is grown in this area. Let the learners learn how to do it. Use the residences to attract learners. Economic needs must be addressed. Our schools need to address the economic needs. Then the learners will be motivated and we as principals will not experience as many problems. Why is the government not listening?* (Principal F)

The principals in the Northern Cape are no ordinary principals; they are exceptional principals who are not overcome by problems, challenges, or anything else that stands in their way.

7. CONCLUSION

This investigation looked at the leadership and management of principals in remote schools in the Northern Cape. Although principals in remote areas in the Northern Cape experience the same challenges as those in other schools in remote areas globally, a distinction can still be made between the challenges before and after the abolition of apartheid. As Du Plessis (2014) points out, remote areas present unique challenges. The abolition of apartheid has contributed to principals having to make adjustments to meet the additional challenges of diversity. In addition, the fact that there is no insight into the circumstances of schools in remote areas is problematic for the principals. Bayar (2016) argues that there is no doubt that the roles of school principals in today's world of education have enlarged considerably. Therefore, the demands on school principals have changed and the expectations with regard to school principals are dramatically more than before. However, strong leadership overcomes this obstacle. To overcome challenges, school principals must closely intertwine and, with relevancy, assess curriculum and instruction, that is, theory, strategy, and implementation. In this process, cohesion will improve. However, further research will need to be done into dealing with diversity, especially in remote areas where communities follow strong historical values and principles. Principals need to be trained and prepared to deal with diversity, power awareness, and the lack of insight into the role of the principal.

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Section 4
Organizational Issues

Chapter #25

THE EVOLUTION OF CHINA'S PRIVATE EDUCATION POLICY: HISTORICAL REVIEW AND PATH ANALYSIS

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ABSTRACT
Based on the policy texts of private education since the founding of the People's Republic of China and from the perspective of historical institutionalism, this article draws the following three conclusions. First, being shaped by changing policies from the state, the development process of China's private education could be divided into four main stages: the stage of being eliminated (1949~1978), recovery and preliminary development (1978~1992), thriving continually (1992~2016), and under classified management as well as standardized development (from 2016). Second, the evolution of private education policy has experienced punctuated equilibrium and gradual transformation as two main modes, which is determined by critical junctures and path dependence. Third, government power and market mechanism play the role of dynamic mechanism of institutional change. To conclude, the article suggests that the state should further clarify the respective responsibilities of the government and the market mechanism to realize the positive mutual interaction.

Keywords: private education, education policies, historical institutionalism, government power, market mechanism.

1. INTRODUCTION: CHINA'S PRIVATE EDUCATION AT A CRITICAL STAGE

Private education plays an important role in the development of Chinese education. According to the bulletin about the statistics of national education development in 2017 which is available on the official website of the Ministry of Education of China, there were 177.6 thousand private schools and higher education institutions in the field of education at primary, secondary and tertiary levels, accounting for 34.57% of the total number of schools and institutions in the country; the number of students registered in private schools reached 51.2047 million, accounting for 19% of the total number of students (MOE, 2018). Private education has made contributions in providing diversified and personalized education forms, improving the quality of education of the whole society, and safeguarding citizens' right to learn and receive education.

However, the changes in state policies cast a shadow over the prospect of the development of private education. In 2016, China's supreme legislature revised *The Private Education Promotion Law*, which was first promulgated and implemented in 2002. According to the revised law, although the state promised continuing encouragement on private education and the responsibilities of the government were reiterated to create good conditions to promote the development of private education, more restrictions were imposed on private education in the meantime. Referring to the legal text, the government should carry out "classified supervision" on different kinds of private schools, and "private schools of the compulsory education stage are forbidden to operate for profit making"

(NPC Standing Committee, 2016). Besides, the central government is about to make more detailed and strict regulations on the operation of private schools and educational institutions, such as running collectivization, merger and acquisition, being listed and so on. The strict management implemented by the state added to the worries of the whole society (especially the capital market) about the prospect of private education, and it seems that private education in China is faced with major challenges.

In fact, the expectation and anxiety of the private education industries to the new law is a miniature of the historical fact that development of private education was deeply influenced by the national policies since the founding of the People's Republic of China. The socialist (nominally communist) nature of the state regime has led to the current situation that the public education dominates the whole education system in China, which challenges the legitimation of private education in an obscure way. The survival and development of private education in China largely depends on the state policies, and it is the state that decides whether to tolerate its existence or encourage its development; at the same time, the market economy also has a profound impact on the development of private education. This paper will review the private education policies in various stages since the founding of the People's Republic of China, and explore the internal logic of the evolution of private education policies.

2. ANALYTICAL PERSPECTIVE: HISTORICAL INSTITUTIONALISM

Historical institutionalism is an important branch of New Institutionalism. Historical institutionalism developed in response to the group theories of politics and structural-functionalism prominent in political science during the 1960s and 1970s (Hall & Taylor, 1996). On the basis of absorbing and drawing lessons from the mainstream theories of structural-functionalism, conflict theory and New Marxism, the theory of historical institutionalism holds that the conflict of competing for scarce resources among different interest groups is the core of politics; the political and economic structure of society makes different interest groups occupy different positions in the conflict of interest with each other, and some groups' interests are satisfied while the others' are deprived. In this process, the state is regarded as not a neutral "intermediary" between competing interest groups but a complicated "institution" that can build group conflict. Historical institutionalism emphasizes the essence of the asymmetries of power in the process of institutional development, and the role of path dependence in the process of institutional continuation and change: under the established socio-political and economic structure, institutions give some people more power, and accordingly, those who obtain more power will further maintain the institution. Through the understanding of path dependence, historical institutionalists put forward the theory of institutional change. According to historical institutionalism, the process of institutional change is generally divided into the normal periods of institutional existence and the critical junctures of institutional fracture. In the normal period, institutional change follows the pattern of path dependence, and there is a certain balance between institution and social circumstances as well as within institution. However, in the period of institutional fracture, the fierce change of institution will be possible, (He, 2002) which is named "punctuated equilibrium" (Krasner, 1984) by some researchers. Historical institutionalism not only presents a suitable theoretical lens for understanding institutions and institutional change, but also offers an explanation for the sources of change (Huang, 2017).

Historical institutionalism's theories on institution change provides a good perspective for us to analyze the evolution of private education policy since the founding of the people's Republic of China. The development process of private education presents several distinct stages, and the continuation of policies in each stage and the transformation of policies in different stages are subject to the existing political and economic structure of the state. The theory of historical institutionalism helps us to explore the essential power of determining institutional change.

3. HISTORICAL REVIEW: THE EVOLUTION OF PRIVATE EDUCATION POLICY IN CHINA

Through analyzing the policy texts and legal documents related to private education in different historical periods since the founding of the people's Republic of China, combined with different researchers' division of the development stages of private education in recent years, this article divides the development of private education into three main stages: the stage of being eliminated (1949~1978), recovery and preliminary development (1978~1992), rapid development (1992~2016), and classified management as well as standardized development (from 2016).

3.1. Private education being eliminated (1949~1978)

During the period of the Republic of China (1912~1949), the national government allowed private schools to be set up, and there were various kinds of schools at all levels run by non-governmental organizations, citizen individuals and foreigners. In 1949, the People's Republic of China was founded, and the new government took over public schools run by old government at all levels in the country, and organized the reopening of schools; from 1950 to 1951, the state changed all the colleges and middle schools run by foreigners into public schools to "resume the exercise of educational sovereignty"; in 1952, the Ministry of Education carried out the adjustment of colleges and departments throughout the country, and changed all the private universities into public ones; finally, the Ministry of Education ordered all private primary and secondary schools in the country to be taken over by the government and changed to public schools (MOE, 1999a). Since then, all kinds of schools at all levels had been transformed into socialist public schools, and public education became the only one legal form of education in China. Private education was declared no longer legal, banned, and eliminated.

During that period, the central government had also briefly introduced the policy of allowing the existence of private education (MOE, 1999b), but the implementation effect of the policy is extremely limited. Private education could not survive because of its conflict with "pure socialist ideology".

3.2. The recovery and preliminary development (1978~1992)

After ten years of chaos and social unrest during the Cultural Revolution from 1966 to 1976, the state began to reform its political and socio-economic system in 1978. On April of this year, CCP leaders emphasized to improve the quality of education, improve the teaching level of science and culture, and better serve the socialist construction, which defined the basic direction for the development of education in the period (MOE, 1999c). At the beginning of this stage, the state adopted an acquiescent attitude towards private education, which made private education began to recover slowly. According to statistics, from 1978 to 1982, eight private higher education institutions emerged (Yang, 2002), and

private primary and secondary schools as well as private vocational schools began to emerge. In 1982, the supreme legislature passed *the Constitution of the People's Republic of China*, which is well known as *the 1982 Constitution*. It clearly stipulated that "the state encourages collective economic organizations, state enterprises and institutions and other non-governmental sectors to run various educational undertakings in accordance with the provisions of the law" (NPC, 1982). From the perspective of the fundamental law of the state, it was clear that private education was allowed to run educational undertakings as "non-governmental sectors". In 1985, the Party passed *The Decision of The CPC Central Committee on The Reform of Education System* to encourage the development of private vocational education (CPC Central Committee, 1985). In 1987, the former State Education Commission issued *Several Interim Provisions on the Running of Schools by Non-governmental Sectors*. It clearly stated that "running schools by non-governmental sectors is an integral part of China's education and a supplement to public schools", "governments at all levels and education administrative departments shall encourage and support non-governmental sectors to run various education undertakings, safeguard the legitimate rights and interests of schools, and protect the running of schools.", "try to help solve the difficulties in running schools, and reward those who have made outstanding achievements in running schools" (State Education Commission, 1987). The state policy once again clarified the legitimacy of private education, and even encouraged private education to grow and expand. Private education seized this historical opportunity period and gradually grew in scale, and achieved its comprehensive recovery and preliminary development.

3.3. Private education thrived continually (1992~2016)

In 1992, the central government decided to establish a market-based economy scheme in order to replace the original state-controlled one in an all-round way, and therefore, education policy of the state should be altered to fit in the new scheme. In 1993, the state issued *The Outline of China's Education Reform and Development*, pointing out the basic tasks of education reform under the requirements of establishing a "socialist" market-based economy scheme. The outline points out that social organizations and individual citizens should be encouraged to run schools, and the government should encourage citizens in running schools as well as raising educational funds. Specifically, in order to raise funds and promote the quality of education, the outline stipulated that the state encouraged and advocated factories, enterprises, institutions, organizations and individuals to donate money to help students and raise funds for running schools; resident in Hong Kong, Macao and Taiwan, overseas Chinese as well as individual foreigners were welcomed to provide financial support and donations to education (CPC Central Committee & State Council, 1993). In order to raise funds for education, the state took the initiative to make use of both domestic private capital and foreign capital, and began to attach importance to the role of the market economy in the allocation of educational resources, which promoted the development of private education. In 1997, the State Council promulgated *The Regulations on Running Schools by Non-governmental Sectors*. The regulations not only clearly defined the rights, obligations and legal responsibilities of the schools run by non-governmental sectors, but also clearly defined the responsibilities of government to guarantee and support the running of schools by non-governmental sectors, which acted as a "milestone" in the development of private education (MOE, 1999d).

Private education ushered in greater historical opportunities in the 21st century. In the year of 2002, the supreme legislature promulgated *The Private Education Promotion Law*, which marked the establishment of the legal system of China's private education (MOE,

2003). Private education started on the right track of running schools and teaching students according to law. With the comprehensive protection of national policies and laws for the legitimate rights and interests, private education has started to thrive continually for more than ten years. According to the statistics available on the website of the Ministry of Education, at the end of 2002, the number of private schools at all levels and types in China was 61200, with a total number of 11.1597 million students (MOE, 2004); by the end of 2015, the number of private schools increased to 155200, with a total number of 43.0191 million students (MOE, 2015). Private education has grown into an important force that cannot be ignored by the state, government and society.

3.4. Under classified management and standardized development (from 2016)

After decades of development, private education has been fully expanded and developed in both quantity and quality. However, problems began to arise with the rapid development of private education. For example, private primary and secondary schools in some cities use the advantage of capital to unreasonably concentrate local high-quality teachers and students, which damages educational equity; high tuition fees of private schools increase the financial burden of students and families. These problems exposed the absence of the state's supervision and management in the field of private education, and the state began to adjust the policies. In 2016, China's supreme legislature revised The Private Education Promotion Law, which made it clear that discriminative supervision and classified management should be applied to profit-making and non-profit private educational institutions (NPC Standing Committee, 2016). Although the state claimed to support the development of private education as before, stricter regulation measures than ever, such as profit-making schools' being not allowed to exist in compulsory education stages, have still added to the concerns. In the future, the development of private education still remains to be observed.

4. PATH ANALYSIS: FROM A HISTORICAL INSTITUTIONALISM PERSPECTIVE

Based on the theories of historical institutionalism, this study believes that as a kind of institutional change, the evolution of private education policy has gone through punctuated equilibrium and gradual transformation as two main modes, which is determined by critical juncture and path dependence; government power and market mechanism plays the role of dynamic mechanism of institutional change.

4.1. Punctuated equilibrium led by government power: 1949~1978

Since the founding of People's Republic of China in 1949, the new "proletarian regime" controlled over all industries in the country in a very short period of time, and rebuilt the whole national machinery according to the socialist ideology. In order to maintain ruling stability, the government managed to take full control of education system and transformed it into one that obeys the orders of the proletariat. Private education was defined as "bureaucratic capitalism, imperialism and feudalism" and eliminated by the state. During this period, the evolution of private education policy showed the characteristics of punctuated equilibrium, and the establishment of new regime was the first "critical juncture" in the process of private education policy change: under the strong direct interference of government power, the original education system was completely ruined.

4.2. Gradual transformation led by government power: 1978~1992

The second critical juncture in the process of private education policy evolution is that the state began to reform its political and socio-economic system in 1978. However, the institution had formed strong inertia and path dependence, and it was difficult to change it rapidly in a short time. Therefore, from 1978 to 1992, the state adopted a gradual reform policy, gradually reforming the old system and introducing new systems. In the field of education, the state had gradually reduced various restrictions on private education. From the initial acquiescence to its existence, it had gradually developed into a positive norm to guide its development and actively protect its rights and interests. At this stage, the evolution of private education policy showed obvious characteristics of gradual transformation, and the leading force to promote the system transformation was the government power.

4.3. Gradual transformation led by both government power and market mechanism: from 1992

In 1992, the state proposed to establish a market economy system, which became the third critical juncture in the process of private education policy evolution. A series of policies and legal texts encouraging the development of private education played a role in promoting private capital investment and running schools. Private education has achieved the fullest development with the help of market mechanism. In the process of advancing education reform and promoting the development of private education, the government had gradually transferred part of its power to the market mechanism. With the establishment and improvement of market mechanism, the market had gradually mastered the initiative to promote the development of private education. Under the market economy, the first batch of empowered private education subject had become the group of vested interests. They held the right of discourse that cannot be ignored in the later process of private education policy making, which had a profound impact on the trend of policy. However, the rapid development of private education has also brought some negative effects, including the expansion of education gap and the rising of family expenditure on education.

In response, the government revised relevant laws and policies in order to strengthen the supervision of private education from 2016, and the revision of The Private Education Promotion Law acts as the fourth critical juncture in the process of private education policy evolution. This declared the determination of the state to further clarify the respective responsibilities of the government and the market in promoting the development of private education, and the ambition to enhance the macroscopic guide. Since the path dependence had been formed for more than 20 years, and the influence of private education operators on policy making could not be ignored, the state adopted a gentle and gradual approach to implementing classified management and intensifying supervision.

5. CONCLUSION AND DISCUSSION: BUILD POSITIVE INTERACTION BETWEEN GOVERNMENT POWER AND MARKET MECHANISM

After a brief review on the evolution of China's private education policy as well as an inquiry from the perspective of historical institutionalism, it could be concluded from this article that the development of private education is deeply influenced by state policies, and government power as well as market mechanism affect private education directly during the whole process. Besides, it is obvious that the absence of either government responsibility or market economy will have a negative impact on the development of private education: the

ban on market economy in 1949 directly led to the demise of private education, while measures taken by the state to establish a market-based economy scheme from 1978 on contributed to the recovery and primary development of private education; although a lack of supervision from the state facilitated the booming of private education until 2016, its adverse impact ultimately led to the advent of classified management and much stricter controls from the government. As a result, the article suggests that the state should further clarify the respective responsibilities of the government and the market mechanism to realize the positive interaction between them. The government should not only encourage the development of private education, but also take necessary supervision to prevent it from excessive profit seeking and damaging the education equity.

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Chapter #26

PROFESSIONAL SUPPORT MEASURES FOR NOVICE TEACHERS IN LATVIA

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ABSTRACT
Retention of novice teachers in education system is a serious problem in Latvia. Mentoring, in-service training and emotional support are crucial for novice teachers to remain and continue working in school. The aim of this research is to explore opinions of Latvian teachers about professional support measures that are available and needed to be introduced for novice teachers. The research results were obtained during an on-line survey (N=1258) conducted by the Latvian Trade Union of Education and Science Employees in 2018, and document analysis. The questionnaire comprised the statements on methodological, financial, material and technological support which were assessed by using 5-point symmetric Likert scale. The results witness about regional disparities mainly between the capital city Riga and other regions. There are statistically significant ($p<0.05$) differences in opinions of the teachers representing different regions of the country. The respondents agree that there is a lack of well-structured and uniform support system for novice teachers at national level. In general, the teachers are positive about availability of an emotional support and in-service training. The most critical opinions are about material and financial support that novice teachers can access. The authors conclude that policy makers should focus on national teachers' support guidelines.

Keywords: mentoring, novice teachers, professional support.

1. INTRODUCTION

First years of teaching are the most determining in a teacher's professional life influencing, for example, job satisfaction and the length of career. Understanding and definitions of a novice teacher are ambiguous. In most of the studies, a novice teacher is considered as the one with less than three years of teaching experience (e.g. Huberman, 1993; Petty, Good, & Putman, 2016), whereas, for example, in TALIS 2018 survey a novice teacher is defined as an educator with less than 5 years of in-service experience (Organisation for Economic Co-operation and Development, 2019). As it has been revealed in previous studies (e.g. Buchanan et al., 2013; Ingersoll, Merrill, & May, 2014), many novice teachers leave teaching soon after their first in-service experience. Retention of educators, especially novice teachers, in education system is a serious problem in Latvia as well as in many other countries. According to Eisenschmidt, beginning teachers in school need support in professional, social and personal dimensions (Eisenschmidt, 2006). It means that teachers need to acquire their roles, develop self-confidence, professional skills and knowledge as well as become members of a school community through integration into a school and profession in general. Colleagues can help to understand internal norms, values, and structure of a school, and more experienced teachers normally contribute to developing professional identity of novice teachers and their teaching approaches. Most of

the novice teachers face so called 'reality shock' (Blakley, 2006), because their expectations are often confronted by reality when working in the real classroom changes their initial conceptions and own philosophy. Successful induction programmes such as mentoring and nationally or locally organized support systems are offered to strengthen coping ability of novice teachers. In different countries newly qualified teachers are offered different support (European Commission/EACEA/ Eurydice, 2015; Parker, 2010); lack of support is often reported as one of the factors influencing teacher's professional future. In almost two-thirds of the countries in Europe beginning teachers have access to structured induction phases of many different organizational patterns, however, Latvia is among those countries where the induction phase for fully qualified teachers does not exist (European Commission/EACEA/Eurydice, 2015) even though mentoring in Latvia is available. Novice teachers who had a mentor have better organizational skills and they cope with their responsibilities more easily (Fletcher & Mullen, 2012; Hauksdottir, Steingrimsdottir, & Svanbjornsdottir, 2018) what in turn leads to greater possibility of teacher retention in a school (Feiman-Namser, 2001; Kelley, 2004). According to TALIS 2018 survey, school leaders in all OECD countries believe that mentoring is important for both teachers' work and students' performance; nevertheless, only 22% of novice teachers in OECD countries and 16% in Latvia have had a mentoring (Organisation for Economic Co-operation and Development, 2019). The most widespread types of professional development in OECD countries are courses and seminars. In Latvia, 95% of teachers have participated in that kind of activities, and 61% of the teachers have been involved in coaching activities (Organisation for Economic Co-operation and Development, 2019). Still, the teachers have pointed out that in certain areas an offer of professional development opportunities should be improved and expanded, for example, there is a demand for additional knowledge and skills in communication and information technologies, teaching in multicultural and multi-language environment, and teaching children with special needs. From all above mentioned, Latvian teachers consider improved skills in information technologies as the most required. In general, according to the OECD data teachers in Latvia are satisfied with their professional development and 89% of them admit its practical usefulness.

The aim of this research is to explore opinions of Latvian teachers about professional support measures that are both available and needed to be introduced for novice teachers.

2. LITERATURE REVIEW AND THE PRESENT STUDY

Professional support measures such as mentoring, in-service training or emotional support are crucial for novice teachers to remain and continue working in school. As Garipov, Nasibullov, Yarullin, and Nasibullova (2019) emphasize, teachers today "need to be mobile, flexible, able to adapt to social changes, prepared for constant development and innovative challenges, capable of being achievement-oriented and demanding towards one's own reflective, intellectual, ICT and communication competencies" Garipov et al., 2019, 8). Support is of a multidimensional nature in the following areas: organizational socialization, classroom management, learning management, educational differentiation and personal and psychological aspects (Mukamurera, Lakhal, & Tardif, 2019). Paula and Grinfelde (2018) have revealed that novice teachers faced following challenges during their first years of in-service: establishing teacher's authority and self-positioning as a teacher, time management, problems with discipline in a classroom, lack of skills to develop curriculum and lesson plans, difficulties in communication with parents. Beginning teachers expected that their mentors would explain school traditions and internal rules, and advice on discipline in a classroom (Paula, & Grinfelde, 2018).

Hanusova et al. (2020) have analysed the reasons of drop-out intentions of novice teachers in the Czech Republic. Their main findings have focused on the key significance of the influence of school culture and climate, cooperation with colleagues and leadership. The authors concluded that teachers tend to stay in a well-functioning school with cooperative colleagues and good head teachers (Hanusova et al., 2020). The professional support from the colleagues and collegiality is crucial especially in the initial phases of a teaching career development (Bakieva, Such, & Alvarez, 2019). Importance of professional collaboration and collegiality is emphasized also in the study of Hauksdottir et al. (2018) who discovered that the school culture in upper secondary schools is not supportive compared to elementary schools due to little tradition for collaboration, and they believed that novice teachers need more robust and more organised support. Novice teachers in Iceland have referred to a heavy workload and a long workweek in their first year of in-service as well as difficulties to separate work from their personal lives; they needed both informal and formal support to improve their teaching skills and ability to cope with the reality of the classroom (e.g. students' use of technology, students' mental problems) (Hauksdottir et al., 2018). According to Mukamurera et al. (2019), novice teachers experience task diversity and heaviness, as well as differences between recognized workloads and actual teaching loads on a daily basis.

Antoniou, Efthymiou, Polychroni, and Kofa (2020) have researched relationship between occupational stress and self-efficacy among primary school teachers working in mainstream and special education schools in Greece. They concluded that the specific stress factors for teachers were favouritism of government and school administration, time pressure and pupils' character, pupils' improvement, resources and equipment, support from parents and society (Antoniou et al., 2020). Another study has focused on factors of job satisfaction among second-career teachers in their initial period at school; the authors concluded that availability of support was the most powerful predictor of high job satisfaction, and experience acquired before teaching career provided a repertoire of helpful strategies, thus improving ability to cope with stressful experiences (Bar-Tal, Chamo, Ram, Snapir, & Gilat, 2020). In their research, Bettini and Park (2017) have investigated novices' teaching experiences in high-poverty schools. They concluded that more research is needed to explore differences in working conditions in high- versus low-poverty schools, and their implications for teacher development and retention (Bettini & Park, 2017). Addressing four major themes (teacher characteristics and personal factors, teacher qualifications, work environments, and teachers' affective reactions to work), Billingsley (2004) has carried out a thematic analysis of studies focusing on factors that contribute to special education teacher attrition and retention.

Spencer, Harrop, Thomas, and Cain (2018) have examined the needs of early career teachers in England, and the extent to which these needs are met through professional development activities in a context in which local authority support has been largely removed from schools. They concluded that teachers needed emotional support and help with behaviour management, and reflective conversations about teaching; they also looked for ideas how to organize interesting classroom activities (Spencer et al., 2018). Informal conversations with colleagues responded to these needs, however, partially. Within-school continuous professional development and mentoring was acknowledged as useful. The authors have revealed that novice teachers found help from social media and the Internet (Spencer et al., 2018, p.33).

The literature review leads to conclusion that majority of the recent studies focus on mentoring and induction programmes as the main forms of support for novice teachers; however, other measures of professional support such as financial, material, technological,

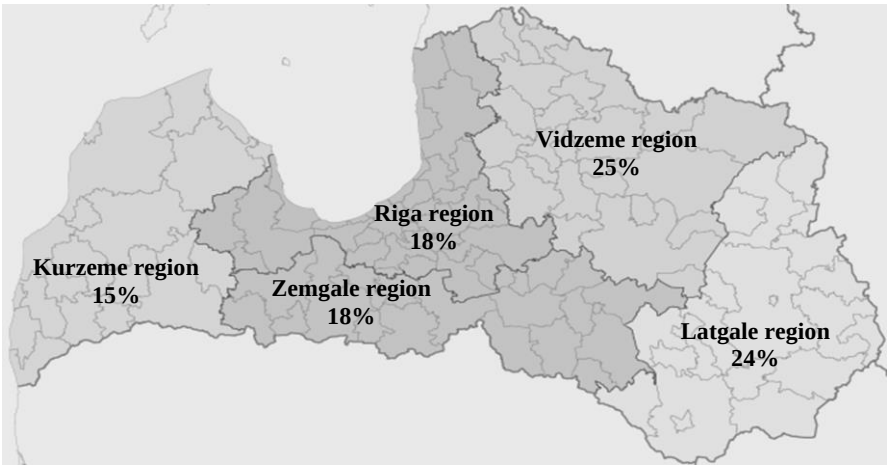
methodological, and societal are also important. In their study, Zhukova, Pipere, Ilisko, and Badjanova (2018) concluded that support for novice teachers in Latvia is systemic and fragmentary, and this is one the reasons why novice teachers leave their work within the first three years of teaching as they find demands too high and workload sometimes unmanageable (Zhukova et al., 2018). The novelty of this particular study is justified by the attempts to find an evidence on importance of multiple support measures.

3. RESEARCH METHODOLOGY

This paper focuses on support for novice teachers by presenting a part of the research results which were obtained during an on-line survey conducted by the Latvian Trade Union of Education and Science Employees (LIZDA) in November, 2018. The questionnaire comprising statements on methodological, financial, material, and technological measures of professional support was developed and posted on the webpage *visidati.lv.* Information about the survey was disseminated via LIZDA homepage, trade union's member organizations in schools, social media, and website *eklase.lv*. The respondents were offered to assess the statements by using symmetric 5-point Likert scale (strongly agree, slightly agree, neither agree nor disagree, slightly disagree, strongly disagree). The research was conducted according to the methodological and ethical principles of the online survey (Toepoel, 2015). The data were processed and presented solely in an aggregated way thus ensuring anonymity of the respondents. Standard deviation (SD) and mean (M) was calculated for the descriptive analysis of quantitative data by using statistical program SPSS (Statistical Package for Social Science v21). Independent samples t-test was calculated to analyse differences in opinions of the respondents representing different regions of Latvia.

The research sample was made of 1258 teachers representing all five statistical regions of Latvia (Figure 1).

Figure 1.
Research sample.



As the questionnaire was not specifically designed for the novice teachers, educators of different age groups and seniority were asked to participate in the survey. Also, the main focus of the survey was not problems of novice teachers. However, the questionnaire

comprised statements related to the needs and support of early career teachers and all teachers were asked to assess the situation either from the perspective of novice teacher, mentor, or colleague. More than half of the survey participants (68%) are LIZDA members. Most of the respondents (60%) represent rural municipalities, whereas 40% are from cities. Among the respondents, 94% are women and 6% are men. The respondents represent all levels of general education system in Latvia (preschool, elementary school, primary school, secondary school) and positions (e.g. teachers, school leaders); they are with different seniority and represent different age groups.

Additionally, a qualitative document analysis was conducted to understand what institutions are involved and what policy measures are undertaken to attract and support novice teachers in Latvia. Analysis was carried out from the perspective of a trade union and social dialogue as LIZDA is one of the most significant social partners in the process of education policy. Therefore, education policy documents and LIZDA initiatives were chosen for the analysis (International Summit...; LU Profesionalas ievirzes...; Visi LIZDA dokumenti; Valdibas ricibas plans...; Latvijas Brivo Arodbiedribu...; ES lidzfinansets projekts...) to investigate what steps have been made so far or what measures are intended in the future to improve retention of novice teachers as well as respond to their professional needs.

4. RESULTS

The survey results are outlined according to the statement groups related to methodological, financial, material, and technological measures of professional support. Generally speaking, the results show regional disparities mainly between the capital city Riga and other regions: there are statistically significant ($p<0.05$) differences in opinions of the teachers representing different regions of the country. For example, contrary to the comparison of all other regions, there are statistically significant differences ($p<0.05$) in teachers' opinions representing Riga and Latgale regions in assessment of importance of all support measures: methodological support (Riga M=2.24; Latgale M=1.97), financial support (Riga M=1.90; Latgale M=1.92), material and technological support (Riga M=2.11; Latgale M=2.05). Methodological support as very important was mostly emphasised by the teachers in Latgale (51%) and Kurzeme (47%) whereas material and technological support was mostly assessed as the most significant by the respondents in Latgale region (43%). This can be partially explained by different regional socio-economic situation, wealth of local municipalities, and other specifics such as number of pupils in the classroom, workload and age of teachers.

As already mentioned previously, mentoring and support of more experienced colleagues is crucial for novice teachers to remain in teaching profession after their first years in school. Regarding integrated *methodological support*, the survey respondents agreed that there is a lack of well-structured and uniform support system for novice teachers at national level. As research results reveal, mentoring is not provided in many schools. This was indicated by 26.2% of the respondents while 13.2% of the respondents were not even informed about availability of mentoring in their schools as they could not answer this question. 44% of the teachers admitted that mentoring is not a paid activity for those colleagues who support novice teachers and 51.7% pointed out that teaching and regular workload for mentors is not decreased due to mentoring responsibilities. That in turn does not motivate teachers of greater seniority to become mentors. Another challenge is providing a mentor of the same school subject what novice teacher delivers. 78.4% of the respondents agreed (strongly agreed or slightly agreed) that mentoring for novice teachers

is available in their schools during their first year of in-service. In general, the teachers were positive about availability of emotional support and in-service training in the school they worked. Opinions of the respondents on additional knowledge that novice teachers need are shown in the Table 1.

Table 1.
Statements in the questionnaire on additional knowledge that novice teachers need in starting their careers.

Additional knowledge/ support that novice teachers need	Strongly agree		Slightly agree		Neither agree nor disagree		Slightly disagree		Strongly disagree		No opinion	
	No	%	No	%	No	%	No	%	No	%	No	%
Mentoring on the basis of respective regulations in every school	545	43.3	413	32.8	126	10.0	43	3.4	18	1.4	113	9.0
Knowledge on rights and responsibilities of teachers, parents and children	632	50.2	401	31.9	101	8.0	24	1.9	12	1.0	88	7.0
Knowledge on better cooperation with colleagues in a school	485	38.6	453	36.0	170	13.5	45	3.6	17	1.4	88	7.0
Knowledge on establishing positive communication with pupils and their parents	576	45.8	460	36.6	106	8.4	26	2.1	15	1.2	75	6.0
Knowledge on how to prepare teaching materials effectively	591	47.0	430	34.2	116	9.2	24	1.9	19	1.5	78	6.2

The survey revealed more critical opinions about *material, technical* and *financial support* that novice teachers can access. The teachers were asked to assess the statements related to remuneration and impact of the lower salary rate on the motivation of young people to engage in teaching profession. Nearly all teachers agreed (90%) that the lowest rate of wages for teachers set out in the regulatory enactments does not increase the prestige of the profession (92% of Riga teachers supported this statement). They also believed that the salary rate of the teacher cannot be lower than the average salary in the country, multiplied by a factor of 1.2 (93% of Riga and 94% of Vidzeme respondents). Regarding this statement, opinions of teachers in Riga and Latgale regions differ significantly ($p<0.05$, Riga M=1.36, Latgale M=1.55), as well as those represented by the respondents from Riga and Zemgale regions ($p<0.05$, Riga M=1.36, Zemgale M=1.46). In comparison to the respondents from other regions, the teachers from Vidzeme region more frequently strongly agreed or slightly agreed (97%) that teacher remuneration does not motivate young people to choose a job in this profession. Zemgale teachers more often (81%) than teachers in the country on average (75%) agreed with the statement that when students with special needs are integrated in general education institutions, teachers are not paid for any additional duties. Regarding this statement, regions of Riga and Latgale have statistically significant differences ($p<0.05$, Riga M=1.36, Latgale M=1.64).

In Latgale, teachers more often (64%) than average in Latvia (58%) strongly agreed and slightly agreed that the costs of their professional development activities were covered by themselves during the period of the last three years. The regions of Riga and Latgale,

contrary to the comparison of all other regions, had statistically significant differences ($p<0.05$, Riga M=2.87, Latgale M=2.42) regarding this statement. Normally in Latvia costs of the seminars and professional development courses for teachers are covered by municipalities. If this is mostly done by teachers themselves, it indicates on limited possibilities of municipalities. In relation to the already available support measures, opinions of the respondents are presented in the Table 2.

Table 2.
Statements in the questionnaire on availability of support measures for novice teachers.

Availability of support measures at school / municipality level	Strongly agree		Slightly agree		Neither agree nor disagree		Slightly disagree		Strongly disagree		No opinion	
	No	%	No	%	No	%	No	%	No	%	No	%
Freely available methodological materials	236	18.8	363	28.9	236	18.8	208	16.5	145	11.5	70	5.6
Professional development courses and seminars	635	50.5	406	32.3	81	6.4	20	1.6	18	1.4	98	7.8
Emotional support provided by senior colleagues	431	34.3	508	40.4	144	11.4	47	3.7	27	2.1	101	8.0
Additional and paid working time for preparation teaching materials	57	4.5	62	4.9	166	13.2	132	10.5	486	38.6	355	28.2
Video training for getting started	34	2.7	70	5.6	163	13.0	119	9.5	503	40.0	369	29.3
Service apartments provided by local municipality	56	4.5	102	8.1	120	9.5	82	6.5	482	38.3	416	33.1
Transport compensation provided by local municipality	70	5.6	58	4.6	117	9.3	81	6.4	569	45.2	363	28.9

It is obvious that in most of the schools, particular material and financial support measures are rather poorly provided. Regarding provision of health insurance there are statistically significant differences between the regions of Riga and Latgale ($p<0.05$); in the region of Riga 75% of the respondents have received health insurance, while in Latgale there were only 21%, which is the least result in comparison to all other regions. Approximately 40-50% of teachers in all regions had free catering in school; there were no statistically important regional differences in this. More than half of the respondents believed that novice teachers should have lower work load at the beginning of their career (28.7% strongly agreed and 29.7% slightly agreed) in order to complete all responsibilities duly and professionally. In general, the survey results revealed that in the regions of Latgale and Riga teachers were more likely to assess all forms of professional support as important, so they felt the need for aid. There are no statistically significant differences in opinions of trade union members and other respondents.

Within the framework of the research, an analysis of documents was performed (Table 3) in order to find out what has been done in Latvia in the period from 2018 to September 2020 to support and attract novice teachers.

Table 3.
Support and attraction activities for novice teachers in Latvia 2018 – 2020.

Year	Organisation/ document	Support measures/ activities	Assessment
2018	Youth Council (YC) of the Free Trade Union Confederation of Latvia (LBAS)	YC of LABS was established in 1997 to protect and represent the common labour, economic and social rights and interests of young trade union members both in the workplace and in national and international institutions	The union represents the interests of young teachers
2018	School of young teachers and psychologists in University of Latvia	At the School of young teachers and psychologists, secondary school students additionally acquire knowledge and improve their skills in order to understand themselves better; they realize their interests and abilities, as well as suitability for their future profession	The university attracts secondary school students to choose the teaching profession
2018	LIZDA research	Evaluation of support measures for novice teachers	LIZDA analyses the available support measures for novice teachers
2019	Government Action Plan for the Implementation of the Declaration of the Intended Activities of the Cabinet of Ministers headed by A.K. Karins	It is declared that government will (1) raise the prestige of the teaching profession by strengthening the teacher mentoring, (2) continue to implement the teacher professional development strategy and provide support for the development of teachers' initial education	The government agreed on the tasks to be performed, which affect the attraction of novice teachers in Latvia
2019	Education International document	The World Teachers' Day theme in 2019/2020 was "Young Teachers: The Future of the Profession."	Attraction of novice teachers was actualized at the international level
2019	Minutes of the International Summit for Teaching Profession (in Finland)	Agreement between LIZDA and Ministry of Education and Science: to renew the teacher training model, to develop a support system for novice teachers, to improve the professional development of teachers, to involve trade unions in the planning and implementation of new education policy reforms	LIZDA has repeatedly emphasized the problem; however, support system for novice teachers has not been developed in Latvia
2019	LIZDA essay competition "I will be a teacher"	It aims to find out, summarize and disseminate the rationale of pedagogy students and pupils on why to choose a teaching profession that is attractive, exciting and interesting in the teaching profession	LIZDA analyses motivation of pedagogical students and pupils to choose the pedagogical profession

Year	Organisation/ document	Support measures/ activities	Assessment
2020	LIZDA research	By the end of 2020, LIZDA plans to conduct a study on the quality of professional life of novice teachers in Latvia	LIZDA will prepare proposals for a support system for young teachers
2020	EU co-financed project "Teacher" (implementers: University of Latvia, Daugavpils University, Liepaja University, initiative "Mission Possible"	The aim of the new teacher education project is to attract capable and motivated professionals from various fields to the work of a teacher, providing the necessary education and practical training (100 selected candidates will be given the opportunity to become a teacher in one year and continue their professional development Latvian schools)	The government is interested in retrain in industry professionals for pedagogical work by providing state-funded studies, scholarships and supervision

Before 2018, when LIZDA conducted a study on the evaluation of teacher support measures including a block of questions related to the support for novice teachers was included, the only youth support and attraction measures were provided by the Youth Council of the Free Trade Union Confederation of Latvia and the School of Young Teachers and Psychologists organized by the University of Latvia. Later, in 2019, the national government, inspired by LIZDA, agreed upon activities which will have future impact on attraction of novice teachers in Latvian schools:

1) increasing the prestige of the teaching profession;
2) strengthening the mentoring institutions for novice teachers;
3) improvement of professional development strategies;
4) support for the development of initial teacher education.

It must be concluded that raising the prestige of the profession is one of the most difficult tasks. At present, the motivation to become a teacher in Latvia is decreasing, the number of vacancies is increasing every year, but the salary for full-time work is decreasing in comparison with the other Baltic States and EU averages. Mentors are appointed for novice teachers; however, there is no motivation system for mentors to be interested in performing this additional job. Opportunities for professional development for new teachers are also limited, as first of all, vocational training for the introduction of competence-based curricula, as well as the improvement of digital skills is financed. It is usually used more acutely by experienced educators, as young teachers have recently received vocational training. In order to overcome the consequences that have arisen as a result of the increase in the number of teacher vacancies, the government co-financed the project "Teaching Staff", trying to attract professionals in the field to retrain for teaching. However, the principle of equal opportunities is violated, because teachers in the field pay for their studies themselves and do not receive a scholarship. Experience shows that a small proportion of professionals from other fields involved in Mission Possible remain in schools for a long time.

Education International announced 2019/2020 a year of young teachers. Its leading idea was "Young Teachers: The Future of the Profession." LIZDA, referring to it, organized an essay competition "I will be a teacher" with the aim to find out, summarize and disseminate the rationale of pedagogy students and pupils why to choose a teaching profession.

5. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Current research has involved teachers of different seniority and age groups representing all levels of general education system in Latvia; however, the authors believe that more specifically opinions of novice teachers should be investigated. Measurements of factors influencing the quality of professional life of young teachers in Latvia could serve as research-based arguments for the development of measures for the support system for novice teachers and for convincing the government of the need to implement them.

It must be concluded that so far, the Ministry of Education and Science, in cooperation with LIZDA, has not been able to develop a support system for novice teachers, which would serve as a basis for attracting and retaining new teachers in schools. In order to find out which areas of support are the most needed for young teachers, LIZDA has launched a study on the quality of professional life of novice teachers in Latvia. This research will be completed by the end of 2020.

6. DISCUSSION

In comparison to the other studies reviewed in the paper, the results of the LIZDA research reveal some similar challenges what novice teachers face in Latvia: lack or limited availability of mentoring (Spencer et al., 2018; Paula, & Grinfelde, 2018; Zhukova et al., 2018), difficulties in communication, problems with discipline in a classroom, need for emotional and psychological support (Mukamurera et al., 2019; Spencer et al., 2018), cooperation with colleagues (Bakieva et al., 2019), establishing teacher's authority and self-positioning as a teacher (Paula, & Grinfelde, 2018; Hauksdottir et al., 2018), unexpected workload on a daily basis (Paula, & Grinfelde, 2018; Mukamurera et al., 2019), stress (Antoniou et al., 2020; Bar-Tal et al., 2020). Apart from the professional support what novice teacher receive from the schools and their colleagues, societal and parental help and understanding is expected (Antoniou et al., 2020). As well as in Billingsley (2004) research, also LIZDA study confirms that special education teachers need greater support including financial remuneration. Most of the research call for well organized, structured and comprehensive support system.

7. CONCLUSIONS

The authors conclude that different professional support measures are available for novice teachers in Latvia, however, there is no support system in place to address which functions and support measures should be implemented at national, municipal and school level. The TALIS 2018 survey indicated following the most common priorities for policy intervention reported by teachers: 1) reducing class sizes; 2) improving teacher salaries; 3) offering high-quality professional development for teachers, and 4) reducing teachers' administration load (Organisation for Economic Co-operation and Development, 2019). Considering these priorities, Latvian policy makers also should focus on implementation teachers' support guidelines at national level. This would allow schools to ensure the most appropriate environment for novice teachers so that they would like to continue their careers in teaching profession. Even though mentoring is available, still many teachers lack this opportunity. Also, teachers of greater seniority may lack appropriate support and motivation to become mentors as often mentoring is not a paid activity and is not included

in teacher workload. Material and financial support measures such as transport compensation, increased remuneration, adequate professional development seminars would increase retention of novice teachers into education system.

The largest trade union in the education sector LIZDA is currently actively involved in supporting novice teachers, but the tasks set by the government, however, are more relevant for various levels and institutions: the state and governmental institutions, pedagogical program implementers and regional universities, municipalities as school founders and schools themselves.

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KEY TERMS & DEFINITIONS

Novice teacher (also beginning teacher, early career teacher): a teacher with less than three (in other sources less than five) years of teaching experience.

Mentoring: process in which a skilled or more experienced educator teaches and counsels a less skilled or less experienced teacher (e.g. novice teacher) to promote his or her professional personal development.

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Chapter #27

INTERNATIONAL SHORT STUDENTS MOBILITY AND TRANSPARENCY: A DUTCH – RUSSIAN PERSPECTIVE

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ABSTRACT
This paper investigates the importance of transparency of internationalization and various obstacles and barriers that influence international short student mobility within the European Higher Education Area (EHEA) in particular in the Netherlands and in Russia. Having in mind that due to privacy regulations and availability of data regarding international short student mobility, this article is using a framework based on literature review. The authors analyze patterns in international short student mobility, both between countries and over time, not only by using various literature analyses but as well as interviews and panel discussions at HAN University of Applied Sciences, the Netherlands and Plekhanov Russian University of Economics, Russia, to give this research an qualitative dimension and underline how internationalization and what various factors are relevant to international short student mobility This article presents an important contribution to this growing field of literature by doing a comparative analysis about the factors which positively improve the international short students mobility. The three folded impact of this paper is obvious for the stakeholders involved: students, institutions and policy makers are responsible for the smooth cooperation and coordination for a better international mobility.

Keywords: European higher education area (EHEA), international short students mobility, international higher education., internationalization of higher education.

1. INTRODUCTION

Even though transparency is thought of as one of the benefits of European Higher Education Area (EHEA), it has evolved into an essential component of the European Union's strategy for bringing higher education frameworks up to date; students, employers and policy maker must have a greater degree of transparency in order for them to better fill out their roles and achieve their objectives. Higher education management also greatly gains from transparency, since it supplies important data in the process of coming up with new strategies and making decisions. The key for the legitimacy, competitiveness and funding for the higher education institutions and their subunits is represented by the unfailing information regarding the benefits provided to their funders, students and society overall. The transparency of higher education institutions has an important role in the quality of accountability and decision-making process. Consequently, transparency of the benefits provided by higher education institutions should be an essential pillar for the governance framework. Due to the increasing variety of these benefits, students have to face an important challenge to decide what field of study to choose and where to study. Moreover, governments are interested that the research services and quality education that

are important to the communities, local business and labor market to be offered by the higher education institutions that are in their jurisdiction.

All the stakeholders that are interested in the higher education are expecting transparency. The demand for transparency in higher education is growing from the side of the general public, public authorities and of course from the side of students. Tools that are helpful for a broader use of information and for a better understanding of the performances and services provided by the higher education institutions are needed. A core objective of the rethinking governance in higher education is the improvement of the transparency regarding the activities and outcomes provided by the higher education institutions.

In the article Transparency in Higher Education: The Emergence of a New Perspective on Higher Education Governance, the authors critically discuss some transparency tools such as accreditation, rankings and performance contracts according to a larger context of higher education policy-making and governance. These transparency tools are analyzed from the perspective of how they are modified in order to ensure the growing demand for transparency in higher education (Jongbloed, Vossensteyn, van Vught, & Westerheijden, 2018). According to Schwaninger, Neuhofer, and Kittel (2017) higher education institutions have their own capacity to lead into a collective environment and they act into a multi-centric network. Students and other stakeholders must be protected and supported by the government against rent-seeking behavior and different similar perverse effects. Information asymmetry between higher education providers and students, government and other stakeholders is acknowledged and intended to be rectified by the orientation in the networked governance paradigm and by encouraging transparency. One of the core characteristics of networked management is given by the sharing information by using ICT tools like ranking websites. Stakeholders can behave more effectively and efficiently in the network based on the trust that increased with the information shared. In order to increase the public value of higher education in the following years it is essential to improve the transparency tools since transparency is one of the fundamental elements of the dynamic in the networked management of higher education systems. What is the scope of higher education policies to attract international students if they are not transparent? What is the scope of specific international mobility policies to attract international students if they are not transparent? What is the scope of higher education institutions to attract international students if they are not transparent? Consequently, even if accessing the data is quite impossible due to the privacy issues, students' perspective is decisive for transparency.

2. INTERNATIONALIZATION AND INTERNATIONAL SHORT STUDENT MOBILITY

In order to gain a better understanding of the value of internationalization and to increase the interest in mobility a great tool can be internationalization at home. The demands related to the number and accessibility of outgoing mobility programs should never be reduced by the internationalization at home tools. There are still many barriers that remain mostly unresolved despite the fact that the need for equitable access to mobility has been known for a long time now. The courses taught in English or in different foreign languages and the mobility of professors and lecturers represent the foundation of the concept of internationalization at home. However, the degree of the use of this concept varies around the world.

The number of international students coming from outside of Europe and the European Union has increased and this situation will be a challenge especially regarding visas for the European higher education institutions. According to ICEF (2018), India and China are those two countries that account for about 40% of the students that are part of the outgoing mobility between the years of 2012 and 2015. Moreover, these two countries have almost half of the tertiary-education-aged population at the global level.

More focus should be paid to modernize, updating and equalizing visa policies in European countries, moreover now considering the imminent Brexit. This focus should be centered to those students who are facing higher costs and most difficulties when applying for visas in European countries, namely non-European international students. One of the major troubles for some non-European international students is represented by the length of student visas. These non-European international students must re-apply for visas every year in order to avoid the risk of deportation before completing a full degree as an international student and this situation is a well-known barrier.

Even if the participation of international students enriches the education, it should be emphasized that in situations of unclear future prospects internationalization cannot flourish. All the European HEIs should consider international students as an opportunity and not as potential cash-cows. In order to support this idea, the needs of students should be seen as highly significant in international mobility. Internationalization should be a core topic in Europe in order to reach set goals. In this context, internationalization and mobility in Europe should be a priority where students must be an essential part of internationalization strategies that require special attention. International students must be integrated in the local student body. Moreover, very often internationalization is not encouraged due to the numerous obstacles that international students have to face during the mobility. Longstanding efforts in the internationalization area may be compromised as a consequence of the unresolved long-term problems and negative experiences that students may have during the mobility. In order to ensure sufficient opportunities to work for students that choose mobility in a country, visa periods should stand during the entire period of stay in a country, consequently, the governments should consider students as a crucial stakeholder when visa regulations are created and updated at national and international level.

3. INTERNATIONAL STUDENT MOBILITY OBSTACLES AND BARRIERS

In the different phases of the decision process, different obstacles may deter students from studying abroad. Financial and familial obstacles are of especially high relevance with regard to the initial decision to go abroad for study purposes. Students who are already planning to study abroad are more concerned about practical matters: integrating a stay abroad into their study program, getting relevant information, securing a place in a mobility program, and ensuring their results achieved abroad will be recognized.

Table 1 shows an overview of what students perceive to be obstacles preventing them from studying abroad. All the studies were based on quantitative analyses using survey data. The obstacles were split into eight dimensions based on what was most commonly assess in the literature. If not all of the studies are listed by each indicator it means that either it was not measured, it was not found to be significant, or the authors indicated that it was not important in their results.

Financial cost refers simply the financial costs that students would incur if they would decide to study abroad. The social cost refers more specifically to leaving behind friends and family and the anxiety that is involved in forming new networks. Lack of information relates to students indicating that they are not sufficiently informed to feel comfortable in deciding to study abroad. Lack of foreign language skills concerns student's fear that their language proficiency is not good enough for staying abroad for a longer period of time. Institutional problems are related to obstacles concerning the higher education institutions such as the transfer of credits or the recognition of foreign degrees. Uncertainty about benefits concerns students that indicate that they are unsure about whether studying abroad is beneficial for their career or personal development. Academic performance is related to student's grades or their doubts about their academic performance. Finally, lack of motivation is a general concept where students simply indicated that they did not feel motivated to study abroad without being more specific.

Table 1.
Indicators mentioned as important.

Indicators mentioned as important	**Literature review**
Financial cost	Beerkens et al (2015)
	Bryła and Ciabiada (2014)
	Doyle et al (2010)
	Hauschildt (2016)
	Kmiotek-Meier et al (2019)
	Lörz, Net and Quast (2016)
	Netz (2015)
	Souto-Otero et al (2013)
Social cost	Beerkens et al (2015)
	Bryła and Ciabiada (2014)
	Doyle et al (2010)
	Hauschildt (2016)
	Lörz, Net and Quast (2016)
	Netz (2015)
	Souto-Otero et al (2013)
Lack of information	Beerkens et al (2015)
	Bryła and Ciabiada (2014)
	Doyle et al (2010)
	Hauschildt (2016)
	Kmiotek-Meier et al (2019)
	Souto-Otero et al (2013)
Lack of foreign language skills	Beerkens et al (2015)
	Hauschildt (2016)
	Kmiotek-Meier et al (2019)
	Lörz, Net and Quast (2016)
	Netz (2015)
	Souto-Otero et al (2013)

Institutional Problems	Beerkens et al (2015)
	Doyle et al (2010)
	Hauschildt (2016)
	Kmiotek-Meier et al (2019)
	Souto-Otero et al (2013)
Uncertainty about benefits	Beerkens et al (2015)
	Lörz, Net and Quast (2016)
	Netz (2015)
	Souto-Otero et al (2013)
Academic performance	Doyle et al (2010)
	Lörz, Net and Quast (2016)
	Netz (2015)
Lack of Motivation	Beerkens et al (2015)
	Bryla and Ciabiada (2014)
	Hauschildt (2016)

From table 1 it can be seen that financial cost is the most often cited obstacle. Moving abroad is costly and while grants are available, many students see them as insufficient. Especially the ERASMUS grant is considered by some to be too low to appropriately cover the costs (Souto-Otero, Huisman, Beerkens, De Wit, & Vujić, 2013). The second most cited obstacle is the social cost which is not too surprising since moving abroad means leaving behind family, friends and partners. Lack of information is more surprising since it would be expected that this is relatively easily remedied by students themselves. Like lack of information, lack of foreign language skills was mentioned by six out of eight studies. Institutional problems come in sixth place showing that students apparently are unsure about the ability of higher education institutions to coordinate and communicate. Uncertainty about the potential benefits was only reported by half of the studies, and academic performance and lack of motivation only by three studies. Some studies also looked at difference between countries (e.g. Netz, 2015; Beerkens, Souto-Otero, de Wit, & Huisman, 2015) but found these differences to not be very substantial indicating that obstacles and barriers are largely similar across different contexts.

These findings can be interpreted in line with the conceptualization by Beech (2015). She argues that the decision to move abroad is not simply due to financial resources, many international students come from a background in which studying abroad is normalized and accepted as a natural step in one's career. Coming from such a culture could lower the social cost and increase the perceived benefits of spending some time studying abroad. This would therefore mean that studying abroad is not just a question of resources but also of attitude and culture.

4. A DUTCH – RUSSIAN PERSPECTIVE

In Russia a totally new set of obstacles to international mobility was introduced in 2020. First it affected only students travelling from China (14 days quarantine upon arrival) but very soon travel restrictions became all-encompassing. Many countries closed their national borders for months. Even after some of them took decisions to open borders on bilateral basis still anti-coronavirus measures significantly jeopardized international mobility: COVID-19 free medical certificate, on-arrival medical check, 14 days quarantine,

post-arrival medical check, increased medical insurance requirements, not to mention all kind of social interaction restrictions. Based on the interviews held at the International Office of Plekhanov Russian University of Economics in Russia, the representatives told us that even with official permission from the Government still many universities took decision not to advise students to use mobility options in spring and fall semester of 2020. For study year 2020-2021 many universities had to arrange distance learning for their foreign students due to their inability to attend classes in person.

In a sense "Pandemic obstacles" have significantly affected desire and ability of international students to move around the world. At the same time, it boosted so called "virtual mobility" options and urged universities to extend their "online degree" offers.

According to the International Office interviews, the ERASMUS grant is considered to be too low to appropriately cover the costs as this particularly affected students from Russia and other former Soviet republics due to exchange rates of the national currencies against euro who dropped by 50% in last 5-6 years. While universities try to support international mobility (mostly outgoing but sometimes also incoming) by increasing the number and size of mobility grants, still the compound speed of inflation and exchange rate is higher than speed of grow of mobility grants. New approach to overcome this obstacle introduced by leading Russian universities is to seek for endowment funding as well as for corporate sponsorship for student and staff mobility.

Another important issue is either explicit or implicit visa limitations due to economic (and sometimes political) sanctions imposed by European countries against China, Russia, Belarus, Turkey and partly Iran in recent years. At the initial stage restrictive actions mostly affected the intensity of staff mobility and significantly dropped-down the level of research cooperation. Later the negative impact on student mobility (exchange programs, double degree programs, summer schools, etc.) also became evident. Based on the data available and the interviews hold at Plekhanov Russian University of Economics in Russia, on average, number of incoming European students in Russian universities dropped down by 15-25% and number of outgoing students to European partners of Russian universities dropped down by almost 30% in 2018-2019 (before coronavirus travel restrictions). At the same time, number of students from China, Kazakhstan and other Central Asian countries studying in leading Russian universities increased by 60-85% which shapes new pattern of "regional" mobility (Plekhanov Russian University of Economics: Strategy Program 2016–2020).

There are a number of obstacles that international students face when wanting to study in the Netherlands which can potentially deter them moving to this country. According to Nuffic, the Dutch organization for internationalization in education, there are several obstacles which might deter students from studying in the Netherlands (Becker & Kolster, 2012). The most important of these which are still relevant are: higher tuition fees, limited opportunities for work, and shortage of accommodation.

First of all, annual tuition fees for Dutch students and students from the EEA, Suriname, and Switzerland are the same for each institution; for the academic year 2019-2020 this was set at € 2,087 (Study in Holland, 2020). However, for non-EEA students tuition fees can range in between € 6,000 and € 15,000 for bachelor programs and in between € 8,000 and € 20,000 for master programs. While certainly not as expensive as some European countries, these are nevertheless relatively high compared to other European countries. This was also confirmed by the interviews hold at HAN University of Applied Sciences, the Netherlands as well from the panel discussions with the Exchange students.

A second barrier is that non-EU students are only allowed to work for a maximum of 16 hours per week next to their studies, except for the months of June, July, and August where full-time work is permitted (Inspectorate SZW, 2020). Many of the Exchange students at the HAN mentioned this as a burning issue as their financial situation is quite precarious. They mentioned in the open panel discussions, their willingness to work but due to the work permit restrictions, language, visa and bureaucratic matters, work possibilities are limited or even impossible. Furthermore, non-EEA students will have to receive a work permit from their employer although this is free of charge. This restriction is tied with the student visa that students have to attain, if they want to work more than 16 hours they will have to get a separate visa or be self-employed.

The third obstacle that international students can face is finding appropriate housing. Unlike many other countries, Dutch higher education institutions almost never provide housing meaning students have to resort to the housing market. Unfortunately, many international students experience problems with finding housing (LSVB, 2019). This is due to several reasons such as that international students often have limited knowledge of housing rules and regulations. This can also make them vulnerable to predatory and sometimes even illegal activities by landlords. Moreover, many dwellings are unwilling to rent out houses to international students and being selected for a house can be difficult if you have to it from abroad.

These three obstacles can deter students from choosing the Netherlands as a destination country, especially when it comes to finances. The higher tuition fees combined with a cap on the number of hours that students are allowed to work can mean that only well-off students from outside the EEA are eligible. Nevertheless, despite these obstacles, enrollment of international students in the Netherlands keeps increasing and the Netherlands is emerging as a popular destination country while other countries, such as the United Kingdom, are losing in favor. Important to note though is that the majority of international students in the Netherlands are from the EU (CBS, 2019). If the Netherlands wants to attract more students from outside the European Union, one possible route would be to relax its restrictions on non-EEA students as these restrictions provide disadvantages that other countries might not share.

5. CONCLUSIONS AND FUTURE RESEARCH

The question regarding the positive assessment of increasing internationality arises and if this positive assessment has continued. Despite the fact that numerous advantages were highlighted for those countries losing talent by “brain circulation”, there were also critiques regarding this situation. The negative impact of the “brain drain” process has been stressed out from several decades ago (see Wächter, 2006). There are different views regarding internationalization and its consequences, even if there is no dominant policy or a certain perspective that can be claimed. There are fears considering that quality and undermining academic approaches through economic rationales are effects of internationality. Moreover, it is considered that aspects such as “global citizenship” and “international understanding” have lost their role as fundamental values of the internationalization of higher education.

A student’s financial situation is so far the major and most dominant obstacle for the students interested in outgoing mobility. For over a decade financial aspect has been a major obstacle to mobility and it still remains unsolved in many situations. Statistical data and also some research papers, as for example Ballatore & Ferede (2013), point out that most of the students who are applying for Erasmus+ mobility are mostly part of distinct

higher socioeconomic groups. Such studies are focused on the elitist nature of different mobility programs and also on the impact that these programs produce. According to Ballatore & Ferede (2013) there is an impression that international mobility is more accessible for certain type of students, in this way creating privilege among students. This observation is based on the fact that those students who have been part of international mobility are mostly students having a higher income and also more job opportunities. Another research elaborated in Germany by Netz & Grüttner (2018) comes to support this view. The empirical study developed by them highlights the fact that nowadays there is a tendency in mobility programs to generate a division between students having a lower socioeconomic background with those students having a higher socioeconomic background even more deeply (Netz & Grüttner, 2018).

This deepening inequality needs immediate attention since it is not in accordance with the objectives and values of European mobility programs. There is a direct contradiction between this deepening of separation among students coming from different socioeconomic backgrounds and the engagements taken at the Yerevan communiqué in 2015. According to the Yerevan Communiqué (2015) the EHEA will follow certain steps in order to ensure that the gender balance will be improved, the social dimensions of higher education will be intensified and opportunities for access and completion of international mobility will be expanded even for those students having disadvantaged backgrounds.

Until the inevitable disparities that are present within the actual system(s) are not solved, the full potential of mobility cannot be reached even if mobility is a tool helpful for the improvement of the learning and abilities of all learners. The number of dependents, the lower income and several other economic factors are among the obstacles that are part of the internationalization process.

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