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Pedagogical Conditions For Improving The Methodology Of Developing Students' Professional Competence In The Digitalization Environment

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Abstract. This article examines the pedagogical conditions necessary for improving the methodology of developing students' professional competence in the context of digital transformation in higher education. The study focuses on the integration of digital learning environments, competency-based education, and innovative pedagogical technologies that collectively contribute to the formation of professionally oriented skills and abilities. Special attention is given to the role of interactive educational platforms, blended learning models, and the digital readiness of teaching staff as key determinants of effective competency development. The findings emphasize that the modernization of methodological approaches in digital education requires a systematic transformation of pedagogical conditions, ensuring the alignment between educational objectives, technological resources, and the evolving demands of the labor market.

Keywords: digitalization, professional competence, pedagogical conditions, higher education, competency-based education, digital learning environment.

Introduction. The rapid advancement and widespread integration of digital technologies have fundamentally transformed the structure, content, and organizational principles of higher education systems across the globe. In the context of contemporary educational development, digitalization is no longer perceived merely as an auxiliary or supplementary instrument for instructional support; rather, it has evolved into a central and systemic component of pedagogical design, curriculum development, and the overall management of educational processes. The emergence of digital ecosystems in education has reshaped traditional teaching and learning paradigms, leading to the reconfiguration of roles, responsibilities, and interactions among students, educators, and institutional frameworks.

In modern higher education environments, the integration of digital technologies has resulted in significant changes in how knowledge is accessed, constructed, and applied. Learning is increasingly characterized by flexibility, interactivity, and personalization, allowing students to engage with educational content through diverse digital platforms, virtual learning environments, and cloud-based resources. As a result, the boundaries between formal and informal learning have become increasingly blurred, giving rise to continuous and lifelong learning trajectories that extend beyond the confines of traditional classroom settings. This transformation has placed new demands on higher education institutions, requiring them to ensure not only the transmission of theoretical knowledge but also the development of practical, adaptive, and technologically mediated competencies.

Within this evolving educational paradigm, the development of students' professional competence has acquired heightened importance and strategic relevance. Contemporary labor markets, characterized by globalization, technological acceleration, and constant innovation, increasingly demand graduates who are capable of functioning effectively in complex, uncertain, and digitally mediated professional environments. Employers now expect individuals not only to possess solid disciplinary knowledge but also to demonstrate advanced problem-solving abilities, critical thinking skills, digital literacy, collaborative competencies, and the capacity for continuous professional development. Consequently, higher education systems are required to respond to these expectations by redefining their educational objectives and by adopting innovative pedagogical approaches that align with the requirements of the digital economy.

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Professional competence in the digital age can be conceptualized as an integrative and multidimensional construct that encompasses a combination of theoretical knowledge, practical skills, cognitive abilities, behavioral attitudes, and digital competencies. It reflects an individual's capacity to effectively apply acquired knowledge in real-world professional contexts, particularly in situations that are complex, dynamic, and technologically intensive. This includes not only subject-specific expertise but also transversal skills such as information processing, digital communication, teamwork in virtual environments, and the ability to independently acquire and critically evaluate new knowledge. In this sense, professional competence is not a static attribute but rather a continuously evolving characteristic that develops throughout an individual's educational and professional trajectory.

Accordingly, the methodology for developing students' professional competence must undergo substantial transformation in response to ongoing digitalization processes. Traditional pedagogical approaches, which are often based on passive knowledge transmission and standardized instructional models, are increasingly insufficient in addressing the needs of modern learners and the demands of contemporary professional environments. Instead, there is a growing necessity to adopt learner-centered, competency-based, and technology-enhanced instructional strategies that actively engage students in the learning process and foster the development of both cognitive and practical skills.

This transformation necessitates the identification, design, and implementation of specific pedagogical conditions that can effectively support the development of professional competence in digital learning environments. Such conditions include the creation of integrated digital educational ecosystems, the incorporation of interactive and adaptive learning technologies, the enhancement of educators' digital pedagogical competencies, and the promotion of autonomous and self-regulated learning among students. Furthermore, it is essential to ensure the alignment of educational content, teaching methodologies, and assessment strategies with contemporary professional standards and labor market requirements. Only through the systematic and coordinated implementation of these pedagogical conditions can higher education institutions effectively prepare students to meet the challenges of an increasingly digitalized and knowledge-driven global economy.

Theoretical Background and conceptual framework - The theoretical foundation of professional competence development in contemporary higher education is grounded in several interrelated pedagogical and psychological paradigms, among which competency-based education theory, constructivist learning theory, and socio-cultural approaches to learning occupy a central position. These theoretical frameworks collectively provide a comprehensive conceptual basis for understanding how professional competence is formed, developed, and assessed in digitally enhanced educational environments, where traditional instructional models are increasingly being replaced by more dynamic, learner-centered, and outcome-oriented approaches.

Competency-based education theory represents a fundamental shift from knowledge-centered instruction to outcome-driven learning processes, in which the primary emphasis is placed on the demonstrable ability of learners to apply acquired knowledge and skills in authentic, real-world contexts. Within this paradigm, education is no longer defined solely by the accumulation of theoretical information, but rather by the capacity of individuals to integrate knowledge, skills, attitudes, and values in order to solve complex professional problems. This approach emphasizes measurable learning outcomes, performance-based assessment, and the alignment of educational objectives with labor market requirements and professional standards. As a result, competency-based education promotes the development of transferable and functional skills, enabling learners to adapt effectively to rapidly changing professional environments characterized by technological advancement and increasing complexity.

In addition, constructivist learning theory provides a critical epistemological and pedagogical foundation for understanding the active role of learners in the knowledge acquisition process. According to constructivist principles, learning is not a passive reception of information, but rather an active, self-regulated, and context-dependent process through which individuals construct new knowledge by integrating prior experiences with new informational inputs. Within this framework, students are regarded as active participants in the learning process who continuously engage in meaning-making activities through exploration, reflection, experimentation, and collaboration. The digitalization of education significantly enhances constructivist learning processes by expanding access to a wide range of digital resources, including multimedia content,

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virtual simulations, interactive modules, and adaptive learning systems. These technologies create rich, immersive, and flexible learning environments that support experiential learning, foster critical thinking, and enable students to engage in problem-solving activities that closely resemble real professional situations.

Moreover, socio-cultural theory, primarily associated with the works of Vygotskian psychology, emphasizes the fundamental role of social interaction, cultural context, and mediated learning in cognitive development. From this perspective, learning is understood as a socially situated process that occurs through interaction with more knowledgeable others, participation in collaborative activities, and engagement with culturally and technologically mediated tools. In the context of digital learning environments, mediation takes on new forms through the use of online communication platforms, learning management systems, virtual classrooms, discussion forums, and collaborative digital workspaces. These tools facilitate continuous interaction between students, instructors, and peer groups, thereby fostering the co-construction of knowledge and the development of higher-order cognitive skills.

Furthermore, the integration of socio-cultural principles into digital education contributes to the formation of learning communities in which knowledge is collectively constructed and shared. Such environments promote collaborative problem-solving, peer learning, and distributed cognition, all of which are essential for the development of professional competence in modern interdisciplinary and technology-driven fields. Digital tools also enable asynchronous and synchronous forms of communication, thereby expanding opportunities for reflection, feedback, and iterative knowledge refinement.

Taken together, these theoretical perspectives form an integrated conceptual framework that underpins the development of professional competence in digitalized higher education systems. The competency-based approach ensures alignment with professional and societal demands, constructivist theory supports active and meaningful knowledge construction, and socio-cultural theory highlights the importance of interaction and mediation in cognitive development. In combination, these frameworks provide a robust foundation for designing pedagogical models that are responsive to the challenges of digital transformation and capable of fostering advanced professional competencies in students. This integrated theoretical perspective also underscores the necessity of creating adaptive, interactive, and technologically enriched learning environments that support continuous learning, critical inquiry, and professional growth.

Pedagogical conditions for developing professional competence - The effectiveness of methodologies aimed at developing students' professional competence in a digitalized educational environment is largely determined by a complex system of interrelated pedagogical conditions that collectively influence the quality, accessibility, sustainability, and relevance of the learning process. These conditions do not function in isolation; rather, they interact dynamically within an integrated educational ecosystem, shaping both the organizational structure and the pedagogical effectiveness of competency-based learning. In the context of rapid digital transformation, the identification and implementation of such conditions become a critical prerequisite for ensuring that higher education institutions are capable of preparing graduates who meet contemporary professional and technological demands.

One of the most significant pedagogical conditions is the creation and continuous development of an integrated digital educational environment that unifies electronic learning management systems, digital repositories of educational content, multimedia instructional resources, and interactive content delivery platforms. Such an environment ensures uninterrupted and flexible access to educational materials regardless of temporal and spatial constraints, thereby significantly increasing the accessibility of learning opportunities. Moreover, integrated digital environments facilitate the personalization of learning trajectories by enabling adaptive content delivery, data-driven tracking of student progress, and individualized feedback mechanisms. Through the incorporation of interactive simulations, virtual laboratories, augmented learning modules, and intelligent tutoring systems, such environments also enhance student engagement, motivation, and cognitive involvement in the learning process. Consequently, the digital educational ecosystem becomes not merely a repository of information, but a dynamically evolving pedagogical space that supports active knowledge construction and continuous competence development.

Another essential pedagogical condition is the implementation of competency-oriented instructional design, which requires a fundamental restructuring of curricula, syllabi, and assessment frameworks in accordance with clearly defined learning outcomes that reflect authentic professional tasks and real-world challenges. This approach shifts the focus of education from fragmented theoretical instruction to the holistic

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development of integrated competencies that combine knowledge, skills, and professional attitudes. Competency-oriented design is operationalized through the systematic application of pedagogical strategies such as problem-based learning, case-based instruction, project-oriented activities, and simulation-based training. These methodologies create opportunities for students to engage in complex cognitive processes, including analysis, synthesis, evaluation, and decision-making, thereby fostering the development of higher-order thinking skills and applied problem-solving abilities. In addition, such approaches promote interdisciplinary integration and encourage students to transfer knowledge across different contextual situations, which is a key requirement of modern professional practice.

Equally important is the methodological and technological readiness of teaching staff to operate effectively within digital learning environments. The digital competence of educators represents a decisive factor in the successful implementation of innovative pedagogical strategies, as it directly influences the quality of instructional design, the effectiveness of technology integration, and the overall learning experience of students. Teachers are expected not only to possess technical proficiency in the use of digital tools but also to demonstrate pedagogical flexibility in designing interactive learning materials, managing virtual classrooms, and facilitating collaborative online learning processes. This necessitates a systematic approach to continuous professional development, including targeted training programs, professional workshops, digital literacy enhancement courses, and institutional support mechanisms aimed at fostering educators' adaptability to ongoing technological change. Without sufficient investment in the professional growth of teaching staff, the potential of digital education cannot be fully realized, regardless of the availability of advanced technological infrastructure.

In addition, the development of students' autonomous and self-regulated learning capacity constitutes a fundamental pedagogical condition for effective competence formation in digital learning environments. The nature of digital education inherently shifts a significant portion of responsibility for learning outcomes from educators to learners, requiring students to actively manage their cognitive, motivational, and organizational learning processes. This includes the ability to set learning goals, plan and monitor learning activities, critically evaluate information sources, and engage in reflective self-assessment. The promotion of self-directed learning strategies is therefore essential for fostering independence, responsibility, and adaptability in students. Furthermore, autonomous learning contributes to the development of lifelong learning competencies, which are increasingly recognized as essential attributes in modern knowledge-based economies characterized by rapid technological change and continuous professional evolution. Digital platforms further support this process by providing tools for personalized learning paths, adaptive exercises, and self-assessment modules.

Finally, the integration of formative assessment strategies supported by digital technologies significantly enhances the quality and effectiveness of the learning process. Unlike traditional summative assessment models, formative assessment focuses on continuous monitoring of student progress, timely feedback provision, and the identification of learning gaps during the instructional process. Digital assessment tools, including online quizzes, learning analytics dashboards, interactive assignments, and automated feedback systems, enable educators to obtain real-time data on student performance and learning behaviors. This data-driven approach facilitates evidence-based instructional decision-making and allows for the timely adjustment of teaching strategies. Moreover, formative assessment contributes to the development of reflective thinking, metacognitive awareness, and self-regulation skills among students, all of which are essential components of professional competence. By fostering continuous feedback loops and encouraging iterative improvement, formative assessment transforms evaluation from a static measurement tool into an integral part of the learning process.

Taken together, these pedagogical conditions form a coherent and interdependent system that underpins the successful development of professional competence in digitalized higher education contexts. Their effective implementation requires a holistic and strategically coordinated approach that integrates technological innovation, curriculum design, educator development, learner autonomy, and assessment reform into a unified pedagogical framework.

Methodological approaches to improvement - The improvement of methodologies aimed at developing students' professional competence in digitalized educational environments requires a comprehensive rethinking of traditional instructional paradigms and the systematic adoption of innovative pedagogical models that are closely aligned with rapid technological advancements and evolving educational

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objectives. In contemporary higher education systems, methodological transformation is not merely a matter of introducing new teaching techniques, but rather involves a fundamental restructuring of the educational process in terms of its design principles, instructional strategies, learning environments, and assessment mechanisms. This transformation is driven by the increasing complexity of professional requirements, the expansion of digital technologies, and the growing demand for adaptive, flexible, and learner-centered education.

One of the most widely implemented and pedagogically effective methodological approaches is the blended learning model, which integrates traditional face-to-face instruction with online and technology-mediated learning components. This hybrid model provides a flexible and scalable framework for organizing the educational process, allowing institutions to combine the strengths of direct teacher-student interaction with the advantages of digital learning environments. Within blended learning systems, students benefit from the opportunity to access instructional materials at any time, engage in asynchronous learning activities, and participate in synchronous classroom discussions that focus on clarification, application, and critical analysis of previously studied content. Furthermore, blended learning supports differentiated instruction by enabling educators to adjust the pace, complexity, and format of learning materials according to individual student needs. This methodological approach not only enhances accessibility and flexibility but also contributes to the gradual development of self-regulated learning skills, digital literacy, and independent cognitive engagement, all of which are essential components of professional competence in the digital age.

Closely related to blended learning is the flipped classroom approach, which represents another significant methodological innovation in competency-based education. In this model, the traditional sequence of instruction is reversed, allowing students to engage with theoretical content independently outside the classroom through digital resources such as video lectures, interactive modules, and online readings. Classroom time is subsequently reallocated to active learning activities, including problem-solving exercises, collaborative projects, case study analysis, and peer-to-peer discussions. This methodological shift transforms the role of the teacher from a primary source of knowledge transmission to a facilitator of learning, mentor, and cognitive guide who supports students in the application and deeper understanding of previously acquired knowledge. The flipped classroom model is particularly effective in fostering higher-order cognitive skills, such as analysis, synthesis, evaluation, and creative problem-solving, as it encourages students to actively engage with complex professional tasks in a collaborative and interactive environment. Additionally, this approach enhances student motivation and engagement by promoting active participation and reducing passive learning behaviors.

In addition to these pedagogical models, the integration of advanced digital technologies such as artificial intelligence-based educational tools, virtual simulations, and adaptive learning systems plays a crucial role in improving methodological effectiveness. Artificial intelligence technologies in education enable the development of intelligent learning environments that are capable of analyzing student performance data, identifying individual learning patterns, and providing personalized instructional recommendations. These systems facilitate adaptive learning pathways that adjust in real time to the learner's progress, strengths, and weaknesses, thereby ensuring a more individualized and efficient learning experience. As a result, students receive targeted support that addresses their specific cognitive needs, which significantly enhances the effectiveness of competence acquisition and reduces learning gaps.

Table 1. Pedagogical conditions and methodological approaches for developing students' professional competence in a digitalized educational environment

No.	Pedagogical condition	Description	Methodological implementation	Expected educational outcome
1	Integrated digital learning environment	Creation of a unified digital ecosystem including LMS, online resources,	Use of learning management systems, virtual classrooms, cloud platforms, digital repositories	Continuous access to learning materials, personalized learning trajectories,

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		multimedia content, and communication tools		increased engagement
2	Competency-based instructional design	Orientation of curriculum toward measurable professional competencies and real-world tasks	Problem-based learning, case studies, project-based learning, simulation training	Development of practical skills, critical thinking, and decision-making abilities
3	Teacher digital competence	Ability of educators to effectively use digital tools and design technology-enhanced learning processes	Professional development programs, ICT training, digital pedagogy workshops	Improved teaching quality and effective integration of educational technologies
4	Student autonomous learning	Development of self-regulated learning and responsibility for learning outcomes	Self-directed learning tasks, online modules, independent projects, reflective activities	Formation of lifelong learning skills, self-management, and critical thinking
5	Formative digital assessment	Continuous evaluation of learning progress using digital tools and feedback systems	Online quizzes, analytics dashboards, adaptive testing, e-portfolios	Real-time feedback, improved learning outcomes, development of metacognitive skills
6	Blended learning approach	Integration of face-to-face and online learning formats into a unified model	Hybrid classes, flipped classroom model, online + offline tasks	Flexibility, improved interaction, deeper conceptual understanding
7	AI and adaptive learning systems	Use of intelligent technologies to personalize learning processes	AI-based platforms, adaptive learning systems, intelligent tutoring systems	Individualized instruction, optimized learning speed, reduced knowledge gaps

Virtual simulations and immersive learning environments further contribute to methodological improvement by providing students with opportunities to engage in realistic, practice-oriented scenarios that replicate professional contexts. Such technologies are particularly valuable in fields that require procedural knowledge, technical skills, and decision-making under complex conditions. Through simulation-based learning, students can experiment, make decisions, and observe consequences in a controlled and risk-free environment, thereby bridging the gap between theoretical knowledge and practical application. This experiential learning approach fosters deeper understanding, enhances retention of knowledge, and strengthens the development of professional competencies that are directly transferable to real-world situations.

Adaptive learning systems, which are often powered by artificial intelligence and data analytics, represent another significant methodological advancement. These systems continuously monitor learner performance and dynamically adjust the content, difficulty level, and pace of instruction to match individual learning needs. By providing real-time feedback and personalized learning trajectories, adaptive systems ensure that each student progresses at an optimal rate, thereby maximizing learning efficiency and effectiveness. Moreover, these technologies support the identification of learning difficulties at an early stage, allowing for timely pedagogical interventions and targeted support.

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Taken together, these methodological approaches—blended learning, flipped classroom models, artificial intelligence-enhanced instruction, virtual simulations, and adaptive learning systems—constitute a comprehensive and interconnected framework for the modernization of professional competence development in digital educational environments. Their combined implementation enables the creation of flexible, personalized, and technologically enriched learning ecosystems that are capable of addressing the diverse needs of contemporary learners while ensuring alignment with the demands of modern professional practice.

Conclusion. The development of students' professional competence in the context of accelerating digitalization processes within higher education systems necessitates a profound and comprehensive transformation of existing pedagogical methodologies, organizational structures, and learning environments. The findings of this study indicate that traditional approaches to teaching and learning, which are predominantly based on knowledge transmission and standardized instructional models, are no longer sufficient to meet the complex and rapidly evolving demands of contemporary professional contexts. Instead, modern higher education institutions are required to adopt innovative, flexible, and technology-enhanced pedagogical frameworks that prioritize competency formation, learner autonomy, and the integration of digital tools into all stages of the educational process.

The analysis conducted in this research highlights that the effectiveness of professional competence development is largely dependent on the systematic establishment and implementation of well-structured pedagogical conditions. Among the most significant of these conditions is the creation of integrated digital learning systems that unify electronic educational platforms, interactive content delivery mechanisms, digital repositories, and communication tools into a coherent and accessible educational ecosystem. Such systems provide continuous and flexible access to learning resources, support individualized learning trajectories, and facilitate the implementation of adaptive and student-centered instructional strategies.

Furthermore, the adoption of competency-based instructional approaches plays a crucial role in ensuring that educational outcomes are closely aligned with real-world professional requirements. This approach emphasizes the development of functional, transferable, and practice-oriented skills through the integration of problem-based learning, project-oriented tasks, case study analysis, and simulation-based activities. As a result, students are not only exposed to theoretical knowledge but are also actively engaged in its application within contexts that reflect authentic professional challenges. This significantly enhances their ability to think critically, solve complex problems, and make informed decisions in dynamic and uncertain environments.

Another essential factor contributing to the effective development of professional competence is the continuous enhancement of teachers' digital competencies and pedagogical skills. Educators play a central role in facilitating meaningful learning experiences, particularly within digital environments that require advanced technological proficiency and pedagogical adaptability. Therefore, ongoing professional development programs, institutional support mechanisms, and training initiatives are necessary to ensure that teaching staff are adequately prepared to design, implement, and manage technology-enhanced learning processes. The digital competence of educators directly influences the quality of instruction, the effectiveness of student engagement, and the overall success of educational reforms in higher education.

In addition, the promotion of students' autonomous and self-regulated learning abilities emerges as a fundamental pedagogical requirement in the digital age. Digital learning environments inherently shift a significant portion of responsibility for learning outcomes onto students, requiring them to develop skills in self-management, critical thinking, information evaluation, and reflective practice. The cultivation of these abilities not only enhances academic performance but also contributes to the development of lifelong learning competencies, which are increasingly essential in professional contexts characterized by continuous technological innovation and knowledge renewal.

The study further demonstrates that the integration of formative assessment strategies supported by digital technologies significantly contributes to the improvement of learning outcomes and the development of reflective and metacognitive skills. Continuous feedback mechanisms, data-driven evaluation tools, and adaptive assessment systems enable educators to monitor student progress in real time and to adjust instructional strategies accordingly. This dynamic approach to assessment transforms evaluation from a static measurement procedure into an integral component of the learning process, thereby enhancing both teaching effectiveness and student engagement.

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Overall, the results of this study confirm that the successful development of students' professional competence in digitalized higher education environments can only be achieved through the systematic and coordinated alignment of technological, methodological, and pedagogical factors. The integration of advanced digital infrastructures, innovative instructional strategies, qualified teaching personnel, and learner-centered approaches forms a holistic educational framework capable of responding to the challenges of contemporary professional landscapes. In this regard, higher education institutions must adopt a strategic and forward-looking approach to educational modernization, ensuring that all components of the teaching and learning process are coherently aligned with the demands of continuous digital transformation and global labor market expectations.

References

1. Vygotsky, L. S. (1978). Mind in Society: The Development of Higher Psychological Processes. Harvard University Press.
2. Piaget, J. (1972). The Psychology of the Child. Basic Books.
3. Bloom, B. S. (1956). Taxonomy of Educational Objectives: The Classification of Educational Goals. Longmans, Green.
4. Anderson, L. W., & Krathwohl, D. R. (2001). A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. Longman.
5. Siemens, G. (2005). Connectivism: A learning theory for the digital age. International Journal of Instructional Technology and Distance Learning, 2(1), 3–10.
6. Bates, A. W. (2019). Teaching in a Digital Age: Guidelines for Designing Teaching and Learning. Tony Bates Associates Ltd.
7. UNESCO. (2023). Global Education Monitoring Report: Technology in education. *UNESCO* Publishing.
8. Laurillard, D. (2012). Teaching as a Design Science: Building Pedagogical Patterns for Learning and Technology. *Routledge.*
9. *Biggs, J., & Tang, C. (2011).* Teaching for Quality Learning at University. Open University Press.
10. Garrison, D. R., & Vaughan, N. D. (2008). Blended Learning in Higher Education. Jossey-Bass.
11. Mayer, R. E. (2009). Multimedia Learning. Cambridge University Press.
12. Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2015). NMC Horizon Report: Higher Education Edition. New Media Consortium.
13. Hattie, J. (2009). Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement. Routledge.
14. Keengwe, J., & Kidd, T. T. (2010). Towards best practices in online learning and teaching in higher education. MERLOT Journal of Online Learning and Teaching, *6(2), 533–541.*
15. UNESCO. (2021). Reimagining our futures together: A new social contract for education. UNESCO Publishing.