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DIGITAL PEDAGOGY AS A RESPONSE TO THE CHALLENGES OF CONTEMPORARY EDUCATION

Abstract: *The current stage of global social and economic development is characterized by digitalization, bringing many changes to education. In the last two years, marked by combatting the SARS-CoV-2 pandemic, information and communication technology in education has seen exponential growth, which has resulted in the need to adapt teaching methods to achieve planned learning outcomes. Teachers have faced the challenge of adequately perfecting teaching and learning methods to respond to pupil demands and their different educational needs and to increase their motivation to participate in an increasingly virtually oriented teaching process. The increasing use of digital technology in teaching in recent years has accelerated the development of new areas of pedagogy. In the scientific literature, there is increasing talk about digital pedagogy as a new branch or approach in pedagogy that studies the laws of digital education, developing new strategies and approaches to enrich the curriculum using information and communication technology. This paper seeks to explain the concept of digital pedagogy and how it can solve traditional didactic problems, shaping and developing innovative learning processes while developing and supporting a curriculum increasingly oriented toward digital technology. It proposes opportunities for teachers to improve the quality of the teaching process and highlights shortcomings and new challenges facing the increased use of information and communication technology in teaching.*

Keywords: *globalization, teaching process, education, pandemic.*

INTRODUCTION

The modern era is marked by urbanization and liberalization processes and exponential growth of information and communication technology (ICT), leading to radical changes in the global economic, political and cultural order. Global connectivity, integration and unification, along with the free movement of goods, services, people and capital, has been driven by digitalization, providing faster information transfer and processing, more effective business processes and greater productivity. Digitalization is the process of social transformation and connectivity through information and communication technology in all areas of human activity (Trittin-Ulbrich et al., 2020). Digital technology in education has, until recently, been limited only to higher education and adult education. Models such as Massive Open Online Courses (MOOCs) and other open education systems provided free online courses for all those not part of formal education and who wanted to acquire additional competencies. It resulted in better and fewer disparities in access to education. However, in the last twenty years, digital technology has become a fundamental feature

of the modern school system, including the preschool, primary and secondary levels. There are several advantages it brings to the educational system. First, the educational program can be adapted to the needs of new generations and the modernization of learning tools and methods. Second, digital technology facilitates individuality in teaching by allowing pupils to choose the way and pace of their learning. Third, it facilitates the development of a system for recording and controlling the learning progress of pupils in digital form (Toktarova & Semenova, 2020; Frolova et al., 2020).

The implementation of digital technology in the educational system falls under broader global policies aimed at creating a digital knowledge economy with highly qualified human capital trained to live in the digital age and capable of adapting to future uncertainties. For example, as part of Europe's Digital Decade and the strategy A Europe Fit for the Digital Age, the Renewed Digital Education Action Plan (2021-2027) (European Commission, 2021) was published, with the aim of adapting the education system in the European Union as effectively as possible to the digital age so that the entire community becomes optimally resilient and competitive. The Action Plan outlines two main strategic priorities: 1) fostering the development of a successful digital education ecosystem by investing in infrastructure, connectivity and digital equipment, developing digital competencies of teachers, effective planning and creating quality, and user-friendly educational content; and 2) developing digital skills and competences for digital transformation through IT education and digital literacy, and understanding technology using big data, such as artificial intelligence. The digitalization of education is also supported by international organizations such as UNESCO (2021) and the OECD (2021), which highlight the importance of introducing technology based on artificial intelligence, learning analytics, robotics and blockchain systems into education in their strategic documents.

The increasing presence of digital technology in education requires redefining traditional ways of teaching and learning and introducing innovative forms of teaching that will be more appropriate for new generations of pupils described as digitally native (Jones et al., 2010; Clark, Hergenrader & Rein, 2015). Additionally, this raises some fundamental pedagogical questions relating to the changing role of teachers and pupils, pupil motivation to learn within an interactive environment, development of digital competencies, and issues associated with rowing digital inequality, including the psychological impact of technology on the overall life of people. In the last two years, these issues have intensified due to accelerated digitalization caused by the SARS-CoV-2 pandemic, which has burdened the already inert educational system in regard to the acceptance and use of new technology. According to Machekhina (2017), the fundamental problem preventing the modernization of the school system is its sluggishness in adapting to new conditions, which is a very significant problem at a time of rapid and sudden global changes. Lewin and Lundie (2016) believe that the reason for the digital inertia of the system is that teachers view technology only as a complementary tool to traditional teaching methods. Pattersson (2019) holds the same view, stating that the use of digital technology, in most cases, does not change established teaching practices. This is supported by recent international research showing that, although teachers have a positive attitude toward new technology (Kilinç et al., 2016; Serin & Bozdağ, 2020), their frequency of use remains low (Fraillon et al., 2014; OECD, 2018). Research conducted in Croatia shows that pupils are much less likely to use digital technology in learning and school obligations than in their free time (Šmit, 2021). This supports discussions about the reluctance of teachers to use technology to improve their teaching processes. This may be due to the low teacher confidence in technology (Eickelmann & Vennemann, 2017; Kim et al., 2013; Pongsakdi, Kortelainen & Veermans, 2021), lack of professional training in the field (Alkan & Erdem, 2010; Sumardi, Rohman & Wahyudiati, 2020) or technological anxiety (Kilinç et al., 2016) that occurs when teachers feel incompetent in using technology.

However, digital technology has become part of the everyday educational experience that creates a new educational spatialization (Schneider & Smith, 2014), changes school culture and mutual relations, and requires the development of new pedagogical approaches to integrate them into the teaching process successfully. That is why in the last few years, there has been increasing talk about digital pedagogy as a new branch or approach in pedagogical science that studies changes in the educational process from the frequent use of digital technology and which supports innovative ways upon which pupils and teachers can

organize their activities and create new forms of relationships that decentralize the teaching process and make it more flexible.

This paper endeavors to explain the concept of digital pedagogy and its potential in solving didactic problems, shaping and developing an innovative learning process and developing a digitally supportive curriculum. Next, opportunities that teachers can utilize in their efforts to improve the quality of the teaching process are suggested, and the shortcomings and new challenges that the increased use of ICT in teaching brings will be highlighted.

DIGITAL PEDAGOGY – IDENTIFYING THE TERMS

In an attempt to better explain the concept of digital pedagogy and its potential in solving traditional didactic problems, first, a conceptual definition of this phrase is necessary. According to Croxall (2012), digital pedagogy means using digital technology to improve teaching, learning, grading and the overall curriculum. Toktarova and Semenova (2020, p. 2) present somewhat broader definitions, stating that it is "a branch of pedagogical science that reveals the essence and legality of digital education, the role of digitized educational processes in personal growth and ways to improve their effectiveness," then as "the process of embedding digital technology into the art of learning, enabling the enrichment of learning, teaching and evaluation processes" and as "the science of the content, forms and methods of education through the use of information technology and the Internet." For Väätäjä and Ruokamo (2021), digital pedagogy is the pedagogical use of digital technology.

Digital pedagogy facilitates the creation of educational content in a digital form incorporating new learning opportunities and the transformation of the didactic triangle into a new form of the "teacher – digital educational environment – pupil." Although the use of digital technology in teaching is not new, an awareness of the need for digital pedagogy has become prominent over the last few years upon the realization and admission that digital resources are not only a neutral tool for creating educational content, but their use requires reflection on technology, i.e., the development of a critical attitude toward them. Giroux (2011, p. 175) pointed out more than a decade ago that intellectuals (including teachers) are playing a new and powerful role requiring a new kind of literacy and critical understanding of the emergence of new media and technology. Hence, Fyfe (2011), Howell (2012) and Garber-Pearson and Chin Roemer (2017) stated that digital pedagogy must also include a critical component according to which teachers can assess how and why to use a particular technology to improve the teaching process. Both Lewin and Lundie (2016) agree, pointing out that digital pedagogy not only refers to a static list of tools but also includes core values and interests, goals and strategies, combining the philosophy of technology and information theory with critical pedagogy and educational philosophy. In other words, it goes beyond merely using technology as a tool but includes learning about and for technology (Badiger, 2013). That is why some authors believe that discussing this concept also entails talking about the critical dimension of digital pedagogy (Garber-Pearson & Chin Roemer, 2017; Hamilton, 2014; Rosen & Smale, 2015).

CRITICAL DIMENSION OF DIGITAL PEDAGOGY AND TEACHER COMPETENCIES

The critical dimension of utilizing technology is an important part of teachers' pedagogy because they have to keep up with the growing demands and expectations placed on pupils and their educational development. Today, pupils have limitless information and different materials at their fingertips with a simple click of a mouse. Therefore, the role of teachers as authorities who teach children is challenging and is under pressure from all available information technology (Amin, 2016). In addition, new generations of pupils have different requirements; hence, teachers need to understand how to use technology effectively and know how to choose appropriate digital tools that will align with the learning outcomes and educational needs of pupils. It requires new knowledge, skills and attitudes and implies forming and improving teachers' digital competencies to enable pupils to learn interactively and purposefully. In addition, they need to change their current perception and attitudes toward school learning and teaching processes. Specifically,

the traditional paradigm of the teacher as holding knowledge and absolute authoritative power is no longer relevant in didactic planning within teaching processes. By digitizing teaching and learning, the teacher gains a new role as a coordinator, mentor, motivator and cocreator of knowledge along with the pupils (Amin, 2016).

Some authors believe digitalization negatively affects educational institutions and processes (Masschelein & Simons, 2013). This argument is found in the fact that digitalization privileges learning over teaching, i.e., aspects of teaching and learning are placed into the hands of pupils, weakening the role of teachers. However, even before digitalization gained prominence, the theory and practice of education pointed to the same new roles of teachers because it has shown that these are desirable qualities of any educational worker. The reasons for negative views are primarily found in teachers lacking competencies and training, which, thus far, have not properly followed modern trends in science and pedagogy. Teachers would readily welcome these changes and take advantage of such opportunities, i.e., the new form of learning, teaching, and planning classes.

As technology becomes more interactive, pupils are no longer passive recipients of knowledge but are needed to engage and interact with the syllabus, which leads to a change in the relationship between pupils and teachers. Here, the importance and potential of digital pedagogy can be seen because the collaborative construction of knowledge occupies a central place in modern education. In other words, digitalization is accompanied by a change in the traditional paradigm of education, where the focus shifts from teachers to learning and from cognition to the constructive creation of knowledge (Frolova, 2020). According to Badger (2013), in this approach to teaching, knowledge is presented as something problematic rather than fixed, thus promoting skills in critical analysis, metacognition, a deep understanding of concepts and reflection by constructing knowledge and involvement in the teaching process. These circumstances suggest that teachers should be constantly upgrading their pedagogical habitus to provide an interactive and meaningful learning experience. They need to be creative and innovative in designing teaching strategies. Ertmer and Ottenbreit-Leftwich (2013) cite the concept of "qualitative pedagogy in an innovative environment" that emphasizes the connection between pedagogy and the changing learning environment. It primarily refers to an environment in which pupils are encouraged to ask questions, gather information and create new knowledge relevant to their personal life in the digital period of the 21st century (Avidov-Ungar & Forkosh-Baruch, 2018; Barak, 2010). The same authors emphasize meaningful learning and that the fundamental goal for pupils is to develop higher levels of knowledge, encourage creativity and teach them how to learn to encourage their personal development and social inclusion and, at the same time, empower teachers to be mentors in every educational sense in line with the concept of modern pedagogy.

In considering the necessary competencies of teachers at the advent of online teaching, a group of researchers and practitioners at Lancaster University and IBSTPI, upon synthesizing much research from the beginning of the 21st century, described online teachers as process mediators, advisors, researchers, content brokers, technology experts, designers and managers or administrators (Bawane & Spector, 2009). The authors state that more competent individuals should be experts in the particular subject area, those able to design teaching methods and materials, e-learning specialists and project managers in the specific field. Although knowledge and skills across a typical spectrum of pedagogical competencies, as teacher competencies in the online or similar digital environment were not prioritized early in the development of online classes, it is clear that the first serious considerations of implementing digital technology in teaching highlighted almost the same priorities that are ordinarily imposed as new standards of competencies of future teachers, as is the case with recent research in today's vastly different world.

By synthesizing the literature on digitization in education, Frolova and associates (2020) highlight the following factors that are important for education in the future:

- Distance learning and support for pupils;
- Use of electronic educational materials;
- Interactive methods for the development of pupil competencies;
- Digital technology for evaluating knowledge;

- Digital technology for monitoring and organizing learning and developing examination technology;
- Network communication within and outside educational institutions;
- Virtual educational environment and social networks;
- Robotization;
- Digital learning games.

Most recent research suggests that pupils in this new form of teaching need even more teacher support to become independent and motivated to learn (Means et al., 2009; Protopsaltis & Baum, 2019, as cited in Greenhow et al., 2021). Consequently, in addition to pedagogical competencies, teachers must have expertise and knowledge of digital technology to be creative and innovative in designing and planning teaching processes. A significant burden on teachers is precisely the motivation of pupils, i.e., their active involvement in the teaching and learning processes. This is particularly challenging for the educational system because the approach and use of digital technology for pupils of different ages should be differentiated to achieve learning outcomes more efficiently and in line with their educational needs. For example, it would be more appropriate to use different games and quizzes for primary school pupils to get them interested and encourage them to learn, while for middle school pupils, it would be more meaningful to use different computer programs for displaying and learning content. Regarding secondary school pupils, a higher level of independence can be assumed, and so in the last ten years, we have had stimulating examples of how pupils independently learn by viewing video content that some teachers recorded and made available on different media. Over time, knowledge websites have been created, giving pupils access to content to assist them in acquiring knowledge independently, which textbooks do not provide because they do not provide clarification that prior to that, they were only able to see once in class. In addition, pupils today have access to various computer programs and programming interfaces to help them find answers to questions and complete tasks for certain subjects. However, using these programs still depends on the pupil's initiative.

However, in Croatia, pupils are much less likely to use digital technology to learn and fulfill school obligations than in their free time (Šmit, 2021), and encouraging them to collect information more efficiently, develop new skills and create new knowledge is necessary. If not mediated and directed by teachers, the contribution of these digital resources in developing pupil competencies is not nearly as strong as when mediated and directed pedagogically to explore and learn, becoming more efficient and autonomous, and more motivated to learn and be independent in researching.

CONCLUSION

Digitalization is one of the most prominent trends in education and has significantly changed teaching and learning practices. The effective use of digital technology and learning resources in education is a key factor in its modernization and is in line with social developments and changes. Although digitalization has many benefits, such as reducing disparities in equal access to education, the development of standardized benchmarking of educational achievements and international comparisons, and more active involvement of pupils in the learning process, it has also generated shortcomings, such as less quality of teaching, the creation of a digital divide and inequality between pupils, including the rise of psychosocial problems among teachers and pupils most noted during the pandemic. For example, a survey conducted by Herold (2020) found that most students of a lower socioeconomic status did not have an adequate number of digital devices and sufficient internet speed during online classes, which impacted their motivation to participate in classes. Furthermore, while digital technology has played a key role in holding classes during the COVID-19 pandemic, the evidence shows that it has been a decidedly limited form of schooling. Teachers were forced over a short period of time to adapt to various forms of distance teaching and different platforms and interfaces, starting with basic information and communication technology for basic communication, where a significant proportion of them had not previously conducted classes using already somewhat outdated PowerPoint presentations. Of course, using these tools does not offer anything new or

better in teaching quality. Nevertheless, it offers advantages in distance teaching, as highlighted by teachers who are less inclined to use digital technology. Therefore, the entire teaching profession and education system is expected to take a step forward toward the optimal use of ICT and training in digital technology so that along with the acquired pedagogical-psychological and didactic-methodical knowledge and skills, they can utilize the potential and numerous opportunities to improve the learning and teaching processes.

That is why digital pedagogy is necessary for modern education because digital technology, regardless of its quality factor in teaching, cannot create a sustainable educational future without connecting with general educational science (Facer & Selwyn, 2021). When meaningfully integrated into the school system, educational technology increases pupil interest in learning, improves the relationship between pupils and teachers, and helps prepare for the digital future. However, this cannot be achieved without the pedagogy that accompanies it. Amin (2016) points out that applications, platforms or digital aids for more efficient learning are not necessary, and although they are helpful, we need to primarily review the role of the teachers and the knowledge they possess in relation to the content and resources available to pupils over the Internet, helping pupils learn as effectively as possible, think and reflect on gained knowledge and how to apply it effectively and thus contribute to their own development through various formal, nonformal and informal forms of learning, whether it is at school or home on the computer or somewhere when together with their friends, they search for information that interests them.

Every crisis, as well as this shorter education crisis caused by the COVID-19 pandemic, uncovers many weaknesses and highlights many new and old opportunities we have at our disposal following the accelerated development of technology and science. Therefore, implementing them in education for the future is imperative because of the many potential advantages, without perceiving and developing them solely for longer-term perspectives as essential in conducting distance teaching due to the pandemic or other specific circumstances that we may encounter tomorrow, but because we want a better-quality education for our children.

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