FOREWORD

inScience Press is delighted to publish this book entitled *Education Applications & Developments IX* 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 ninth 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 9th edition bring us to the most broadening issues in contemporary research on Education. This book explores four major areas within the broad spectrum of Education, corresponding to four sections: "Teachers and Students", "Projects and Trends", "Teachers and Learning", 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 2023) 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 36 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: *Educational strategies in sustainability economics - Empowering change through education*; by Maria Luísa Vasconcelos & Sandra Bernardo. This chapter looks at different ways to consolidate Sustainability Economics in the curricula of undergraduate and graduate economic-related education levels so as to enhance the knowledge and analytical skills they need to successfully address sustainability-related issues. Proposals are guided by four key principles – interdisciplinary perspectives, critical thinking, experiential learning, and collaboration with stakeholders –, and are aligned with the Dublin Descriptors'

guidelines. The suggested multi-faceted educational approaches include integrating specific sustainability contents into the curriculum, using problem-based learning approaches, providing experiential opportunities, and facilitating interdisciplinary collaboration and community engagement. Anticipated outcomes include a more comprehensive understanding of economic principles related to sustainability, increased awareness of economically sustainable practices, and improved proficiency in policy evaluation. The ultimate goal is to devise educational approaches in Sustainability Economics at the undergraduate and graduate levels capable of better empowering students to make informed decisions for a more sustainable future.

Chapter 2: *The contribution of morphological awareness to reading comprehension in Arabic*; by Bahaa' Makhoul & Vered Vaknin-Nusbaum. This study examined the contribution of morphological awareness (MA) to reading and reading comprehension in Arabic among 3rd and 4th graders. MA tests (inflections and derivations) and reading tests examining phonological decoding, orthographic recognition and reading comprehension, were administered to 50 students whose Arabic is their mother tongue. Furthermore, differences in reading achievements between students with low and high MA were examined. Findings indicate that both inflectional and derivational MA significantly explain reading comprehension. Furthermore, it was found that students with lower MA demonstrate inferiority in phonological decoding and reading comprehension compared to those with high MA. It can be inferred that Arabic readers use MA as a strategy that contributes to their ability to identify words and to comprehend a text as early as in the 3rd and 4th grades.

Chapter 3: *The digital age of assessments – National benchmark test reconfigured to online platform*; by Naziema Jappie & Ashley Van Niekerk. The sudden shift from contact to remote digital learning platforms and the facilitation of assessments via online platforms brought about unique challenges to the South African (SA) education landscape. The purpose of this technical research paper is to document the digitization project from the @NBT Online perspective and describe the @NBT Online system migration from a project and technical management perspective. Consultations were held with stakeholders to brainstorm possible solutions that would assist the Centre for Educational Assessments (CEA) in responding to the global pandemic which led to a partnership with Territorium Life (TL). TL had an online platform known as EdTest-AI, a software as a service (SaaS) solution, which combined proprietary software that uses various to deliver remote test proctoring, including verifying student identity and monitoring the room during an assessment. The first pilot @NBT Online was successfully administered on Saturday, 25 July 2020. The cost-effective and innovative SaaS approach implemented for this project is the first of its kind to be used in SA. Thus, this project is envisaged to support the departmental CEA plans in highlighting the needs that require innovation and the adoption of new and emerging technologies.

Chapter 4: *The art and science of assessment – Connecting classroom-based speaking assessments to teachers' practice*; by Rúben Constantino Correia. Speaking has been increasingly promoted in language syllabuses and curriculums, both in Portugal and internationally, as one of the major aims of foreign language teaching. Naturally, the importance of oral skills has led to increasing research in this area, with the focus largely on the need to measure ability and the best way to do it. Unsurprisingly, considerable attention has been drawn both to assessment and the context in which it operates. However, the unique features of speaking make it the most challenging skill to assess. Bearing this in mind, and my role as both researcher and teacher with a vested interest in speaking, I spent almost a full school year at a Portuguese public school cluster doing classroom observation in an attempt to chart: a) – typical classroom interactions between learners / teachers and learners / learners, and b) – the general nature of most speaking events taking place in the classroom, including that of assessment. Findings seem to evidence that Portuguese EFL teachers appear to be at odds with designing suitable assessment procedures for monitoring students' progress. There is a narrow view of assessment as synonymous with testing, and thus the grading function, which largely contributes to the dominance of summative assessment over formative assessment.

Chapter 5: *Computer gaming and academic learning – Targeting the role of esport in school*; by Björn Sjödén & Michael Trotter. The role of computer games in school is a controversial topic. An increasing number of upper secondary schools offer three-year programs with an "esport profile" within aesthetics and media. Marketing suggests that esport can attract students who are interested in playing computer games, but the scholastic value of esport remains to be clarified. Whereas "gamification" is an established term for transforming educational and other formal practices into game-like activities, little has been said about its counterpart "schoolification": how originally playful and informal practices are transformed to fit within school curricula and syllabi for achieving academic goals. We discuss the relevance of esport in secondary education, a working hypothesis is that the potential benefits of esport in academic learning is more about how students learn than what they learn. Specifically, we present and discuss and propose how self-regulated learning (SRL) as a framework can facilitate skills transfer from esport to academic learning. Using examples from multiplayer games, we elaborate on how co-regulation through social interaction can be used as a means for developing SRL. We conclude by suggesting how esport and educational researchers may use the SRL framework to address empirical questions about esport in relation to academic studies.

Chapter 6: *Assessing compliance with bloom's taxonomy: An examination of summative assessment papers for final year b-ed students*; by Mokete Letuka. Summative assessment papers must be compiled in accordance with Bloom's taxonomy of the cognitive domain. For final year student teachers, the recommendation is that eighty percent of the question paper must be pitched at

Bloom's taxonomy's upper cognitive levels and only twenty percent of the question paper must be pitched at Bloom's lower cognitive levels. This distribution is designed to assess higher order thinking and thus instill, promote, and reinforce independent and critical thinking, as well as problem-solving skills in final year students. To determine whether examiners comply with this recommendation, I analyzed ten question papers from the faculty of humanities through document analysis. The study found that some examiners pitch their question papers for final year student teachers entirely at Bloom's lower cognitive levels and only a few distribute the questions close to the required recommendations. Of concern was that some examiners inappropriately used action verbs belonging to Bloom's higher levels. It is recommended that examiners be re-trained in setting question papers in line with the revised Bloom's taxonomy protocol and the correct use of action verbs. It is recommended also, that main assessment papers must be quality-assured in terms of the levels of questioning before they are administered.

Chapter 7: *RTI tier 2 executive function program for 1st grade Brazilian schoolchildren*; by Graziele Kerges-Alcantara & Simone Aparecida Capellini. Objectives: To develop a second-tier Response to Intervention (RTI) program for the development of executive functions in first-year elementary schoolchildren and to analyze the clinical significance of the program via a pilot study. Method: This study was developed in two phases: elaboration and application of the RTI program for Brazilian schoolchildren; and a clinical significance analysis of the children's performance in pre- and post-test situations. The initial sample comprised 71 children (age from 6 years to 6 years and 11 months of both sexes) from two Brazilian public schools. These were submitted to a pre-assessment protocol. Risk for difficulty in executive function was presented by 18/37 of the participants that completed the pre-assessment protocol, and these were selected for the intervention program. Results: There was a reliable improvement in the components of executive function inhibition, working memory and alternation, for some children and in rhyme identification tasks, phoneme production, and phonological working memory, although the program does not focus on its development. Conclusion: The program we elaborated demonstrated applicability and can be used by educational speech therapists, school psychologists and educators as a scientific evidence-based intervention tool to support the development of executive functions in second-tier RTI programs.

Chapter 8: *The transition from concrete to formal thinking*; by Ghada Wattad & David Chen. In the current study we have investigated the development of logical and mathematical reasoning among a mature sample following Piaget's theory of cognitive development. The purpose of the current study is examining if continued biological development and/or continued accumulation of life experience, learning and education can develop thinking that contributes to the transition to the formal operational thinking stage. Research was designed to test whether knowledge content (domain) affects learning by studying cognitive distribution in three domains. The

study further explores the premise that schooling is the main factor that precipitates the transition to formal thinking. The research is based on two kinds of populations: The first consists of one thousand literate adults aged between 18 and 76 (M= 39). And the second of one hundred and three illiterate adults. The findings indicate that, there was not any continuation of the formal cognitive development during the entire adult life. Only about 25% of the population continues to the formal operational stage, and this is before the age of 20. learning was affected by domain specificity. In addition, about one-fifth of the illiterate population that never attended school do achieve formal thinking.

Chapter 9: *Educating third culture kids and cross culture kids: Students with hidden and apparent diversity*; by Patricia A. Stokke. This chapter discusses the impact of cross-cultural experiences on the education of a growing student population; those who live mobile lives. These students move across countries for their parents' careers or as immigrants or travel daily across cities or national borders to attend school. A transitory lifestyle means they must adapt to unfamiliar educational environments (Lijadi & van Schalkwyk, 2018), which may cause challenges in their sense of belonging and interruptions in academic progression. Consequently, educators have a responsibility to understand the complexity and interrelatedness of learning, education, and culture (Hofstede, 2001) and adapt accordingly to support student success. The challenges facing this student population, including the needs and strengths emerging from their unique cross-cultural and mobile experiences will also be discussed, as well as methods of adapting teaching schemas. Additionally, potential areas of research are recommended. Teaching and serving students of hidden and apparent diversity is based on research in the fields of CCKs and TCKs, global transitions, cultural competence, cross-cultural and international education.

Chapter 10: *Contemporary art methods in teaching visual arts*; by Marija Brajčić & Dubravka Kuščević. Recomposition and photomontage are an integral part of contemporary art and should be implemented in the contemporary teaching of visual arts. This paper aimed to determine whether using recomposition and photomontage in visual arts classes stimulates student creativity. The research was carried out from 2019 to 2022 among students at the Department of Teacher Education and the Department of Preschool Education at the Faculty of Humanities and Social Sciences in Split, who applied the methods of recomposition and photomontage in visual arts classes. The research was qualitative and quantitative, observation and descriptive methods were used, and a total of 133 students participated in the research. The resulting artworks were divided into groups according to the degree of creativity that the students expressed in the artworks. It was concluded that the works created with the use of recomposition and photomontage stimulated creativity among students. A significantly greater degree of freedom was observed in combining, using imagination and creating new ideas.

Chapter 11: *Mentors' competence development to support novice teachers: Cross analyzing two mentoring context*; by Julie Courcy, Nathalie Gagnon, & Andréanne Gagné. Mentorship is known to be one of the most utilized and effective ways to support new teachers. Many researchers have focused on how the mentees are supported and how an experienced mentor can make a difference in their induction process. Knowing the benefits of this affiliation, one of the main keys for a successful mentorship program is the mentor's ability to respond to the mentee's needs. Based on Le Boterf's competent action model this chapter exposes the commonalities between two different studies, both focusing on the development of the mentors' competent action: S1 was conducted in the province of Ontario, with mentor supporting novice teachers in their induction process and S2 was conducted in the province of Quebec with 11 participants, acting as associate teachers (ATs) with interns, in Vocational Training Centres. The cross-analysis shows that both mentors and ATs have similar needs regarding their competency development. The results shed light on the various factors conducive to the development of competency as seen through the lens of Le Boterf's concept of competent action: how to act, desire to act and ability to act. Finally, three keys are recommended to better support the mentors competent action development.

Chapter 12: *Emergent literacy stimulation in initial years of literacy*; by Caroline Fernandes Brasil, Luana Baron Scollo, & Simone Aparecida Capellini. This study focus on verify the educational efficacy of a stimulation program with emergent literacy practices with students in the initial literacy series. Materials and Methods: The study included 20 students from the 1st and 2nd year of Elementary School I of a municipal public school, of both sexes. The students were divided into two groups, with group I (GI) consisting of 10 students, aged 6 years to 6 years and 11 months, five 1st year students and five 2nd year students undergoing the training program. stimulation and group II (GII) consisting of 10 students, aged between 6 years and 6 years and 11 months, five 1st year students and five 2nd year students not subject to the stimulation program. The results revealed that GI students had better performance in skills considered predictive of reading development, such as copying shapes, dictating pictures, segmenting syllables, dictating words, repeating words, alliteration, rhyming, repeating numbers in reverse order and naming digits in order fast and automatic, while GII students also performed better in copying shapes, dictating figures and segmenting syllables.

Section 2, 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 13: *Abelian groups and what student teachers should learn for teaching algebra*; by Natalia Karlsson & Wiggo Kilborn. The purpose of this didactic project is to analyze a current research question, namely how student teachers' knowledge

of Abelian groups contributes to their understanding of an essential aspect of teaching algebraic concepts by extending numbers and arithmetic operations. The theoretical approaches employed are Subject Matter Knowledge, and the choice of algebraic content with focus on students' learning of algebra. Discussions about the Subject Matter Knowledge model related to teacher students' learning of algebra in the context of knowledge for teaching are crucial domains for the outcome of this chapter and the research questions. In this chapter a central content is a conceptualization of Common Content Knowledge (CCK) related to the algebraic content of the Abelian groups, and its conceptual transformation into Specialized Content Knowledge (SCK) for teaching of algebra. Conceptual findings illustrate theoretically the conceptual transformation as interplay between CCK and SCK within the SMK model. This study can contribute with new knowledge about professionally specific mathematic knowledge for teaching algebra. The outcome of this theoretical research work is a follow-up of an earlier research project, namely Mathematics in teacher education: Student teachers' knowledge of and perceptions of mathematics.

Chapter 14: *What are the models of courses in academic teaching in Slovakia? - Document analysis and the survey of lecturers' opinions*; by Tímea Šeben Zaťková. The aim of the study is to identify, describe and compare models of courses in academic teaching (AT) conducted at Slovak universities and to describe how the pedagogical content knowledge (PCK) of university lecturers is acquired at particular higher education institutions (HEI). There are also briefly described the organisational aspects of pedagogical education of university lecturers in Slovakia, which is mainly conducted as part of their further education. The document analysis was employed to identify existing models of courses in AT in Slovakia. The text of the study also illustrates the experience with the implementation of courses in AT at Slovak universities and summarises results from a questionnaire survey on the importance of the pedagogical preparation and educational needs of the course participants - university lecturers. A variety of good practices, surveys and opinions of participants and graduates from various models of education are good sources of inspiration for higher education quality improvement. The study also intends to emphasise the requirement that teachers´ work at any level of education (even in higher education) cannot be the result of high erudition in the scientific field and only intuition-based knowledge of education and its principles.

Chapter 15: *Student teachers behaving badly: Teachers' perceptions of student teachers' misbehaviour during teaching practice*; by Jaysveree M. Louw. Teaching Practice (TP) is a crucial component in initial teacher training programmes. All B. Ed and PGCE (Post Graduate Certificate in Education) students at South African universities must undertake TP and behave professionally and ethically during their TP period. However, universities often receive negative feedback from the teaching community about the behaviour of some students. This negative feedback was one of the motivating factors that prompted this study. The second

motivation was the findings of the portfolio content that student teachers have to submit after TP. Some students' actions were dishonest, for example, they forged mentor teachers' signatures. The purpose of this study was to obtain teachers' perceptions of how pre-service teachers conduct themselves during TP. Interviews were conducted with thirty participants to collect data. The findings revealed that even though many students are generally well-behaved and ethical, some of them are entitled, unprofessional and disrespectful. From these findings one can conclude that some student teachers behave in an undesirable fashion which can negatively impact their future placements at schools. One of the recommendations is for student teachers to be adequately prepared by teacher education programmes to meet the professional requirements of teaching in the real school and classroom environment.

Chapter 16: *Online quizzes for content consolidation in higher education: A comparative study in tourism degrees*; by Sónia Pais, Laura Chagas, & Ana Pires. New strategies regarding student-centered approaches have emerged in higher education contexts, to promote student motivation and engagement towards the learning process. Online quiz platforms such as Kahoot! seem to contribute to the consolidation of learning, particularly through content review. Our research is based on data from a quantitative survey conducted among students from a Portuguese higher education institution offering undergraduate degrees in the area of Tourism, specifically within the subjects of English and Statistical Analysis. Following a consistent application of Kahoot! quizzes in class for reviewing purposes, the survey was implemented to allow for an examination of how the students perceived the usage of this game-based learning tool. Results show that most students are very receptive to this tool and highly recommend it, as it promotes motivation. Students also consider the use of Kahoot! in classes to make learning more challenging and dynamic, while positively contributing to content consolidation. To better understand students' responses to the platform, in this study we aim at analyzing the results according to area of study and investigating different correlations between variables. However, the results obtained evidence that further studies are needed to confirm the effect on the use of Kahoot! in student performance.

Chapter 17: *Positive digital learning: Challenges and path forward for educators*; by Dimitra Pappa, Jan Pawlowski, Kati Clements, & Sofoklis Sotiriou. Digital technologies are rapidly changing teaching and learning in the 21st century as both teaching methods and priorities are evolving. Likewise, the skills required of 21st century educators are constantly evolving, and while it is widely recognised that digital literacy is critical, there is no general consensus on what it means for an educator to be digitally literate and what competencies should be included in literacy frameworks for educators. The debate over teachers' digital competencies continues as the rapid pace of technological change makes it difficult to keep up with the latest trends. At the same time, other critical dimensions emerge that also need to be taken into account. In the present research, we examine the impact of two significant challenges that have emerged in recent years on educators' competencies:

Emergency Remote Education (ERE) and generative artificial intelligence (generative AI). We examine their practical implications and the resulting emotional challenges of using digital technologies in education. We critically discuss existing competency frameworks that outline the knowledge, skills and attitudes that educators should possess to effectively support student learning and development. Based on the lessons learned, we discuss future directions for their improvement, namely the integration of digital skills with emotional e-competencies, towards the development of a holistic framework for positive digital learning.

Chapter 18: *Innovating teacher education through rural educational contexts: New possibilities in teaching and learning*; by J. Spencer Clark, Eileen M. Wertzberger, & Nooshin Darvishinia. In the United States (US), rural schools are often unable to provide the same academic opportunities as suburban and urban schools. Rural student populations are becoming increasingly diverse and require rural schools to provide new services to their community. This chapter examines how we have collaborated with rural schools to address their need for resources, teachers, and support. We use ecological agency to frame the ways contextual affordances and challenges of rural schools provide distinct opportunities for teacher education programs to innovate teaching and learning. Many factors that have prevented sustained and authentic engagement with rural schools have been minimized in recent years through technology and increased broadband connectivity. Technology offers a range of opportunities for teacher education programs to engage more authentically with rural schools and provide sustained support through telepresence-based field and student teaching experiences, distance and online-based supervision, and shared virtual and online pedagogies of the rural. To make these innovations more sustainable, the use of technology in rural schools will need to be evolved and supported in new manners to have an impact on the agency of rural teachers. In this way, rural can be a lens for technological innovation in teacher education and rural schools.

Chapter 19: *Analysing the extent to which student teachers implement their lesson design during teaching practice*; by Mokete Letuka & Paseka Patric Mollo. Lesson designing focuses on the structure of a series of lessons. It incorporates the planning, organization, and sequencing of lessons to achieve learning outcomes. Student teachers are capacitated to master the skills of lesson planning so they can plan their teaching on a lesson plan template. However, what they do in the classroom is not a reflection of the lesson design itself. As a result, the researchers sought to investigate the reasons for this lack of synergy between the lesson design and the actual lesson presentations. This qualitative research was conducted through document analysis and semi-structured interviews. A sample of 20 B.Ed. degree student teachers who are in their third year of study were randomly and conveniently selected. The findings revealed that most student teachers do not have high regard for lesson designing. The assessment rubric used to evaluate student teachers' teaching competence does not outline aspects of the lesson design. Moreover, student teachers are unsure of how to implement some of the aspects of the lesson plan

template. The study highlighted the need to put more emphasis on the importance of lesson designing. It was further recommended that lesson designing should allow for pedagogic flexibility.

Chapter 20: *Utilising social network analysis skills to meet pediatric palliative care needs in South Africa*; by Rika Swanzen. Integrating Pediatric Palliative Care (PPC) within the curriculum of the social services qualifications is part of new and niche development in education. To meet the needs of terminally ill children requires the best practices from the inter-disciplinary teams involved. The social service professions have a strong history in impacting communities to meet the needs of vulnerable populations. A tried and tested framework on environmental networking, that may be at risk of only being seen as part of earlier innovation, provides a practice model for meeting the partnership goal of sustainable development. Considering the risk to terminally ill children when sufficient partnerships are not in place, as required by the seventeenth sustainable development goal, a case is made for a deeper understanding of the service context and the strengthening of support structures through social network analysis and environmental modification.

Chapter 21: *The information designer role on health education: Participatory methodologies to citizen empowerment*; by Mónica Santos & Suzana Dias. The authors, Design research experts, explore Design Thinking's holistic methodology in this article. This burgeoning concept is gaining recognition and application in various contexts. Their aim is to emphasize the importance of collaboration and interdisciplinary work, fostering interactions among individuals from diverse domains and merging specialized and practical knowledge. This approach cultivates a participatory culture and stimulates innovative solutions. In this article, the authors present a segment of research conducted by (Santos, 2020), focusing on health education message co-creation and Information Design's role in healthcare, enabling population autonomy. After an extensive literature review involving health, Information Design, and Design Thinking experts, the study examined the clinical analysis report model used by the Portuguese National Health Service. Through co-design involving designers, users, and healthcare professionals, the study developed a prototype for a new clinical analysis report, which is showcased as a successful example in this paper. In conclusion, there's an urgent need to reassess longstanding power dynamics in decision-making centers. The authors stress that citizens/users shouldn't be relegated to passive content recipients based on assumptions but should be integral to the co-creation process, right from the beginning. With this paper, the authors aim to empower all individuals as direct agents of social innovation in their daily lives.

Chapter 22: *What difference does a social practice approach to adult literacies education make to adult learners' quality of life in western Rwanda?*; by Peter Mtika, Pamela Abbott, Wenceslas Nzabalirwa, & Ismael K Byaruhanga. Provision of quality adult education has the potential to make a difference in the lives of adult learners especially those from poor and marginalised backgrounds. In this chapter,

we report on the effect of implementing a social practice approach to adult literacies education in rural communities in three districts in Western Rwanda. Following the implementation of a social practice approach to adult literacies education, we interviewed a sample of 32 participants, two or three years after they completed adult classes, to understand what impact the classes may have had on improving their lives and wider capabilities. The findings indicate that a social practice approach to adult literacies education impacted participants in connection with health, hygiene and sanitation, nutrition, improved marital relationships, better support for children's education, and greater community involvement. Adult learners developed greater understanding and practical grasp of life skills, social competence, positive self-image, and personal and family wellbeing while developing their literacies. They retained and used the knowledge and skills to improve their lives, that of their immediate households and the wider community. Implications of the findings are discussed.

Chapter 23: *Analysing information and communication technology (ICT) skills of Setswana student teachers at a university of technology in South Africa*; by Bridget Kesaobaka Mangwegape & Paseka Patric Mollo. The use of ICT has become an indispensable component of education in modern times. Recently, most teachers, including indigenous language teachers, have been involved in integrating technology into their classroom practices. But there is a lack of research on integrating ICT by Setswana student teachers at higher education institutions. This study aims to investigate the competency levels of Setswana student teachers in using ICT in their classrooms. A total of 20 student teachers were purposively selected to participate in this study. Data was collected using classroom observations and interviews. The SAMR model was used as a data analysis tool to determine the extent to which Setswana student teachers can integrate ICT in their classrooms. The results of this study indicate that the student teachers' competence to use ICT was still at a lower level. They predominantly only have basic computer literacy skills, such as word processors, PowerPoint, and other digital resources. The study revealed that the student teachers' ICT integration levels were still at the substitution and augmentation levels.

Chapter 24: *The 'third space', where everyday and formal writing practices meet*; by Paolo Sorzio & Caterina Bembich. In this chapter, the development of literacy competence is intended as a process of progressive connection of the everyday writing repertoires with the more formal writing genre characteristic of schooling, through students' participation in innovative activities in the "third space" (Gutiérrez, 1993; 2008; Gutiérrez, Rhymes, & Larson, 1995). Moving from Jack Goody's conceptualization of writing as a "technology of intellect" (Goody, 1987; Olson, 1996), it is considered that young people work out highly contextualized writing repertoires in their everyday life to achieve specific goals in practice. These repertoires may differ from the literacy competencies required in school and this divergence may produce in students from non-mainstream backgrounds an experience of "cultural discontinuity" (Mehan, 1998) that, in turn, may be an element

of school failure. To mediate the development of appropriate literacy repertoires in multicultural schools, it is required the construction of a "third space", in which the existing everyday writing repertoires may be transformed to achieve expressive and argumentative goals in social communication. The empirical basis for the analysis derives from a school ethnography, conducted in a secondary school serving a student population of recent immigration in Italy in a working-class town in Northern East Italy.

Section 3, entitled "Teaching and Learning", offers research about foundations in the education process itself, in various contexts, both for tutors and students.

Chapter 25: *Integrating science in religious education using an argument-based inquiry approach in Kampala Ismaili secondary classroom*; by Bilquis Hamid. Current secular and Religious Educational (RE) systems in Uganda are registering improvement, but not fast enough to meet the needs of its students. Most secular and religious classrooms still follow a teacher-centred approach where students depend on their teachers' instructions to perform any task and rarely think critically beyond the curriculum. Extensive research indicates that students' critical thinking skills improve when science teachers use an Argument-Based Inquiry (ABI) approach. Relatively, less research is done in RE using science subject knowledge to prove religious claims through argumentation. Thus, this small-scale study aimed to enhance critical thinking in students by integrating science into religious education through discourses using the ABI approach. Data collection methods included students' written and verbal responses to religious claims and reflections from students and teachers. Data collected from sixteen sessions were analysed using codification. The findings suggest that the ABI approach facilitated critical thinking, extended discussions, and improved justification of scientific claims beyond the RE curriculum. This small study can inform global RE teaching practices to develop critical thinking skills in students using argumentation. Affirming that argumentation is at the heart of classroom practice, this paper concludes that teachers need to develop their argumentation skills through ongoing professional development.

Chapter 26: *Conceptual transition in students' learning from arithmetic to an algebraic context: A conceptual way from rational numbers to rational equations*; by Natalia Karlsson & Wiggo Kilborn. Our current research addresses students' arithmetic and algebraic knowledge, focusing on conceptual connections, and relationships between two aspects of knowledge. The contents in question are rational numbers and rational equations in grades 7, 8 and 9. The study contains three tests given to 400 students in grades 7-9. The tools for analysis comprised an algebraic concept of rational numbers, the theory of generalizing arithmetic into algebra, and theoretical approach about the relationship between arithmetic and algebra in a conceptual context. Current research shows that students' knowledge of algebra and arithmetic has a limited conceptual connection and a weak relationship with each other. Their knowledge of arithmetic operations and solving rational

equations used to be solely procedural and relied on formulas learnt in a procedural – and often mixed – manner. This caused conceptual consequences for students' knowledge of rational numbers and their essential properties, as well as shortcomings in students' ability to operate with rational numbers. This study highlights that conceptual transitions from rational numbers to rational equations play a crucial role in students' learning, focusing on the conceptualization of arithmetic concepts and their ability to operate in an algebraic context.

Chapter 27: *Immersive virtual reality and artificial intelligence to prepare students for clinical examinations: Definitions and application*; by Brendan Concannon & Shaniff Esmail. This chapter explores the potential of virtual reality (VR) and artificial intelligence (AI) to reduce test anxiety in health science students. The chapter provides basic definitions of VR, AI, GPT and campus anxiety. The chapter describes an investigation which used a generative pre-trained transformer (GPT) to generate responses from virtual patients in a virtual clinic, allowing students to familiarize themselves with the clinical setting. The immersive VR simulation allowed students to practice for their clinical practical exams with history-taking and cognitive assessment modules. Results show that students exposed to VR had significantly lower anxiety scores compared to those who did not use it. Interviews and focus groups revealed themes related to student background, exam feedback, fear of the unknown, self-consciousness, and the exam environment. The study highlights the potential of AI-enhanced VR as an effective tool in increasing student familiarity with clinical exam environments and reducing test anxiety.

Chapter 28: *The MelArete project to foster children's ethical development: From theory to practice*; by Luigina Mortari & Federica Valbusa. The chapter presents the MelArete project, which includes the following components: (a) a theory of ethical education, conceived as education to care and virtues; (b) an educational programme aimed at encouraging primary school children to reflect on ethical concepts and experiences; and (c) a qualitative research to rigorously evaluate the effectiveness of the designed educational activities in fostering the development of children's ethical thinking. In particular, the chapter outlines the theory of ethical education in which the educational programme is grounded, also by comparing it with the main traditions in this field. Then, it presents in detail the educational activities designed for primary school and, in the conclusion, discusses them with reference to research findings.

Chapter 29: *Oral reading fluency measures for educational monitoring*; by Maíra Anelli Martins, Noemi Del Bianco, Ilària D'Angelo, Catia Giaconi, & Simone Aparecida Capellini. This study assessed oral reading fluency development in students from the 2nd to the 5th grade of Elementary School I over a school year. The research involved 400 students, aged 7 to 10 years, from a municipal public school in São Paulo. The Performance Assessment in Reading Fluency was employed, and students were evaluated in March, July, and November using three texts of similar complexity. The analysis considered the number of words

read correctly and incorrectly per minute, with statistical analysis conducted using SPSS 22.0. The results revealed significant improvements in reading fluency over time. The Wilcoxon Signed Rank Test indicated a statistically significant difference between the third and first assessment moments, with increased words read correctly and decreased errors. The Mann-Whitney Test further supported these findings, indicating that the first assessment had fewer words read correctly per minute compared to the second and third assessments, along with fewer misspelt words. In conclusion, this study provides a simple, reliable, and valid method for monitoring and tracking the progressive development of oral reading fluency in students from the 2nd to the 5th grade of Elementary School I.

Chapter 30: *Auditory and language processing disorder: A case study*; by Fabio Corsi & Ivan Traina. This chapter describes a psychoeducational intervention for supporting language learning. It concerns a child that lost about 80% of hearing functioning at 11 months age, caused by an occlusive otitis. Despite successful surgery, the child didn't learn to talk. Chapter objective consists of presenting the psychoeducational intervention adopted. This was based on inclusive practices aimed to develop language skills and carried out by an interdisciplinary team in collaboration with primary school teachers. The methodology used for describing the intervention consisted of a naturalistic observation that allowed collecting information on changes as result of the intervention. This permitted the analysis of the insights generated through practical experiences, and to find evidence in research on language learning. Also, the results emerged through the observation of this intervention provided useful elements for encouraging the exploration of intervention's potentiality and inspire future trajectories of research.

Chapter 31: *Eco-political rule awareness in childhood*; by Gudrun Marci-Boehncke, Matthias O. Rath, & Madeleine Rusch. Do preschool and primary school children already have a "political consciousness"? Furthermore, how is this expressed? A focused study examines ecological awareness in the context of the interdisciplinary research project "PoJoMeC", funded by the Federal Agency for Civic Education in Germany. The theoretical basis of the research presented here is Bronfenbrenner's (1979) ecological model of human development. However, we understand this development as shaped by a process of medial orientation (cf. Johnson, & Puplampu, 2008). Our study concretizes the question of political consciousness to the socioecological rule awareness of nine students from upper primary school classes (grade 4). Methodologically, we focus on the children's explicit knowledge, subjective theories, media sources of information, and their concepts of rule-guided action.

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

Chapter 32: *Bullying as driver of low mathematics and science achievement in South African schools in a challenged context*; by Marien Alet Graham. All children deserve safe, decent schooling; but school bullying dominates South African news. We used Bronfenbrenner's ecological theory to examine bullying and Grade 9 math and science achievement in public schools without tuition. We used a quantitative positivist approach using TIMSS 2019 data to develop multi-level models, each with 20 predictors and maths and science achievement as the outcomes. Unsurprisingly, learners who were refused to talk to, had their family insulted, forced to do things they didn't want to do, shared nasty or hurtful messages or embarrassing photos about them online and were physically hurt, performed significantly worse. Principals' views on learner intimidation and verbal abuse were significant predictors. Surprisingly, learners who reported being stolen from significantly outperformed those who reported being stolen from less or not at all. This seems counterintuitive, but we offer some explanations. In the maths model only, learners who had mean things said about their physical appearance outperformed those who had this happen less often, and in the science model only, learners who had lies spread about them significantly outperformed those who did not (again, we provide suggestions for these counterintuitive results). Recommendations are provided for future research.

Chapter 33: *The effect of entrepreneurial leadership on teacher job satisfaction: The mediating effect of professional development, teacher-student relations and teamwork*; by Devorah Eden & Ido Liberman. Privatization and decentralization policies in Israel's educational system have spawned entrepreneurial leadership among school principals. We define entrepreneurial leadership as the combination of principals' proactiveness (seeking opportunities for innovations), and school innovativeness (actual innovations). Principals as entrepreneurs must ensure that teachers overcome their resistance to the frequent changes and willingly participate in their implementation. We suggest that this depends on their job satisfaction. The literature indicates that job satisfaction is related to teachers' professional development, good teacher-student interaction, and teamwork. Data were collected from 410 Israeli teachers who completed a questionnaire evaluating their principal and his/her effect on them. We hypothesize that (a) proactiveness and innovativeness will have a positive effect on teachers' job satisfaction; (b) the relationship will be mediated by teachers' professional development, teacher-student relations, and teamwork. The results partially supported our mediation model. We concluded that teachers follow their principal willingly and actively when provided with opportunities for growth and satisfaction.

Chapter 34: *Transformation in school leadership: Voices of female leaders*; by Samantha Kriger & Sinobia Kenny. Due to an apartheid regime, South Africa was demarcated according to race classifications of 'white', 'coloured', Indian and 'black'. Race classifications determined where one lived, went to school, and the possibilities to pursue higher education. For women of color in South Africa interested in a post-schooling education, the state availed bursaries to pursue teaching (and nursing) to control and limit their careers. The backdrop to separate and segregated living and learning for each racially classified group was to socialise amongst themselves, school themselves and obtain careers deemed sufficiently fit by an apartheid government. The transition from apartheid to a more inclusive and less segregated society has been slow and particularly evident in school leadership. This chapter reports on an empirical case study of the first seven 'coloured' women principals who assumed leadership positions in historically 'white' led schools. The study locates itself in the broader Cape Town area of South Africa two decades into the country's democracy. It has a qualitative research design and uses a case study method for data collection. Following ethics approval, semi-structured interviews served as data collection instruments. Data were analysed thematically, and the findings provided insights into leadership in historically 'white' schools in post-apartheid South Africa.

Chapter 35: *Using the results of problem-solving simulations to improve group learning*; by Alexander Pojarliev. The paper discusses the application of simulations for group problem solving. The aim is to explore trends in group performance, which can enable analysis and discussion of decision-making processes during training sessions. The results of 115 groups with a total number of participants of about 510 people were obtained from 5 different simulations. The average individual and group results, the gain/loss from the group discussion and the resulting synergy were calculated as efficiency measures. The results of the groups in the sample were compared with those of known published abroad studies and the means and standard deviations were calculated to serve as reference values for Bulgarian groups. Expectations of similarity in the performance trends of individuals and groups are confirmed. The hypotheses regarding the increase in the quality of group decisions compared to the averaged individual results (in 83% of cases) and the relatively limited achievement of synergy (only in 30% of cases) are confirmed. Differences are also established between groups based on belonging to a private or state organization and open groups or members of a team/organization. The observations create a basis for in-depth discussions during the training sessions on how the quality of group learning can be improved.

Chapter 36: *Learning about heritage and identity through engraving and printing - Artistic mediation workshops for students in Tomé, Chile*; by Jessica Castillo-Inostroza. This work shares an innovative project, carried out with students from early childhood to secondary education in the commune of Tomé, Chile. It is an artistic mediation project materialised in an exhibition as a pedagogical

proposal. It seeks to highlight the value of the territory through the observation of works of art in order to approach the creation of images that show the local identity. The plastic language mainly used are simple techniques linked to engraving and printing as the main strategy of knowledge. Through the Artistic Teaching Methodologies, creative exercises were proposed based on the work of 6 local artists with the aim of understanding what was observed in the works of art, relating to it from personal experience and, finally, creating something from it. In this way, art is taught through art. The dynamics and visual results of the students' work were analysed through Arts Based Methodologies, using visual tools.

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