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Digital Competences and Pedagogical Traditions in Education

POVZETEK – V članku raziskujemo integracijo digitalnih tehnologij s tradicionalnimi pedagoškimi pristopi v kontekstu sodobnega izobraževanja. Poudarjamo pomen ohranjanja temeljnih vzgojno-izobraževalnih vrednot, kot sta čustvena podpora in celostni razvoj, ob uvajanju digitalnih orodij. Študija izpostavlja tako priložnosti kot izzive digitalne preobrazbe izobraževanja, vključno z digitalno neenakostjo in pomanjkanjem digitalnih veščin. Poseben poudarek je dan usposabljanju učiteljev, vlogi digitalnih platform in mednarodnim primerom dobre prakse, kot je estonski projekt AI Leap 2025. Združevanje tradicionalnih in digitalnih pristopov omogoča razvoj kompetenc 21. stoletja ter ustvarja vključujoča, prilagodljiva in inovativna učna okolja. Prispevek zagovarja uravnotežen model, ki vključuje tehnologijo v poučevanje ob ohranjanju bistvene človeške razsežnosti izobraževanja.

ABSTRACT – This paper explores the integration of digital technologies with traditional pedagogical approaches in the context of contemporary education. It underscores the importance of preserving core educational values, such as emotional support and holistic development, while adopting digital tools. The study highlights both the opportunities and the challenges of the digital transformation of education, including issues such as digital inequality and a lack of digital skills. Special emphasis is placed on teacher training, the role of digital platforms, and international examples of good practice, such as Estonia's AI Leap 2025 initiative. Combining traditional and digital methods supports the development of 21st-century competences and fosters inclusive, flexible, and innovative learning environments. The paper advocates a balanced model that integrates technology into teaching while maintaining the essential human dimension of education.

1 Introduction

The digital transformation of education represents one of the central challenges of contemporary society and has a profound impact on the evolution of pedagogical theory and practice (Redecker & Punie, 2017). The rapid development of digital technologies, such as artificial intelligence, cloud computing, and mobile devices, enables the integration of innovative digital tools into teaching and learning processes, while simultaneously transforming the role of teachers from traditional knowledge transmitters to facilitators of digital learning environments (OECD, 2021). These changes require the continuous professional development of teachers and the implementation of new didactic strategies that support critical thinking, creativity, and digital literacy among students (Retelj, 2022).

Although digital transformation brings numerous advantages – including personalized learning pathways, greater flexibility, real-time feedback, and enhanced student en-

gagement – it also introduces new challenges. Digital inequality persists as a significant barrier, with unequal access to digital devices and high-quality internet disproportionately affecting students from disadvantaged backgrounds (OECD, 2021). Furthermore, a successful adoption of digital technologies in education depends not only on technical infrastructure but also on the digital competence of teachers, their attitudes toward technology, and the level of institutional support (European Commission, 2022).

In addition, the integration of digital technologies raises ethical questions concerning data privacy, digital wellbeing, and the potential for technology-driven exclusion or surveillance. Addressing these complex issues requires a holistic and evidence-based approach that combines technological innovation with pedagogical, ethical, and organizational transformation within educational systems (Vekić-Kljaić et al., 2022). Ultimately, the goal of digital transformation should be to promote equity, inclusivity, and the development of transversal skills that prepare learners for the demands of the digital society.

The aim of this paper is to analyse how traditional pedagogical methods can be integrated with digital approaches to create a balanced and effective educational model. In addition, the paper explores the challenges of digital transformation, the possibilities of applying digital tools in teaching, and international examples of good practice that can serve as guidelines for improving the education system in the Republic of Croatia.

2 Methods

This paper is based on a qualitative, narrative literature review. Relevant academic articles, policy documents, strategic frameworks (such as DigComp 2.2 and the Digital Services Act), and examples of educational practices (e.g. e-Schools, AI Leap 2025) were selected based on their relevance to the main themes. Sources were selected not through a systematic database search but through an interpretive approach, focusing on key developments and challenges in the digital transformation of education. A thematic analysis was applied to identify recurring concepts, such as digital literacy, teacher professional development, and the integration of pedagogical traditions. The research also includes a comparative analysis of selected international practices and their implications to the Croatian educational context.

3 Results

The analysis revealed key findings at the intersection of digital transformation and pedagogical practices. Digital competences are increasingly conceptualised as multidimensional, encompassing not only technical skills, but also ethical awareness, social responsibility, and critical thinking abilities. Traditional pedagogical models continue to offer structure and effectiveness; however, they are increasingly complemented by constructivist and alternative approaches, such as Montessori and Waldorf, which emphasise creativity, autonomy, and holistic development.

Blended learning and flipped classroom models have emerged as effective methods for combining the benefits of face-to-face instruction with the flexibility of online learning. These approaches contribute to higher levels of student engagement, autonomy, and the development of critical thinking skills. The role of teachers is shifting, with increasing emphasis on mentorship and facilitation, which requires targeted professional development in both digital and pedagogical domains.

Furthermore, international examples such as Estonia and Finland demonstrate the importance of long-term investment in infrastructure, teacher education, and ethical standards for the successful integration of technology in education. In the Croatian context, national initiatives, such as e-Schools and e-University, illustrate progress in digitalisation but also point to persistent challenges regarding rural infrastructure, teacher support, and the development of sustainable and inclusive digital education policies.

Digital Competences

Digital competences represent a combination of technical, cognitive, and social skills that enable effective and responsible use of digital technologies (Ala-Mutka, 2011). Earlier frameworks emphasized computer literacy and basic technical skills (Delors, 1996), but the concept has since expanded to include critical thinking, ethical behaviour, and the ability to create and share digital content (Lankshear & Knobel, 2015).

The European Union recognizes digital competences as one of the eight key competences for lifelong learning (European Parliament and Council of the EU, 2006; 2018), emphasizing their transversal value in education, employment, and daily life. Digital transformation requires the development of comprehensive competences that go beyond technical skills to include social inclusion, safety, and digital well-being (Vuorikari et al., 2022).

The EU strategy aims for at least 80 % of citizens to possess basic digital skills by 2030 and to develop 20 million ICT professionals (European Commission, 2021a; 2021b). These guidelines provide a framework for the development of educational policies focused on individual resilience and adaptability in a digital society.

The DigComp framework, developed to strengthen citizens' digital competences, was first published in 2013 and has been updated several times. DigComp 2.0 (2016) redefined the conceptual model, DigComp 2.1 (2017) added eight proficiency levels, while the latest version, DigComp 2.2 (2022), includes 21 competences across five areas and over 250 examples of knowledge, skills, and attitudes (Vuorikari et al., 2022).

According to this framework, digital competences involve critical and responsible use of technology for learning, work, and civic engagement. They include information and data literacy, communication and collaboration, digital content creation, safety, problem-solving, and critical thinking. Individuals should be aware of the impact and limitations of digital technologies, develop an ethical approach to information, and use technology to achieve personal, social, and professional goals (Council of the European Union, 2018).

Ultimately, developing digital competence entails not only acquiring technical skills but also understanding their broader impact on education and social development.

The Role of Digital Skills in Education and Societal Development

Digital competences, as a combination of knowledge, skills, and attitudes, are essential for both personal and professional development (Council of the EU, 2018). ICT tools have become an integral part of everyday life, and their use in education, work, and society requires the development of digital skills that ensure the safe and effective use of technology.

Despite the growing importance of digital skills, there are significant disparities in their acquisition, depending on access to e-services, educational attainment, and the development of digital policies (Rodríguez-Hevía et al., 2020; Stofkova et al., 2022). Rapid technological changes, including the emergence of artificial intelligence, virtual reality, and phenomena such as disinformation, highlight the need to redefine digital literacy.

In education, digital transformation is increasingly seen as an opportunity to enhance teaching and learning. When thoughtfully integrated, digital technologies can empower students, foster key competences, and improve educational quality (Grosseck & Bran, 2016; Abd-Rabo & Hashaikeh, 2021; Norton et al., 2020). Within the framework of Education 4.0, emphasis is placed on flexibility, lifelong learning, and readiness to adapt to rapid market and societal changes (Hong & Ma, 2020).

The European Declaration on Digital Rights and Principles (European Commission, 2023) emphasizes that digital transformation in the EU must serve the well-being of individuals while respecting fundamental rights. At its core is the right of every citizen to education and the acquisition of both basic and advanced digital skills, regardless of gender or socioeconomic status.

The declaration calls for ensuring digital infrastructure in all educational institutions and for developing programs that promote media literacy and critical thinking. Special emphasis is placed on lifelong learning and adapting to technological change through upskilling and reskilling of both teachers and students.

Pedagogical Traditions and Their Impact on the Educational Process

Quality and inclusive education is essential for enabling individuals to actively participate in society and the labour market (Council of the EU, 2018). One of the main challenges of contemporary pedagogy is the selection of effective teaching methods that foster critical thinking and active learning (Tavoosy & Jelveh, 2019).

Traditional pedagogy, rooted in philosophical thought and the development of educational institutions since the 17th century, emphasizes the teacher as a central figure and promotes values through analytical and systematic methods of instruction (Rodríguez, 2013). Although often criticized for encouraging passive knowledge acquisition, it remains prevalent due to its structured approach and efficiency in teaching large groups of students. In the context of competence-based education, there is an increasing emphasis on the active role of students and the adaptation of teaching methods to meet new educational goals (Méndez, 2012).

Modern education also incorporates alternative pedagogical approaches. Montessori pedagogy, developed in the early 20th century by Maria Montessori, is based on

self-directed learning, exploration, and individual development, with the teacher acting as a mentor (Montessori, 1912). In Croatia, an increasing number of kindergartens and schools apply this approach.

Waldorf pedagogy, founded in 1919 by Rudolf Steiner, focuses on the holistic development of the child by balancing intellectual, artistic, and practical activities, with an emphasis on creativity and rhythm in learning (Steiner, 1996).

These methodologies offer valuable complements to traditional education, particularly in the development of emotional and creative competences. A combination of elements from both traditional and alternative pedagogies can contribute to the creation of a more flexible and modern educational system suited to the challenges of the 21st century.

Criticism of Traditional Methods and the Need for Innovative Approaches

Traditional teaching methods, such as lectures, remain widely used due to their efficiency in conveying information to large groups of students. However, their limitations in fostering active learning, creativity, and competence development are increasingly emphasized (Pires, 2019; Carter et al., 2016).

Constructivist-based learning emphasizes the active role of students, collaboration, and problem-solving (Vygotsky, 1978), in contrast to behaviourist approaches, which rely on repetition and external reinforcement (Skinner, 1953). Alternative models, such as Montessori and Waldorf education, are grounded in constructivist principles, encouraging greater engagement and the development of creative and critical skills.

Contemporary teaching methods, including problem-based and project-based learning and discussion techniques, further promote students' socio-emotional development and create more dynamic educational environments (Fung et al., 2016; Wang, 2022). By combining traditional and modern approaches, it is possible to create a balanced educational model that meets the demands of the 21st century.

Digital Tools, Educational Platforms, and the Benefits of Digitalization

In the context of the Fourth Industrial Revolution, educational systems are faced with the need to adapt to new labour market demands and the development of future skills (Türkeli & Schophuizen, 2019). Digital technologies, such as computers, smartphones, and educational platforms, have become essential tools for bridging the digital divide and enhancing the quality of teaching.

Learning management systems enable personalized learning, progress tracking, and collaboration, while virtual communities support teachers' professional development (Hodges et al., 2020). In the post-pandemic era, blended learning increasingly uses multimedia and digital tools to boost student engagement (Sevnarayan, 2022). Although digital learning offers flexibility, it is important to select methods and content thoughtfully to ensure effective learning processes.

In Croatia, a range of educational platforms supports teachers in creating and sharing content, tracking student progress, and personalizing instruction. Among the most

prominent are Edutorij and Moodle, which allow for the structuring of online courses and access to digital materials. Additionally, platforms such as e-Sfera and Izzi offer digital textbooks and interactive content that support both classroom and remote teaching.

One of the key national initiatives is the e-Schools project, which modernized over 1300 schools by providing digital infrastructure, equipment, and teacher training (CARNET, 2023). Building on this initiative, the e-University project was launched, aimed at the digital transformation of higher education through investments in infrastructure, cybersecurity, and the professional development of academic staff (CARNET, n. d.).

Challenges of Digital Transformation in Teaching

The digital transformation of education requires reliable infrastructure, high-quality digital content, and continuous teacher training (Du Toit & Verhoef, 2018). Successful integration of technology depends on aligning curricula with digital methods, the availability of resources, and support from educational policies (Türkeli & Schophuizen, 2019).

Although digital tools offer numerous advantages, their impact on students' academic achievement is not always direct. Key challenges include insufficient digital competences among teachers, disparities in access to technology, and the influence of students' socio-economic background (Johnson, 2023). Excessive use of digital tools may lead to cognitive overload, highlighting the need for a balanced and pedagogically informed approach.

National projects, such as e-Schools and e-University, have enabled the development of digital infrastructure, teacher training, and the strengthening of digital competences, contributing to reduced inequality among schools and increased access to quality education (CARNET, 2023; CARNET, n. d.).

Possibilities for Implementing Digital Technologies in Teaching

Digital learning, especially through models such as blended learning, is becoming increasingly important in modern education as it combines technology with traditional methods and enables greater flexibility in learning (Hrastinski, 2019; Owston, 2018). Blended learning contributes to the development of academic achievement and critical thinking, especially when adapted to different learning styles (Zhang & Zhu, 2020).

The flipped classroom model further strengthens active learning by having students study content independently at home, while classroom time is used for problem-solving and collaborative activities (Bergmann & Sams, 2012; Roehl et al., 2013). These approaches foster interaction, motivation, and student engagement, thus creating more effective teaching and learning environments.

Blended learning and flipped classrooms have been proven to increase student engagement and promote the development of critical thinking by offering flexible access to learning materials and encouraging greater student responsibility (Pohl et al., 2018; Staker & Horn, 2012). Classrooms become collaborative spaces where students use various digital tools for teamwork and communication.

Digital platforms such as Google for Education and Office 365 offer a wide range of tools for collaborative learning, while tools like Kahoot and Scratch support interactive revision and programming skill development. With e-learning, students gain access to materials at their own pace, making education more accessible and inclusive (Green et al., 2012; Lee & Lim, 2011).

In Croatia, the Loomen platform enables distance learning, while globally, MOOCs (Massive Open Online Courses) are gaining popularity as a flexible and accessible form of education for a wide audience (Kumar et al., 2021). Digital transformation is also supported at the EU level, where the importance of developing digital and media competences in inclusive educational settings is emphasized (European Commission, 2023).

Blended learning and flipped classrooms allow for increased flexibility, engagement, and the development of collaborative and critical thinking skills. Digital platforms such as Moodle, Edutorij, Google for Education, and Office 365, together with national projects like e-Schools and Loomen, provide valuable resources for modern and interactive education.

However, the implementation of these approaches, particularly in primary education, faces several challenges: insufficient digital and pedagogical training for teachers, lack of time for professional development, inadequate infrastructure in rural areas, and a digital divide among students. Effective implementation requires systematic teacher training, adaptation of assessment methods, and ensuring equal access to technology.

The Changing Role of Teachers in Digital Education

The digital transformation of education brings significant changes to the role of teachers, who are no longer merely transmitters of knowledge, but also mentors who foster critical thinking, independence, and the development of students' digital competences. The use of digital tools requires adjustments in teaching methods, as well as the development of both pedagogical and technical skills.

To be effective in a digital environment, teachers must develop professional digital competences, which include technical proficiency, the pedagogical application of technology, and an awareness of the broader social impact of digital education (Livingstone, 2016; Instefjord & Munthe, 2016). The education of future teachers has a dual role, not only to develop their competences, but also to empower their ability to meaningfully and inclusively integrate technology into their teaching (Baran et al., 2019; Tømte et al., 2015).

4 Discussion

Challenges and Barriers to Digital Education

Digital literacy and access to technology are strongly influenced by socioeconomic factors, such as income, education, and infrastructure availability (DiMaggio et al.,

2001). These factors shape individuals' opportunities to develop digital skills, which include not only technical but also communication and creative competences.

Research shows that educational status, age, and gender significantly affect digital abilities, while the concept of "digital natives" fails to account for individual and family contexts (Livingstone et al., 2005; Van Deursen et al., 2011). Understandings of digital literacy vary across disciplines, which has led to the emergence of related concepts such as information, computer, and media literacy (Ilomäki et al., 2016; Martin, 2006).

Contemporary approaches increasingly emphasize the importance of critical thinking and the emotional dimension of digital literacy, which is key to developing digital citizenship (Ferrés et al., 2018; Pérez-Escoda et al., 2019; Redecker & Punie, 2019). Reducing digital inequality requires comprehensive educational and infrastructural policies that ensure equal access to knowledge and digital resources.

Digital literacy goes beyond technical skills and includes critical thinking, safety, ethics, and responsible digital behaviour. In today's digital society, technology is not only a tool, but also a space for educational and social participation.

Socioeconomic factors strongly influence the development of digital competences, and individuals from less privileged backgrounds often lack equal access to digital tools, which deepens digital inequality. The DigComp 2.2 framework highlights the importance of not only technical but also ethical and social dimensions of digital competences, including data protection, online safety, and inclusivity.

A critical approach to digital literacy also includes emotional and social intelligence, as well as the ability to make responsible decisions in digital environments. Education on digital safety and ethics should be a core component of the modern curriculum.

Ethical and Security Dimensions of Digital Education

Although digital educational technologies enable more personalized and interactive learning, their rapid advancement raises important ethical and security challenges. Key concerns include the protection of personal data, algorithmic bias, and unequal access to technology (Hartong, 2022).

Many educational platforms collect student data, often without users being clearly informed, highlighting the need for regulatory frameworks that ensure transparency (De Vries et al., 2019). The European Digital Services Act (DSA) seeks to protect users, particularly against data misuse and disinformation (European Parliament, 2021).

Educational institutions have a responsibility to ensure the ethical implementation of EdTech tools and to educate students about digital safety and ethics. In Croatia, topics related to online safety are already part of the informatics curriculum, but a more comprehensive approach is needed – one that includes the broader context of ethics in a digital society (Ponsa, 2014).

For successful digitalization of education, it is essential to align technological capabilities with ethical guidelines, legal regulations, and the responsible actions of educational institutions.

Teacher Professional Development and Students' Digital Advancement

Successful integration of ICT in the educational system depends on the development of teachers' digital competence, which includes technical knowledge, pedagogical skills, and the ability to align technology with educational goals (European Commission, 2009; Tourón et al., 2018). Effective teaching requires the connection of content, technology, and pedagogy, implying the thoughtful use of digital tools in instruction (Krumsvik, 2008; Mishra & Koehler, 2006).

High-quality initial teacher training is essential for implementing innovative ICT-based approaches, yet training programs are often limited to technical aspects without empowering teachers to apply them in their teaching practices (Miralles-Martínez et al., 2019). Although numerous professional development programs are available in Croatia, teachers face challenges such as a lack of time, language barriers, and post-pandemic digital fatigue, which slow down the continuous acquisition of new digital competences.

Teachers are often left to explore digital tools independently, which can lead to loss of motivation and cognitive overload, underscoring the need for systematic support. To ensure a successful integration of technology into the teaching, a systematic support must be provided through flexible training, mentoring, and resources in the Croatian language.

The current professional development programs are frequently technically focused, neglecting the pedagogical needs of teachers. Additional obstacles include a lack of time, infrastructure, and technical resources, especially in rural areas. Sustainable change requires tailored training, continuous support, and the development of professional networks that enable teachers to share experiences and collaborate.

Practical Inspirations: Estonia, Finland, and the Republic of Croatia

Estonia is among the global leaders in digital transformation in education, thanks to initiatives such as Tiger Leap and ProgeTiger, which provided the technological infrastructure and teacher training. The new AI Leap 2025 strategy introduces artificial intelligence into schools through partnerships with the leading AI companies, with an emphasis on ethical and effective use of technology (Education Estonia, n. d., 2025).

In Finland, digitalization is progressing gradually, with a strong emphasis on aligning technology with pedagogical goals. Programs such as EduCluster Finland, Virtual Living Labs, and AI-powered personalized learning solutions (e.g. JAMK, Haaga-Helia) demonstrate how digital tools can enhance education when thoughtfully applied to meeting teaching needs (Education Finland, 2024).

The e-Schools program serves as the cornerstone of digital transformation in the Croatian education, enabling the equipping of schools with digital technology, teacher training, and the implementation of modern teaching methods. The project has improved efficiency, fostered more active learning, and increased transparency in school management, and was recognized in 2020 by the European Commission for promoting equal educational opportunities (CARNET, 2023).

Like Estonia's Tiger Leap, Croatia's approach includes the e-University project, which aims to digitally upgrade higher education institutions by 2025 through investments in infrastructure, cybersecurity, and teacher training (CARNET, n. d.; Education Estonia, 2025).

Based on international examples, Croatia could further enhance its education system by expanding the e-Schools and e-University programs, particularly in the direction of developing AI competences and teachers' digital skills. Specialized workshops, digital tools, and mobile applications can support personalized learning, as exemplified by Finland's Freadom app.

Collaboration with technology companies, following Estonia's model and partnerships with organizations like OpenAI, can ensure access to cutting-edge educational solutions and training. This approach would enable equitable and sustainable digital education development, preparing all stakeholders for the demands of the 21st century.

Tomorrow's Education: Technology, AI, and Policy

The development of advanced artificial intelligence tools, such as ChatGPT, opens new possibilities for personalized learning, increasing student engagement, and supporting teachers in lesson planning (Kamalov et al., 2023; Yang, 2023). However, their integration into education requires a careful consideration of pedagogical goals, ethical principles, and cultural sensitivity (Holmes et al., 2023). It is essential that AI tools complement, rather than replace, the role of the teacher and are used in accordance with educational values.

To reduce the digital divide, investment is needed in infrastructure, continuous teacher training, and equitable access to educational resources, especially in less developed regions. This includes the development of local training centres, free access to digital tools, and inter-school cooperation. Tools like ChatGPT must be linguistically and culturally adapted and used responsibly, with a focus on privacy protection and digital safety.

Educational policies should be grounded in European frameworks such as Dig-Comp 2.2, which promote the development of digital competences, critical thinking, and media literacy. Successful implementation of these guidelines requires strategic planning, investment, and the involvement of all educational stakeholders to ensure a high-quality and equitable digital future in education.

5 Conclusion

The digital transformation of education brings numerous opportunities, but also significant challenges. The integration of digital tools enables innovative teaching methods, enhances student engagement, and fosters the development of key 21st century competences. However, successful implementation requires systematic teacher training, guaranteed access to technology, and the development of strategies to reduce the digital divide.

The analysis of good practice examples, such as Estonia's digital education model, demonstrates that continuous investment in infrastructure, teacher training, and ethical standards plays a crucial role in the digitalization process. Projects like e-Schools and e-University in the Republic of Croatia represent important steps forward, yet there remains a need to further improve professional development programs and adapt educational policies to emerging technological challenges.

Ultimately, the goal is to create a sustainable education system that balances innovation and tradition, one that prepares learners not only for the demands of the digital economy, but also for ethical, inclusive, and reflective participation in a digital society. This study emphasizes the critical importance of integrating digital tools in a meaningful and equitable manner, while preserving the essential human dimension of teaching.

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Digitalne kompetence in pedagoške tradicije v izobraževanju

Digitalna preobrazba izobraževanja predstavlja ključno prelomnico za sodobne izo--braževalne sisteme po vsem svetu. Z naraščajočo integracijo digitalnih tehnologij v vsakdanje življenje se njihov vpliv na izobraževalne procese poglablja in širi. Prispevek ponuja celovito analizo presečišča med digitalnimi kompetencami in tradicionalnimi pedagoškimi praksami z namenom oblikovanja inovativnega in uravnoteženega izobraževalnega okvira. V raziskavi preučujemo razvoj digitalnih kompetenc, pedagoških modelov, nacionalnih in mednarodnih pobud na področju digitalnega izobraževanja ter praktične izzive, s katerimi se soočajo učitelji pri uvajanju novih tehnologij v učni proces.

Uvod izpostavlja nujnost izobraževalne preobrazbe, ki jo spodbuja digitalizacija. Tehnološki napredek je preoblikoval vlogo učiteljev, zasnovo učnih vsebin in strukturo učnega okolja. Čeprav digitalna orodja ponujajo priložnosti za personalizacijo, fleksibilnost in interaktivnost, vzbujajo tudi pomisleke glede digitalne neenakosti, dostopa do virov ter pripravljenosti učiteljev in institucij. Cilj raziskave je preučiti, kako lahko tradicionalne pedagoške vrednote, kot so mentorska vloga učiteljev, učenje, osredotočeno na učenca, in čustvena podpora, ohranimo in okrepimo v digitalno obogatenem izobraževalnem okolju.

Teoretični okvir poglobljeno predstavi koncept digitalnih kompetenc. Sprva so bile povezane predvsem z osnovnim znanjem računalništva in IKT, danes pa predstavljajo večdimenzionalni konstrukt, ki vključuje kritično mišljenje, etično uporabo tehnologije ter sposobnost sodelovanja in ustvarjanja v digitalnem okolju. Evropska unija digitalne kompetence priznava kot eno od osmih ključnih kompetenc za vseživljenjsko učenje ter jih postavlja v središče izobraževalne politike. Okvir DigComp, zlasti njegova najnovejša različica (DigComp 2.2), vključuje 21 kompetenc, razdeljenih na pet področij, skupaj z več kot 250 primeri znanj, veščin in stališč. Okvir poudarja ne le tehnično usposobljenost, temveč tudi etično ozaveščenost, varnost in socialno vključenost, ki so ključne kompetence za odgovorno digitalno državljanstvo.

Študija digitalne kompetence umešča v širši družbeni kontekst in poudarja njihov pomen za družbeno vključenost, zaposljivost in vseživljenjsko učenje. Posebno po-

zornost namenja razlikam v dostopu do digitalnih virov in veščin, ki so povezane s socialno-ekonomskim statusom, geografsko lokacijo in spolom. Raziskave kažejo, da kljub percepciji mlajših generacij kot "digitalnih domorodcev" ostajajo velike vrzeli na področju kritične in etične digitalne pismenosti. Zato je treba digitalne kompetence razvijati skozi formalno izobraževanje ter jih podpreti z enakopravnim dostopom do infrastrukture, kakovostnih vsebin in vključujoče pedagogike.

V nadaljevanju so v prispevku analizirane pedagoške tradicije skozi zgodovinske in filozofske osnove izobraževanja. Tradicionalna pedagogika, ki temelji na učitelju kot osrednji figuri in strukturiranem kurikulumu, ostaja vplivna zaradi svoje jasnosti in učinkovitosti. Vendar pa jo vse pogosteje dopolnjujejo oziroma izpodbijajo alternativni pristopi, kot sta montessori in waldorfska pedagogika, ki poudarjata ustvarjalnost, avtonomijo učenca in celostni razvoj. Ti modeli, utemeljeni v konstruktivistični teoriji učenja, obravnavajo učenca kot aktivnega udeleženca v učnem procesu in se ujemajo z digitalno pedagogiko, ki podpira personalizacijo, sodelovanje in reševanje realnih problemov.

Prispevek ne vključuje samo teoretične razprave, temveč je v njem predstavljana tudi praktična implementacija digitalnih orodij v izobraževalnem okolju. Digitalne platforme, sistemi za upravljanje učenja (LMS) in orodja za sodelovanje podpirajo sodobno poučevanje in učenje. Med primeri so Moodle, Edutorij, Google for Education, Office 365 in Kahoot, ki omogočajo dostavo vsebin, vrednotenje znanja in interaktivno sodelovanje. V Republiki Hrvaški sta projekta e-Šole in e-Sveučilišče pomembno prispevala k digitalizaciji osnovnega, srednjega in visokošolskega izobraževanja s pomočjo infrastrukture, izobraževanja učiteljev in strateškega razvoja digitalnih vsebin.

Kljub tem dosežkom digitalna transformacija izobraževanja prinaša številne izzive. Učitelji pogosto niso dovolj usposobljeni za učinkovito integracijo digitalnih orodij v poučevanje. Poleg tega so prisotni odpor do sprememb, neenak dostop do tehnologije, zlasti v podeželskih območjih, in pomanjkanje časa za strokovni razvoj. Pretirana ali neustrezna uporaba digitalnih tehnologij lahko povzroči kognitivno preobremenjenost in zmanjša učni uspeh. Zato mora biti digitalizacija zasnovana na pedagoških načelih in ne zgolj na tehnoloških inovacijah.

Soobstoj tradicionalnih in digitalnih modelov izobraževanja raziskujemo skozi pristope kombiniranega učenja in obrnjenih učilnic. Ti hibridni pristopi združujejo prednosti učenja v živo s fleksibilnostjo spletnega učenja. Kombinirano učenje upošteva različne učne stile in spodbuja samostojno učenje, medtem ko "obrnjen razred" omogoča reševanje nalog in skupinsko delo v učilnici. Empirični dokazi kažejo, da ti pristopi izboljšujejo vključenost učencev, motivacijo in razvoj kritičnega mišljenja – če so ustrezno načrtovani in podprti.

Spremenjena vloga učiteljev v digitalni dobi je osrednja tema prispevka. Učitelji niso več le prenašalci znanja, temveč mentorji, oblikovalci in vodje učnih izkušenj. Digitalne kompetence učiteljev zajemajo tehnično usposobljenost, pedagoške spretnosti in sposobnost za odgovorno in vključujočo uporabo tehnologije. Model TPACK (Tehnološko-pedagoško predmetno znanje) ponuja okvir za razumevanje teh razsežnosti. Vendar številni programi strokovnega izpopolnjevanja še vedno dajejo prednost tehničnim veščinam, zanemarjajo pa oblikovanje učnih vsebin, etiko in vključenost. Tudi na Hrvaškem se učitelji srečujejo z jezikovnimi ovirami, pomanjkanjem časa in postpandemično izčrpanostjo kljub vse večjim prizadevanjem za njihovo usposabljanje.

Etika in varnost sta ključna vidika digitalnega izobraževanja. Razširjena uporaba izobraževalnih tehnologij povzroča pomisleke glede zasebnosti podatkov, algoritmične pristranskosti in komercializacije izobraževanja. Uredbe EU, kot je Akt o digitalnih storitvah (DSA), poskušajo nasloviti te izzive, vendar njihovo izvajanje na ravni šol ostaja neenotno. Učitelji morajo biti usposobljeni ne le za uporabo digitalnih orodij, temveč tudi za zaščito podatkov, medijsko pismenost in etično odločanje v digitalnih okoljih. V hrvaškem kurikulumu informatike je tema varnosti že vključena, vendar so potrebni širši in medpredmetni pristopi za razvoj digitalne etike.

Na podlagi mednarodnih primerov dobre prakse prispevek izpostavlja Estonijo in Finsko kot vodilni državi na področju digitalnih inovacij v izobraževanju. Estonija je z iniciativama Tiger Leap in AI Leap 2025 zgradila močno digitalno infrastrukturo in uvedla umetno inteligenco v šole. Finska sledi bolj postopnemu, pedagoško usmerjenemu pristopu, ki podpira avtonomijo učiteljev in lokalne rešitve. Oba modela nudita dragocene usmeritve za Hrvaško, zlasti na področju razvoja kompetenc za uporabo umetne inteligence, javno-zasebnih partnerstev in vključujočih digitalnih politik.

Digitalna pismenost ne bi smela biti obravnavana zgolj kot tehnična sposobnost, temveč kot temeljna veščina sodobnega državljana. Zato je nujno, da se razvoj digitalnih kompetenc sistematično vključuje v vse ravni izobraževalnega sistema – od predšolske vzgoje do visokošolskega izobraževanja in izobraževanja odraslih. Že v zgodnjem otroštvu je mogoče s pomočjo didaktičnih digitalnih orodij razvijati osnovno razumevanje tehnologije, spodbujati logično mišljenje in digitalno ustvarjalnost. V osnovni in srednji šoli je ključnega pomena, da se digitalnih orodij ne uporablja zgolj za predstavitev vsebin, temveč tudi kot sredstvo za samostojno raziskovanje, sodelovalno delo in ustvarjanje učnih gradiv. Poleg tega morajo izobraževalni programi v visokošolskem prostoru vključevati pripravo bodočih učiteljev na delo v digitalno preoblikovanem učnem okolju, z ustreznim poudarkom na etiki, varnosti in vključevanju vseh učencev. Tak celostni pristop omogoča razvoj digitalne pismenosti kot trajnostne kompetence, ki prispeva k večji družbeni enakosti in aktivnemu državljanstvu.

Poleg tega je pomembno, da se digitalna pismenost ne razvija izolirano, temveč kot sestavni del celostne izobraževalne izkušnje, ki vključuje tudi razvoj socialnih in čustvenih kompetenc, empatije in sposobnosti za kritično refleksijo. Integracija digitalnih orodij mora biti vedno podprta z jasno pedagoško vizijo, ki učencem omogoča ne le tehnično obvladovanje orodij, temveč tudi razumevanje njihovega vpliva na posameznika, družbo in demokratične procese. V tem kontekstu postaja digitalna pismenost več kot le sposobnost uporabe tehnologije – postaja orodje za opolnomočenje, ustvarjalnost in odgovorno delovanje v kompleksnem svetu.

Zaključno poglavje obravnava prihodnost izobraževanja v kontekstu novih tehnologij, kot je umetna inteligenca. Orodja, kot je ChatGPT, ponujajo možnosti za personalizirano učenje, administrativno podporo in pomoč pri načrtovanju pouka. Vendar pa je njihova uporaba smiselna le, če je usklajena s pedagoškimi cilji, etičnimi standardi in kulturnimi posebnostmi. Umetna inteligenca mora dopolnjevati človeški vidik poučevanja, ki vključuje empatijo, mentorstvo in odnose, ne pa ga nadomestiti.

Prispevek zagovarja celosten in uravnotežen pristop k digitalni transformaciji izobraževanja, ki združuje inovacije s tradicijo, pravičnost z odličnostjo in tehnološki napredek s pedagoško integriteto. Za uresničitev te vizije so potrebne trajne naložbe

v infrastrukturo, celovito usposabljanje učiteljev in vključujoče izobraževalne politike. Končni cilj je oblikovanje izobraževalnega sistema, ki učence pripravlja ne le na digitalno gospodarstvo, temveč tudi na odgovorno, etično in premišljeno delovanje v digitalni družbi prihodnosti.

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