

FOREWORD

inScience Press is delighted to publish this book entitled *Education Applications & Developments XI* 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.

This 11th volume, presented in two parts, addresses some of the most relevant and pressing issues in contemporary educational research. Through the contributions of a dedicated group of authors, this volume explores diverse dimensions of Education, fostering the advancement of knowledge and encouraging innovation in the field. Progress in education depends on the active commitment of individuals who are willing to develop creative solutions and who believe in their capacity to bring about meaningful change. In this spirit, the present volume seeks to inspire broader public engagement and strengthen collaboration within and across communities. As part of our ongoing commitment to serving society, we underscore the importance of reinforcing research initiatives, promoting education and science, and encouraging interdisciplinary cooperation. We believe that connecting diverse perspectives and areas of expertise is essential for advancing educational practices that are both impactful and inclusive.

This 11th edition is organized around four major areas within the broad field of Education: “*Teachers and Students*”, “*Projects and Trends*”, “*Teaching and Learning*”, and “*Organizational Issues*”. Part I focuses on the areas: “*Teachers and Students*” and “*Teaching and Learning*”, while Part II addresses “*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 2025) conference series (<http://end-educationconference.org/>). This meeting occurs annually with consistently successful outcomes. Selected original papers were expanded by their authors and underwent a renewed evaluation process. Following this, authors of the accepted chapters were invited to revise and improve their work based on the reviewers’ feedback. This process resulted in the publication of 27 high-quality chapters in Part I and 31 chapters in Part II. The following sections and chapter abstracts provide further insight into the content and scope of Part I of this volume.

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

Chapter 1: *The use of Aharon Appelfeld’s Adam and Thomas in literary education*; by Milan Mašát. This paper analyses the pedagogical potential of Aharon Appelfeld’s *Adam and Thomas* (2013) for Literary Education and specifies implementation across three schooling levels: early primary, lower secondary, and upper secondary. Using qualitative literary content analysis, we evaluate the novel against explicit criteria: (1) developmental fit (linguistic demands, cognitive load, scaffolding); (2) thematic accessibility and complexity; (3) ethical and historical sensitivity when teaching traumatic literature, particularly Holocaust-related content; and (4) curricular alignment with reading comprehension, literary concepts, intercultural competence, and values education. We conceptualise the text’s “spaces of indeterminacy” as structured invitations for learner interpretation, drawing on a reader-response perspective that acknowledges diverse cultural and historical backgrounds. Although the Second World War provides the setting, the narrative foregrounds agency, care, and moral growth, offering entry points for plot oriented as well as philosophically inclined students. We model grade-banded adaptations of the same passage to show progression in task complexity and sensitivity, and we outline safeguards (pre-teaching of context and vocabulary, informed choice, and debrief routines). The study provides transparent criteria and concrete pathways for age-appropriate classroom integration.

Chapter 2: *Inclusive strategies for the teaching and learning of queer-themed curricula in the language classroom - A narrative review*; by Matthys Johannes Uys. The global discussion surrounding the social challenges faced by queer identities and the incorporation of queer-inclusive curricula in educator training is extensive. Queer individuals encounter queerphobia in their daily lives, which engenders adverse experiences for queer students within heteronormative educational settings. The investigation into the inclusion of queer-themed curricula has yielded promising and beneficial outcomes. However, there remains a gap in implementing pedagogical strategies, as there appears to be a disjunction between the experience of queer individuals and their prerogative to human rights, specifically equality, within the language classroom. Consequently, there is a pressing need for further information to equip educators with the pedagogical knowledge required to integrate queer-themed curricula effectively into the language classroom. The qualitative approach, with social constructivism (as the research paradigm) and textual analysis (as the research method), makes up the research methodology of this chapter. The results highlighted and discussed strategies educators could implement in their teaching and learning to include queer-themed curricula: addressing heteronormativity, “leaning in” to discomfort, including intersectionality, reading “straight” texts through a “queer lens”, including texts with queer characters,

queering queer-inclusive texts, analysing high-caliber queer literary elements (e.g., themes and characters), and creating safe zones.

Chapter 3: *Unlocking natural ability: Expanding opportunities for emerging performing arts actors*; by Limkani Sincuba. Natural talent makes the art industry richer with actors and performances. The study investigated the significance of creating opportunities for aspiring actors in the field of dramatic arts, emphasising the role of natural talent and structured training. The study adopts Howard Gardner's Theory of Multiple Intelligences as its theoretical framework. In the qualitative case study approach, twelve participants were purposively selected for the study. Data were collected through structured interview questions, which facilitated the identification of key themes through coding and thematic analysis. The findings reveal that, despite the significant challenges associated with pursuing an acting career, including intense competition and limited resources, various initiatives have emerged to support aspiring actors. Programs emphasising local theatre participation and community-based training provide essential skills and networking opportunities. The study recommends programs that priorities raw talent and ensure accessibility in a supportive environment, where participants hone their artistic skills and develop critical life competencies, resilience, which could be essential for artists. The findings advocate for the expansion of similar initiatives that recognise and nurture natural talent in aspiring actors. The study concludes that there is a need to integrate performing arts education into community frameworks to cultivate future generations of artists.

Chapter 4: *From simulated classrooms to real-world readiness: Rethinking micro-teaching for economics pre-service teacher preparation*; by Vangile Candice Khumalo, Abelwe Maluleka, & Rhulani Maluleka. Micro-teaching provides pre-service teachers with a valuable platform to develop and refine their pedagogical skills. This chapter examines the perceptions of third-year Economics pre-service teachers at a South African university regarding the effectiveness of micro-teaching. Using semi-structured interviews within a qualitative case study design and interpretivist paradigm, and drawing on a small purposive sample of three participants, the study offers an in-depth, exploratory account of their experiences rather than generalisable findings. Three key themes emerged: confidence building, enhanced subject knowledge, and the value of feedback. The analysis is framed by Bandura's Social Cognitive Theory, highlighting the importance of self-efficacy and observational learning. Although participants recognised the benefits of micro-teaching in bridging theoretical knowledge with classroom practice and in enhancing their perceived readiness for real classrooms, they also reported challenges such as limited resources, time constraints, and rigid lesson structures. The study relies primarily on self-reported experiences, and the absence of observational or documentary data is acknowledged as a limitation. Nevertheless, the chapter offers recommendations for enhancing micro-teaching within teacher education and outlines directions for future research, with implications for policy and practice across the sector. Given the small purposive sample (three participants) and reliance on interview data, the findings are

exploratory and not statistically generalisable, but they offer context-specific insights and directions for future research.

Chapter 5: *Learning analytics to support low-achieving students in programming education*; by Takuya Hasegawa & Yosuke Ito. In recent years, providing effective programming education has become an important issue in Japan. This study aimed to support students predicted to have low proficiency by analysing their coding processes. Programming lessons were conducted at a senior high school, and learning analytics were performed using both the frequency of tokens contained in the students' programs and their proficiency levels measured through assessments. Using machine learning with token frequencies as features, a classification model was constructed to identify the lower-achieving group effectively. Furthermore, by examining tokens with low coverage rates in this group and visualising their positions in the exemplar program, patterns were identified that may help pinpoint areas of difficulty. These findings suggest that the proposed analysis method can help support students at risk of low proficiency.

Chapter 6: *Cultural ontology in mathematics education: A pedagogical framework for geometry instruction in pre-service teacher training*; by Lina Vinitzky-Pinsky & Artour Mouftakhov. This study explores integrating historical perspectives into geometry instruction for pre-service mathematics teachers. Traditional curricula portray mathematics as fixed, emphasizing Euclid, Pythagoras, and Thales, while neglecting non-Euclidean contributors like Lobachevsky, Bolyai, and Riemann. Eight third-year students at Achva Academic College engaged in a learning sequence using the Discipline-Culture structure (Tseitlin & Galili, 2005) to examine shared and discipline-specific contexts, as well as contested concepts. They analyzed historical definitions of angles and expanded the DC-Structure with Non-Euclidean axioms. Guided by Cultural Ontology, students recognized mathematics as evolving perspectives. This study employs a mixed-methods approach through triangulation analysis, integrating qualitative research, ontology construction, and historical analysis. Findings showed varied engagement, fostering reflective, informed educators.

Chapter 7: *Adult education and training in Latvia: Case study of the Zemgale planning region*; by Ginta Kronberga & Monta Mantrova. Adult education and training are vital in a postmodern society; they allow not only to improve an individual's personality but also to maintain competitiveness in the labour market. The research aim is to explore issues and solutions in adult education and training within the Zemgale planning region in Latvia. The research concludes that the most widespread problem in adult education and training is a lack of strategy at all responsible levels, with main issues including coordination deficiencies among providers, difficulties in reaching the target audience due to logistical matters, and insufficient resources allocated to adult education and training. The results indicate that municipalities display significantly different models in the planning and organization of adult education and training processes, which leads to suboptimal

use of local institutions for promoting adult education and training availability and long-term unbalanced approaches to adult education and training policy and management by sectors and regions, including the planning and implementation of European Union resource grants by state institutions not delegated to planning regions and municipal NGOs. The proposed solutions include better coordination at the regional level, strategic planning, and investment in adult education and training resources, as well as innovative approaches to engaging the community.

Chapter 8: *Entrepreneurship education by Me & MyCity project*; by Auli Ojala. This study examines the Me & MyCity learning environment as a pedagogical method for enhancing working-life competencies among Finnish sixth-grade pupils. In Me & MyCity, twelve-year-old students participate in a one-day simulation in a miniature society that includes companies and public services. During the visit, pupils work in assigned roles, earn a virtual salary, and act as active citizens and consumers. The project aims to investigate the learning outcomes and experiences of both teachers and pupils. The research sample consists of 40 teachers, 220 pupils, and an additional group of 70 pupils from Tampere and five surrounding municipalities. The theoretical framework is based on the Finnish Core Curriculum 2016, phenomenon-based learning, Kolb's experiential learning theory, and Strauss's grounded theory approach. Empirical data have been collected through multiple qualitative and quantitative methods. The findings indicate that Me & MyCity is an effective and engaging teaching method that supports pupils' understanding of economic concepts, working life, and entrepreneurship. Pupils enjoy participating in the simulation and value the opportunity to work in a chosen profession. However, teaching materials are perceived as somewhat theoretical, suggesting that more concrete preparatory activities could strengthen learning outcomes.

Chapter 9: *A framework for early detection of weak signals of STEM-related aptitudes*; by Alina Florentina Grigorescu (Pîrvu) & Cezar Scarlat. The present work aims to establish a research framework and an appropriate procedure for the assessment and identification of emerging skills related to STEM (as weak signals) from primary school so that students have the necessary training and support to adapt to universities and future workplaces. As methodology, the study is based on directly observed and/or personal experienced cases in the Romanian engineering higher education as well as pre-university education cycles, which are complemented by pilot tests designed for this purpose. Secondary research (literature survey) marks the literature gap and complement the matter under investigation. Since this is a pioneering effort, several challenges are foreseen. This project can be risky in the long term because positive/negative outcomes can occur, requiring a step-by-step approach. Nevertheless, the lessons learnt, and implications are important for the main stakeholders: education policy makers and administrators, students and professors alike (Grigorescu & Scarlat, 2025).

Chapter 10: *Science communication as a field of praxis: A theoretical model of converging domains*; by Mayara de Carvalho Santos, Wilton José Diolindo Nascimento Júnior, & Gildo Girotto Júnior. Science Communication (SC) has expanded across multiple formats and platforms, but it lacks a theoretical consensus on its nature and purposes. This chapter proposes a theoretical model that understands SC not as a process or an instrument, but as an autonomous field of praxis. The model argues that SC materialises its practice at the convergence of four fields—the scientific, the communicational, the educational, and the technological—and operates through a process of negotiated autonomy. This praxis-based approach opposes traditional paradigms of discursive reformulation and genre, which reduce it to a merely instrumental view. Instead, we consider SC as an intentional and reflective action that redefines itself, its object, and its purpose. The model suggests that SC must present science in action, aim to expand the public's conceptual profile, and foster a relationship of mutual enrichment between science and society. This approach seeks to strengthen trust in science, recognising it as a pillar of a more just and democratic society. The model also offers conceptual guidance for the design, analysis, and evaluation of communication practices across diverse institutional and social contexts.

Chapter 11: *Intermediate phase teachers' knowledge, beliefs, and challenges in promoting self-regulated learning in selected South African primary schools*; by Keneilwe Agbenyegah & Bernadette Geduld. Primary schooling is a key contributor to the ongoing underperformance and broader crisis in South African education, yet despite increasing demands associated with the twenty-first century and the Fourth Industrial Revolution, it has received limited attention in developing self-regulated learning approaches. Self-regulated learning is essential in contemporary education, equipping learners with cognitive, motivational, and behavioural skills for academic success and lifelong learning. Teachers' perceptions, knowledge, and beliefs about self-regulated learning shape classroom practices and learners' opportunities to develop these skills. However, limited familiarity with SRL concepts may constrain teachers' ability to integrate SRL effectively into their teaching. Although the value of SRL is well established in the literature, less is known about teachers' understanding of SRL and their capacity to promote it in South African primary school contexts. This qualitative study explored Intermediate Phase teachers' knowledge of, and beliefs about, the value of SRL. Situated within an interpretivist paradigm, purposive sampling selected fifteen teachers from three primary schools. Data were generated through semi-structured face-to-face interviews. Findings indicate that while teachers recognise the importance of self-regulated learning and their role in fostering it, limited knowledge and training hinder effective implementation, highlighting the need for targeted professional development.

Chapter 12: *Arithmetic repetition in the teaching and learning of algebra and functions in upper secondary school - Reality status and development directions*; by Natalia Karlsson & Wiggo Kilborn. This study examines students' learning of arithmetic–algebra content, focusing on the transition from prior arithmetic knowledge to algebra in relation to how repetition is organized in teaching. The focus was on repetition of arithmetic content, as well as arithmetic repetition–concept shifts into new learning contexts, including algebraic expressions, equations, and the concept of function. In this study, teaching and students' subject-specific learning were analyzed according to the methodological design of Freudenthal's didactical phenomenology, with a focus on the relationship between the teaching of arithmetic and algebra, and Bernstein's conceptualization of the repetition–without–repetition approach, which concerns how prior knowledge should be systematized and integrated with new knowledge. The study illustrates that students' prior knowledge is used to a very limited extent in teaching and in a one-sided manner. The teaching of algebra is seen as an isolated act and has no conceptual connection to students' arithmetic knowledge. The following chapter sets out recommendations to address this problem and outlines an alternative approach to the teaching and learning of algebra and functions that incorporates repetition. The study highlights the importance of developing an alternative approach to “get through” learning-oriented repetition and teaching, grounded in a psychological perspective.

Chapter 13: *Exploring the relationship between students' mathematics self-efficacy and mathematical literacy*; by Eleni Nolka. Mathematics self-efficacy—the belief in one's ability to successfully perform mathematics-related tasks—has been consistently linked to improved mathematical performance and literacy. This study investigates the relationship between mathematics self-efficacy and mathematical literacy among Greek students at the end of compulsory education. A sample of 650 students from schools across major urban centers, small urban centers, and rural areas in Greece participated in the study. Mathematics self-efficacy was measured both as a single composite index and through four specific subcategories: (1) self-efficacy in solving abstract mathematical exercises, (2) self-efficacy in addressing real-world problems, (3) self-efficacy in mathematical literacy skills, and (4) self-efficacy in information literacy skills. The study aims to determine whether statistically significant correlations exist between students' performance in mathematical literacy and each of these dimensions of self-efficacy. The findings reveal a statistically significant positive correlation between overall mathematics self-efficacy and mathematical literacy performance. Furthermore, each of the four subcategories also demonstrated statistically significant positive correlations with mathematical literacy outcomes. These results underscore the multifaceted nature of mathematics self-efficacy and its critical role in supporting students' success in mathematical literacy, particularly as assessed in large-scale frameworks such as PISA.

Chapter 14: *Supporting science teachers to cultivate epistemic empathy*; by Valentina Bologna & Caterina Bembich. Epistemic empathy involves understanding and appreciating others' cognitive and emotional experiences during knowledge construction, communication, and critique. Lacking empathy in science education is a major issue because it causes educators to overlook or undervalue students' unconventional ideas when they stray from established scientific beliefs. Failing to acknowledge the learner's intellectual and emotional struggles can confine student ideas within rigid frameworks, hindering inclusive and equitable learning. To address this challenge, a professional development program was implemented during the 2023/2024 school year for primary and lower secondary school teachers. The program aimed to foster new teaching habits by encouraging the adoption of the Investigative Science Learning Environment (ISLE) approach. The present study sought to connect the development of these professional habits with the growth of epistemic empathy and to assess teachers' awareness of their evolution through their own reflections. Preliminary findings demonstrate that the training framework successfully facilitated the emergence of new teaching habits and enhanced teachers' understanding of epistemic empathy, highlighting the vital role of structured professional development in fostering responsive and student-centered instruction.

Chapter 15: *Integrating advanced technology for pedagogical enhancement in grade 10 accounting instruction: A South African viewpoint*; by Olwethu Solundwana & Limkani Sincuba. The study investigated the integration of technology into Grade 10 accounting instruction, examining how teachers adapted their methodologies to incorporate various technological tools, such as online platforms and interactive software, following the COVID-19 pandemic. A qualitative research approach was employed. The study adopted a constructivist learning theory. A purposive sample of 15 accounting teachers from five schools in the OR Tambo Coastal region was utilised. Data were collected through in-depth interviews. The data was analysed using thematic analysis. The study concluded that while technology integration offered significant benefits for educational outcomes in accounting, it also revealed challenges that require comprehensive training programs and strategic investments in resources. Future research could investigate the long-term effects of technology integration on learner performance and identify effective practices for teacher professional development. The study recommended ongoing professional development programs tailored for accounting teachers, prioritising resource allocation for technology access, and establishing collaborative learning communities among teachers. Additionally, training programs were developed to enhance learners' technological skills. Updating the curriculum to emphasise digital literacy and creating robust support systems for technical issues were essential.

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

Chapter 16: *Self-evaluation among first-year university students: Anticipated performance in academic assessments*; by Giulia Maria Cavaletto & Federica Cornali. This study explores university students’ self-perception regarding their preparation and expectations for grades compared to the results obtained in an exam. Involving 134 freshmen from a bachelor’s degree program, the survey compared students’ predictions about their grades with those they actually achieved. The results highlighted a significant discrepancy between expectations and performance, with many students tending to overestimate their own preparation, especially those with unsatisfactory results. The analysis also revealed a relationship between the type of secondary school attended and grade expectations, with students from technical and vocational schools often having higher expectations compared to those from high schools. The study suggests that a lack of familiarity with university evaluation methods and the effects of previous school socialization could influence students’ perceptions.

Chapter 17: *Developing critical thinking skills in secondary school learners using educational philosophies: South African teachers’ perspectives*; by Bianca Williams & Celestin Mayombe. Critical thinking is one of the highly recommended skills for the 21st century that young people should cultivate from secondary education to prepare them for the future of work. This chapter examines how secondary school teachers use educational philosophies in classrooms to develop critical thinking skills in learners. The study used a qualitative research approach and a multiple case-study design to understand the participant teachers’ perspectives. The study population consisted of Grade 10-12 secondary school teachers within the Buffalo City Metro (BCM) District in the Eastern Cape, South Africa. The sample size consisted of 12 teachers. Purposive sampling was used to select the participant teachers for semi-structured and focus group interviews. The study used thematic analysis methods to analyse data. The findings reveal that teachers practised social constructivism and progressivism as educational philosophies to develop critical thinking skills in their learners. The authors conclude that developing critical thinking skills in secondary school learners by using relevant educational philosophies could result in preparing them for the future world of work or tertiary education. To develop critical thinking in secondary school learners, the study recommends that the Department of Education and policymakers should implement ongoing teachers’ continuous professional development that involves hands-on strategies for teaching each subject in classrooms.

Chapter 18: *The use of grade-level readers in the foundation phase*; by Martha Khosa. Grade-Level Readers in the form of Reading Anthologies are provided in South African Foundation Phase classrooms (Grades 1 to 3) for home language learners to promote their reading interest and make teaching reading easier. However, evidence shows that teachers lack an understanding of teaching reading in line with methodologies prescribed in the curriculum. This study examines the

effectiveness of Grade-Level Reading Anthologies in impacting reading instruction and promoting reading in the Foundation Phase. A qualitative case study underpinned by Tomlinson's theory of differentiation, Vygotsky's Zone of Proximal Development and Krashen's Input Hypothesis were used to collect and analyse data in six quintile 1 and 2 (categorised as the poorest) primary schools. Grade 3 reading lessons (with grade-level readers used as the main resource during group guided reading activities) were observed. Data from the lesson observations were analysed manually by using thematic analysis. Classroom observations revealed the teachers' lack of knowledge in teaching reading and their inability to cater for differences and diversity in the classroom. In view of these findings, it is recommended that teachers be provided support through coaching from relevant stakeholders so that they can teach reading cognisant of the differences existing in their classrooms.

Chapter 19: *Through a child's eyes - Literature as a bridge to understanding PTSD*; by Yaakova Sacerdoti. This article examines a corpus of Israeli picture books for children aged 4–7 that depict fathers coping with combat-related posttraumatic stress disorder (PTSD). Written and published in direct response to the October 7, 2023 attacks and the ensuing Iron Swords War, these six works constitute the only literary corpus to date that addresses paternal combat-related PTSD in Israeli children's literature. They mark a profound cultural shift, challenging established motifs of heroism and sacrifice alongside the broader national ethos that has long shaped Israeli narratives for the young. The analysis considers these six books: Papa Tank (Sosonovsky, 2023), Posti and Me (Leibovitz & Cohen-Leibovitz, 2025), What Happened to Or's Dad? (Brosh, 2024), Where Did Dad's Laughter Go? (Tzvi, 2024), Daddy Postamaty (Zerach, 2024), and Menachem's Secret Soldier (Ramati, 2024). Together, these books trace how trauma reshapes family life - from initial harmony through paternal withdrawal and children's emotional disorientation to tentative understanding and open-ended recognition. By translating complex psychological realities into symbolic and accessible forms, the corpus enables young readers to perceive war and recovery through a child's eyes, foregrounding young children's emotional interpretations and coping strategies. These works reconfigure the canonical figure of the stoic "Israeli fighter," redefining heroism to include vulnerability, empathy, and relational resilience. Beyond the Israeli context, the study contributes to broader academic and pedagogical discourse on trauma, illustrating how children's literature can serve as a cross-cultural and therapeutic medium that equips young readers, especially those growing up amid conflict, with tools for dialogue, emotional literacy, and resilience.

Chapter 20: *Exploring the effectiveness of integrating didactic games in arithmetic lessons: A case study at the rudimentary level in South Africa*; by Fitzgerald Abakah & Albert Antwi. Primary school learners' consistent underperformance in arithmetic, mainly attributed to ineffective instructional approaches employed in mathematics classrooms in South Africa, is the impetus for conducting this study. This quantitative case study examined the efficacy of incorporating a didactic game - Magic Square - in tandem with the Gurteen Knowledge Café approach for

arithmetic instructions. Participants ($n = 31$) were Grade 3 learners from a primary school in the Northern Cape Province. Initially, learners were taught arithmetic using the traditional approach, followed by a pre-test. The intervention involved collaborative groups of 3-4 learners engaging with the new pedagogy, followed by a post-test. Kolb's experiential learning cycle served as the theoretical framework. Data collection methods included classroom observations, a pre-test and a post-test. Learners' pre-test and post-test scores were statistically analysed using the Bayesian Random-Effect Negative Binomial Model, which revealed a significant difference between the mean marks of the pre-test and post-test. The findings suggest that Magic Square is a more effective pedagogical tool for conducting arithmetic lessons at a rudimentary level compared to the traditional approach. Consequently, the researchers recommend incorporating the Magic Square as a didactic game into arithmetic instructions in South African primary schools to improve learners' performance and engagements.

Chapter 21: *Developing transversal skills through creative team building in engineering education*; by Francesca Maria Ugliotti, Michele Zucco, & Margherita Cassis. Integrating pedagogical innovations and inclusive approaches in university education supports a shift from passive instruction to active, cooperative learning and the development of transversal skills – particularly collaboration and critical problem-solving – demanded by contemporary engineering and architectural practice. This article presents an experiential team-building intervention implemented in a first-year Building Drawing course at Politecnico di Torino, designed to enhance peer interaction and cooperative decision-making between students from heterogeneous backgrounds. The experiential activity proposes a creative challenge in the field of modular architecture by using the 3D-printed basic element proposed by the architect Walter Gropius. The intervention was evaluated through a questionnaire combined with qualitative classroom observations to capture perceived learning experience and group dynamics. This experience shows how innovative teaching methodologies can strengthen relational and collaborative behaviours and, in parallel, increase student motivation, preparing learners to manage group dynamics and suggesting that inclusive, design-based team building can effectively support the development of transversal skills in AEC education.

Chapter 22: *Teaching law in the age of artificial intelligence: time for curriculum reform?*; by Allison Geduld. A revolution has been introduced by the introduction of generative artificial intelligence (AI). Generative AI systems can now perform activities relating to problem-solving and decision-making. The introduction of AI questions traditional approaches to teaching and learning but brings with it a plethora of ethical issues such as academic integrity. Curriculum policy documents on legal education in South Africa outline essential skills for law graduates such as reading, writing and research skills. None of these documents speak to the ethical use of AI tools. The central question of this study is: what aspects of legal curricula in South Africa should be addressed to adequately prepare law graduates for the legal profession in the age of AI? The first part consists of a consideration of the relevant

skills that are needed for law graduates in the age of AI. The second part evaluates the various quality standards documents on legal education in South Africa against the findings in the first part. The final section will propose recommendations for curriculum reform. This paper concludes that legal curricula must incorporate skills training aimed at the use of AI tools.

Chapter 23: *Critical thinking dispositions in the university student population: A narrative synthesis of the concept*; by Sharmila Fathima, Ron Salden, Chia Ping Lee, Terry Lansdown, & Deborah Ann Hall. Experts in the field of critical thinking (CT) make a conceptual distinction between CT skills and dispositions. While CT skills are the cognitive abilities to think critically, CT dispositions are the ingrained habits and attitudes that motivate individuals to apply those skills in given situations. Despite the rapid growth of CT research over the past three decades, most work has concentrated on CT skills rather than dispositions. Hence, there is a lack of consensus on the dispositional dimension, specifically how it is measured and how it can be nurtured by educators. This chapter addresses how CT dispositions have been defined in the literature. A systematic review methodology was used to search Web of Science, Scopus and PsycINFO databases from 1988 to 2022. Of 1014 records screened, 63 met the inclusion criteria. Findings were synthesised to create a single conceptual framework comprising 26 distinct dispositions. While our framework shows strong alignment with previous models, it adds new knowledge by highlighting the role of affective components, such as empathy. The framework provides a unified basis for advancing research, assessment, and pedagogy for CT dispositions in education settings. Moreover, critical evaluation of current measurement instruments reveals limited coverage and highlights the need for more comprehensive tools.

Chapter 24: *Extending the 2D3S4L framework: Generative AI for pedagogy, literacy, and cross-cultural English classrooms*; by Wei Zhang & Dzintra Iliško. This chapter presents the 2D3S4L instructional model, designed to embed generative chatbots into secondary English classrooms with pedagogical coherence. The model aligns teaching and learning processes across two dimensions (teachers and students), three stages of instruction (pre-class, in-class, post-class), and four recursive loops (analyze, design, implement, evaluate). Grounded in sociocultural theory and the TPACK framework, the model was implemented in Chinese secondary schools using DeepSeek and Doubao AI to support writing, speaking, and reflective reading tasks. Findings show chatbots enhanced idea generation, linguistic accuracy, and learner autonomy, while teacher prompts and scaffolded feedback were critical for effective integration. Concrete examples illustrate how chatbots facilitate task execution and deepen reflection. The chapter provides a structured framework, as well as practical guidance, on what future AI-enhanced language instruction might look like. The chapter provides not only a structured framework but also concrete suggestions for what new AI-enhanced language instruction may be for educators in the future. These initiatives set up both theoretical foundations as well as practical approaches toward the impactful implementation of AI in language learning.

Chapter 25: *The combined use of concept maps and the Kahoot gaming tool for a structured teaching of telecommunications*; by Gerasimos Pagiatakis, Nikolaos Voudoukis, Dimitris Uzunidis, & Dimitrios Karaoulanis. The chapter presents the combined use of concept maps and the Kahoot gaming tool in the teaching of telecommunications. Concept maps were used for the presentation of the overall telecommunication subject through core concepts such as signals, transmission techniques, links, networks/services and market issues aiming at the students forming a well-structured overview of the telecommunication subject. At a second level, map elements were correlated to illustrate essential features of specific telecommunication applications. Kahoot, on the other hand, was used to help students visualize specific complicated topics such as electromagnetic propagation and signal transmission through optical fibers, the rationale being that visualization would help the students better comprehend the subsequent mathematical analysis. Kahoot was also used by the students to self-check the knowledge obtained by means of concept maps. The described approach was applied in the framework of telecommunication courses at the Department of Electrical & Electronic Engineering Educators, School of Pedagogical & Technological Education (ASPETE), Athens, Greece with the aim the students to develop technological and pedagogical content knowledge in accordance with the TPACK framework. The teaching process was evaluated through of two short questionnaires, the answer to which showed that the applied approach was successful and well received.

Chapter 26: *Enhancing motivation in dentistry education through an interdisciplinary multimedia project-based learning approach*; by Riánsares Arriazu Navarro, Encarnación Amusquivar Arias, Carlos Bocos de Prada, María José Borrego Gutiérrez, Lucía Guerra Menéndez, Elisa Jiménez Cabré, Esther Lantero Bringas, Úrsula Muñoz Morón, María del Nogal Ávila, María Isabel Panadero Antón, Sergio Portal Núñez, & Julio Sevillano Fernández. In recent years, fostering active student engagement and interdisciplinary learning in health sciences education has become increasingly important. This chapter presents an in-depth evaluation of the BioFilm project, an innovative Project-Based Learning initiative implemented with first-year Dentistry students at Universidad San Pablo-CEU, including both international and national students. Many dentistry students do not perceive the relevance of basic science subjects in their future profession, which can make learning process overwhelming. The BioFilm project was designed to bridge this gap by integrating Biology, Genetics, Biochemistry, and Physiology through collaborative didactic video creation. This approach promotes knowledge integration, encourages transferable skills development, and leverages Information and Communication Technologies (ICT) to enhance motivation. Drawing on the pilot project experience, this chapter offers a comprehensive analysis of its design, outcomes, and reflections from both students and faculty, highlighting key challenges and outlining recommendations for future implementation.

Chapter 27: *Embodied learning through approaching works of art in the education of future kindergarten teachers*; by Kalliopi Trouli & Sofia Trouli. This paper aims to explore embodied learning through approaching works of art in the context of educating future kindergarten teachers and to contribute to the application of contemporary theory of embodied cognition in Pedagogical Departments. The study highlights the pre-existing perceptions of future kindergarten teachers regarding the use of embodied learning through approaching works of art in the classroom or in a museum environment and proposes, based on students' concerns and needs, a workshop grounded in this approach. A two-phase mixed research study was conducted. In the first phase, 53 undergraduate students completed an initial questionnaire, followed by analysis of their responses. Based on the findings, a four-phase workshop was designed and implemented, simulating experiential embodied learning practices for the school classroom. In the second phase, 23 students from the initial sample participated in the workshop and completed a second questionnaire. Data were analyzed using descriptive statistics and thematic analysis. Findings from the first phase indicate that future kindergarten teachers associate artistic, physical, and cultural experiences with key aspects of comprehensive preschool development. Reflections from the second phase revealed deeper emotional engagement's motor activation, empathy, creativity, and participation in learning, highlighting the workshop's potential in teacher education.

Special thanks to the above authors, editorial advisory members, and reviewers who contributed with their efforts to make this book possible.

May, 2026

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