Digital Pedagogies in the 21st Century: Impacts, Challenges, and Opportunities

Newton Barai[#1]

[#] *State Aided College Teacher, Department of Education, Kalna College, Kalna, India*

[1]newtonbarai92@gmail.com

***Abstract*—** The 21st century has seen a big change in education because digital technologies are now used in both teaching and learning. Digital pedagogies, including cyberpedagogy, techno-pedagogical skills, and learner-centred approaches, have changed traditional classrooms into places where students can interact, feel included, and learn new skills. This paper integrates current academic research to analyse the effects, obstacles, and prospects of digital pedagogies. The results show that they have a positive effect on student engagement, achievement, and the development of 21st-century skills. However, they also show that there are still problems, such as a lack of infrastructure, teacher readiness, and socioeconomic inequalities. There are chances to make things better by encouraging inclusivity, making it easier for people to get involved through online platforms, and pushing for systemic innovation in curriculum and assessment. The study finds that digital pedagogy is not just a way to improve technology; it is a new way of thinking that needs money, training, and fair policies to get students ready for the challenges of a digital, globalised world.

***Keywords*— Digital Pedagogy, Cyberpedagogy, Inclusive Education, Teacher Competence, 21st-Century Skills**

I. INTRODUCTION

The 21st century has seen major changes in education, mainly because digital technologies are being used more and more in teaching and learning. Traditional teacher-centred models, which often rely on rote memorisation and passing on knowledge, are not enough to get students ready for a globalised, knowledge-based society (Scott, 2015). Digital pedagogy, on the other hand, focuses on learner-centred methods, personalisation, teamwork, and the growth of higher-order skills like creativity, critical thinking, and problem-solving.

Digital pedagogy is the purposeful use of ICTs, online platforms, and interactive tools to improve the way people learn and teach. Scholars contend that effective digital pedagogy transcends mere technology adoption, necessitating a reconfiguration of educational practices, assessment methodologies, and the roles of educators (Dhakal, 2022). For example, cyberpedagogy shows how learning environments are going from being guided by people to being run by computers, with teachers acting as guides for questions and co-creators of knowledge instead of just giving information (Duishonbekova & Baitokova, 2025). It has been shown that using ICTs together can help people talk to each other, work together, and think critically, but there are still problems to solve. Research indicates that although educators acknowledge the potential of ICTs, their implementation is frequently superficial, hindered by inadequate training and infrastructure (Liesa-Orús et al., 2020). This gap highlights the significance of frameworks like DigCompEdu, which delineate the competencies educators must possess to empower learners in digital environments (Caena & Redecker, 2019).

Digital pedagogy also has a lot of potential for fairness and inclusion. Adaptive learning systems, MOOCs, and mobile platforms enhance educational accessibility, facilitating customised learning experiences in various contexts (Zou et al., 2025). In nations such as Nepal and Pakistan, digital pedagogy models have yielded quantifiable enhancements in student performance, especially when integrated with learner-centred approaches and active methodologies (Dhakal, 2022; Khan et al., 2023). However, the digital transformation of education faces obstacles including inadequate infrastructure, socioeconomic disparities, and opposition to pedagogical innovation. Jansen and van der Merwe (2015) assert that teaching practice in the digital era necessitates a paradigm shift, wherein educators adopt digital literacy, learner autonomy, and collaborative ecosystems. Without these kinds of changes, traditional methods and systemic barriers could make the promise of digital pedagogy less likely to come true.

This paper analyses the effects, obstacles, and prospects of digital pedagogies in the 21st century. It aims to show how digital methods can support inclusive, student-centred learning by bringing together current research and practice and talking about the systemic problems that make them less effective. Digital pedagogy is not just a new technology; it is a new way of thinking about education in a world that is more connected than ever before.

II. CONCEPTUAL FRAMEWORK

The conceptual framework for this study is based on the intersection of pedagogy, technology, and learner-centred approaches. It focuses on how digital pedagogies change the way we teach and learn in the 21st century. It utilises established pedagogical theories, modern digital integration models, and international standards for teacher competence.

Conventional teacher-centred models, emphasising knowledge transmission, are progressively insufficient in meeting the requirements of a knowledge-driven society (Scott, 2015). Digital pedagogy redefines the teacher's role as a facilitator, mentor, and designer of learning experiences, while positioning learners as active participants and co-creators of knowledge (Duishonbekova & Baitokova, 2025). This change in thinking fits with learner-centred ideas like personalisation, participation, and productivity. Dhakal (2022) put forward a structured Digital Pedagogy (DP) model that is based on seven teaching principles: curriculum mapping, objectives, resources, activities, communication, feedback, and assessment. This model shows how ICTs can be used in a planned way in the

classroom, making sure that digital tools are not just used for fun but are an important part of lesson planning. Tucker (2014) also stressed how Web 2.0 technologies like blogs, wikis, and forums can help people work together and learn skills that are useful in the 21st century. Teacher readiness is crucial for successful digital pedagogy. The DigCompEdu framework delineates 22 educator-specific competencies encompassing professional engagement, pedagogy, and learner empowerment (Caena & Redecker, 2019). These competencies correspond with the Technological Pedagogical Content Knowledge (TPACK) framework, which underscores the amalgamation of content, pedagogy, and technology (Asad et al., 2021). Research in higher education indicates that although professors acknowledge the importance of ICTs for communication and collaboration, deficiencies in training and confidence remain (Liesa-Orús et al., 2020).

In the digital age, learners are both consumers and producers of knowledge, which means they need to be independent and creative and know how to use technology (Saykili, 2019). Adaptive learning systems, MOOCs, and mobile platforms enhance educational accessibility, facilitating individualised learning experiences in various contexts (Zou et al., 2025). Nonetheless, obstacles like inadequate infrastructure and socioeconomic disparities persist in influencing the efficacy of these ecosystems (Khan et al., 2023). This framework serves as the perspective through which the effects, obstacles, and prospects of digital pedagogies are examined in this paper. It places digital pedagogy not merely as a technological advancement but as a revolutionary framework that reinterprets the objectives and methodologies of education in the 21st century.

III. IMPACTS OF DIGITAL PEDAGOGIES

Digital pedagogies have profoundly transformed the educational landscape in the 21st century, affecting teaching methodologies, student engagement, and institutional structures. Their effects can be seen in many areas, such as how well students learn, the roles of teachers, how inclusive schools are, and how knowledge is made available to everyone. One of the most important effects of digital pedagogy is that it makes students more interested in learning and helps them do better in school. Dhakal (2022) showed that using a structured Digital Pedagogy (DP) model in Nepal helped postgraduate students do better in maths. In the same way, Duishonbekova and Baitokova (2025) found that interactive platforms like Kahoot encouraged critical thinking and active participation. Experimental groups used the platform with more confidence than control groups, with a 46% increase. These results show how digital tools can turn places where people passively learn into places where people actively learn.

Digital pedagogy has changed the role of teachers from simply passing on information to creating and guiding learning experiences. Scott (2015) stressed that teachers in the 21st century need to encourage learning through questions and working together instead of just memorising facts. Frameworks like DigCompEdu, which list skills for professional engagement, digital pedagogy, and learner empowerment (Caena & Redecker, 2019), help this change happen even more. Teachers who learn techno-pedagogical skills can better combine content, pedagogy, and technology into a single way of teaching (Asad et al., 2021). Digital pedagogies also help make education more accessible by making it available through online platforms, MOOCs, and mobile learning. Zou et al. (2025) contended that digital ecosystems facilitate personalised learning experiences, permitting learners to advance at their own pace and in accordance with their specific needs. In contexts like Pakistan, Khan et al. (2023) noted that digital methods can help with inclusive education policies, but there are still problems with infrastructure and teacher training. These changes show that digital pedagogy could make education more accessible to everyone, regardless of where they live or how much money they have.

Putting ICTs in the classroom helps students learn important 21st-century skills like communication, teamwork, creativity, and critical thinking. Tucker (2014) emphasised the significance of Web 2.0 technologies—such as blogs, wikis, and forums—in facilitating knowledge co-creation and collaborative problem-solving among learners. Liesa-Orús et al. (2020) also found that professors in Spain thought ICTs were important for teaching these skills, but they didn't use them very much because they didn't get enough training. This shows that digital pedagogy has two effects: it can help students learn new skills, but only if teachers are well-prepared and schools support it. Digital pedagogy has made universities and schools rethink how they design their curricula, how they test students, and how they train teachers. Saykili (2019) observed that higher education institutions are progressively embracing learner-centred methodologies, incorporating digital literacy and autonomy into their frameworks. This systemic effect is part of a bigger change toward education models that are flexible, adaptable, and open to everyone. This is in line with the global need for lifelong learning.

IV. CHALLENGES OF DIGITAL PEDAGOGIES

Digital pedagogies have shown a lot of promise for changing education, but there are a number of problems that make them less effective. These problems include things like infrastructure, teacher readiness, fairness, and adapting the system.

The lack of good infrastructure is one of the biggest problems, especially in developing countries. Duishonbekova and Baitokova (2025) observed that restricted access to dependable internet connectivity and digital devices hinders the implementation of cyberpedagogy in numerous contexts. Khan et al. (2023) also said that schools often have trouble using ICTs in the classroom because they don't have enough technology. Digital pedagogy risks making existing inequalities worse instead of fixing them if the infrastructure isn't strong enough.

The success of digital pedagogy relies significantly on the proficiency and confidence of educators in utilising technology. Liesa-Orús et al. (2020) discovered that while professors in Spain acknowledged the importance of ICTs in enhancing communication and collaboration, their implementation frequently remained superficial due to insufficient training. This gap shows how important it is to have professional development frameworks like DigCompEdu, which give teachers structured guidance on how to improve their digital skills (Caena & Redecker, 2019). The difficulty, though, is making sure that these kinds of frameworks are used by a lot of people and adapted to the needs of the area.

Digital pedagogy also has to deal with the problem of differences in wealth and income. Zou et al. (2025) contended that although digital ecosystems facilitate personalised learning, they may intensify inequalities when access to devices and connectivity is inconsistent. Students from marginalised communities often don't

have the tools they need to fully participate in digital learning environments, which creates a digital divide that makes it harder for everyone to be included. Khan et al. (2023) also found that in Pakistan, differences in access to technology make digital teaching methods less effective at the secondary level.

Another problem is that people don't want to move away from traditional teacher-centred models and toward learner-centred ones. Scott (2015) stressed that teaching in the 21st century needs to be based on questions and group work, but many teachers still use old-fashioned ways of teaching. Jansen and van der Merwe (2015) observed that pedagogical practice frequently encounters challenges in adapting to digital environments, as educators are reluctant to assume new roles as facilitators and co-creators of knowledge. This resistance makes it harder for new teaching methods to be used and limits the power of digital pedagogy to change things.

Finally, when you add digital pedagogy, you need to rethink how you test students and design your curriculum. Dhakal (2022) emphasised that digital pedagogy models must be congruent with curriculum goals and assessment methodologies to prevent superficial technology utilisation. But many schools still use old-fashioned tests that don't do a good job of measuring skills like teamwork, creativity, and digital literacy. This misalignment makes it hard for people to really use digital teaching methods. In short, the problems with digital pedagogy include a lack of infrastructure, poor teacher training, unequal access to education based on income, a lack of willingness to change teaching methods, and a lack of alignment between curriculum and assessment. To deal with these problems, we need to invest in the system, train teachers, and make sure that educational reform is fair and open to everyone.

V. OPPORTUNITIES OF DIGITAL PEDAGOGIES

Digital pedagogies offer a lot of chances to change education in the 21st century, even though there are some problems. These chances cover things like getting students involved, making sure everyone feels welcome, helping teachers grow professionally, and coming up with new ideas for the whole system. They give us a chance to think of education in a more fair, flexible, and future-focused way. Digital pedagogies facilitate a transition from teacher-centred to learner-centred methodologies, wherein students actively engage in the construction of knowledge. Scott (2015) stressed that teaching in the 21st century needs to focus on personalisation, participation, and productivity. Interactive platforms, adaptive learning systems, and MOOCs are examples of tools that let students learn at their own pace, which encourages independence and creativity (Zou et al., 2025). This focus on the learner makes students more motivated and involved, getting them ready for a lifetime of learning.

Digital ecosystems make it easier for people to get an education by breaking down barriers based on where they live and how much money they have. Khan et al. (2023) emphasised that digital methodologies can facilitate inclusive education policies, especially in environments where conventional pedagogical methods marginalise certain groups. Mobile learning and online platforms make education more accessible to everyone by giving students in remote or underserved areas access to high-quality resources. Duishonbekova and Baitokova (2025) said that cyberpedagogy creates flexible learning spaces that can change to meet the needs of different students, which helps make things fair. Digital pedagogies offer avenues for learners to cultivate essential 21st-century competencies, including collaboration, communication, creativity, and critical thinking. Tucker (2014) showed that Web 2.0 technologies like blogs, wikis, and forums make it easier for people to work together to solve problems and create new knowledge. Liesa-Orús et al. (2020) also noted that integrating ICT into higher education helps students develop these skills, which are important for living in a digital society. Digital pedagogy aligns education with the skills needed in global job markets by including these kinds of skills in the curriculum.

Digital pedagogies also give teachers a chance to grow in their careers. Frameworks like DigCompEdu define the skills that teachers need to use technology in a meaningful way in their work (Caena & Redecker, 2019). Asad et al. (2021) stressed how important techno-pedagogical skills are for teachers because they help them create interactive and welcoming learning spaces. These frameworks not only help teachers feel more sure of themselves, but they also encourage new ideas in how to plan lessons, test students, and run a classroom. Digital pedagogies promote systemic innovation in curriculum design, assessment, and policy at the institutional level. Saykili (2019) contended that institutions of higher education are progressively embracing flexible and adaptive frameworks that incorporate digital literacy and learner autonomy. Dhakal (2022) showed that structured digital pedagogy models can connect curriculum goals with technology, making sure that the technology is used in a way that is meaningful and not just for show. These kinds of systemic changes make it possible for education systems to deal with global problems and opportunities in a good way.

VI. DISCUSSION AND ANALYSIS

The use of digital teaching methods in the 21st century is both a chance for education systems around the world to change and a difficult problem to solve. The effects, problems, and chances talked about above show how innovation, fairness, and systemic adaptation all work together in a dynamic way. Digital pedagogies have shown clear benefits in getting students more involved, helping them learn better, and teaching them skills for the 21st century, like how to work together and think critically (Dhakal, 2022; Tucker, 2014). But these effects are not evenly spread out because of ongoing problems with infrastructure and teacher readiness. Duishonbekova and Baitokova (2025) pointed out that the lack of reliable internet and devices makes it hard for people to use cyberpedagogy, especially in developing areas. Liesa-Orús et al. (2020) discovered that although educators acknowledge the potential of ICTs, their application frequently remains superficial due to insufficient training. This tension shows how important it is for the whole system to invest in both technology and professional development.

Digital pedagogy has the potential to make education more accessible and open to everyone, which is its main promise. Online platforms, MOOCs, and mobile learning environments facilitate educational access for learners from various backgrounds, irrespective of geographical limitations (Zou et al., 2025). However, socioeconomic disparities persist in influencing access, resulting in a digital divide that compromises inclusivity (Khan et al., 2023). So, even though digital pedagogy can lead to more fairness, it will only work if there are specific policies in place to fix the problems with access to devices, connectivity, and digital literacy. Teacher competence is a key factor in making the most of digital pedagogy.

Frameworks like DigCompEdu help teachers build digital skills in areas like professional engagement, teaching, and giving students more power (Caena & Redecker, 2019). Asad et al. (2021) stress the importance of combining techno-pedagogical skills so that teachers can create interactive and welcoming learning spaces. Nonetheless, resistance to pedagogical transformation persists as an obstacle, with numerous educators hesitant to transition from conventional teacher-centred paradigms to learner-centred methodologies (Scott, 2015; Jansen & van der Merwe, 2015). To solve this problem, schools need to change their culture and train their staff.

Digital pedagogies promote innovation in curriculum design, assessment, and institutional frameworks at the systemic level. Saykili (2019) contended that institutions of higher education are progressively embracing flexible and adaptive frameworks that incorporate digital literacy and learner autonomy. Dhakal (2022) showed that structured digital pedagogy models can connect curriculum goals with technology, making sure that the two work well together. These innovations indicate that digital pedagogy is not merely a technological enhancement but a paradigm shift necessitating a reevaluation of educational policies, teacher training programmes, and assessment strategies. In summary, digital pedagogies in the 21st century embody a dual reality: they provide transformative effects and opportunities for inclusivity, skill enhancement, and systemic innovation, while simultaneously facing obstacles related to infrastructure, equity, and resistance to change. The study suggests that the future of digital pedagogy depends on a balanced approach that includes building infrastructure, giving teachers more power through competence frameworks, and making sure that everyone has equal access to technology. By dealing with these problems, education systems can fully take advantage of digital pedagogy to get students ready for the challenges of a digital, globalised society.

VII. CONCLUSION

Digital pedagogies in the 21st century signify a transformative paradigm that reconfigures the objectives and methodologies of education. Their effects are clear in the way they get students more involved, help them learn better, and teach them important skills for the 21st century, like working together, being creative, and solving problems (Dhakal, 2022; Tucker, 2014). In addition, they have changed the role of teachers, making them more like facilitators and designers of learning experiences than just people who pass on information (Scott, 2015; Duishonbekova & Baitokova, 2025). Nonetheless, the obstacles of infrastructure deficiencies, insufficient teacher training, socioeconomic disparities, and opposition to pedagogical reform continue to pose substantial hindrances to the successful execution of digital pedagogy (Liesa-Orús et al., 2020; Khan et al., 2023). If these systemic problems aren't fixed, the promise of digital pedagogy could be lost, especially in places where access to technology is limited and teachers aren't well-prepared.

Despite these challenges, digital pedagogies offer remarkable opportunities for inclusivity, equity, and systemic innovation. Online platforms, MOOCs, and mobile learning environments democratise education by increasing access for a wide range of learners (Zou et al., 2025). Frameworks like DigCompEdu and techno-pedagogical models help teachers grow professionally by making sure they have the skills they need to use technology in a meaningful way in their classrooms (Caena & Redecker, 2019; Asad et al., 2021). Digital pedagogy promotes curriculum flexibility, adaptive assessment, and learner autonomy at the institutional level, aligning education with the requirements of a globalised, digital society (Saykili, 2019). In conclusion, digital pedagogy is not just a new technology; it is a complete change in how we teach. Policymakers and institutions must invest in infrastructure, prioritise teacher training, and enact inclusive policies that bridge the digital divide in order to fully realise its potential. In this way, education systems can use digital teaching methods to create fair, student-centred environments that get students ready for the challenges of the 21st century.

References

[1] Aithal, S. (2025). Chapter 1: Introduction to Digital Pedagogies. In *Zenodo (CERN European Organization for Nuclear Research)*. https://doi.org/10.5281/zenodo.15298006

[2] Asad, M. M., Aftab, K., Sherwani, F., Churi, P., Moreno-Guerrero, A., & Pourshahian, B. (2021). Techno-Pedagogical Skills for 21st century Digital Classrooms: An extensive literature review. *Education Research International*, *2021*, 1–12. https://doi.org/10.1155/2021/8160084

[3] Bakar, S. (2021). Investigating the Dynamics of Contemporary Pedagogical Approaches in Higher Education through Innovations, Challenges, and Paradigm Shifts. *Social Science Chronicle.*, *1*(1), 01–19. https://doi.org/10.56106/ssc.2021.009

[4] Caena, F., & Redecker, C. (2019). Aligning teacher competence frameworks to 21st century challenges: The case for the European Digital Competence Framework for Educators (Digcompedu). *European Journal of Education*, *54*(3), 356–369. https://doi.org/10.1111/ejed.12345

[5] Clark, J. E. (2010). The digital imperative: making the case for a 21st-Century pedagogy. *Computers & Composition/Computers and Composition*, *27*(1), 27–35. https://doi.org/10.1016/j.compcom.2009.12.004

[6] Cynthia, L. S. (2015, December 1). *The Futures of Learning 3 : what kind of pedagogies for the 21st century?* https://hdl.handle.net/20.500.12799/3747

[7] Dhakal, B. P. (2023). Digital Pedagogy: An effective Model for 21st Century Education. *Academic Journal of Mathematics Education*, *5*(1), 1–9. https://doi.org/10.3126/ajme.v5i1.54534

[8] Duishonbekova, G., & Baitokova, A. (2025). Cyberpedagogy – the educational challenge of the 21st century. *Bulletin of the Jusup Balasagyn Kyrgyz National University*, 20–28. https://doi.org/10.58649/1694-8033-2025-1(121)-20-28

[9] Efremova, N., & Huseynova, A. (2023). Digital Pedagogy: Opportunities and Challenges of learning in the information environment. In *Lecture notes in networks and systems* (pp. 283–292). https://doi.org/10.1007/978-3-031-21432-5_29

[10] Gurbanova, O., & Gurbanova, M. (2025, September 11). *PEDAGOGICAL MODELS IN THE 21st CENTURY*. https://mpcareer-google.ru/index.php/journal/article/view/2998

[11] Guven, I., & Gulbahar, Y. (2020). Building a digital learning culture by rethinking pedagogies for the 21st century. In *Advances in educational technologies and instructional design book series* (pp. 150–170). https://doi.org/10.4018/978-1-7998-1591-4.ch009

[12] Habibullah, K., Ruqaia, K., Iffat, B., & Quratulain. (2023). Existing Pedagogical Practices at Secondary Level; Emerging Trends Challenges and Opportunities in 21st Century. *Zenodo (CERN European Organization for Nuclear Research)*. https://doi.org/10.5281/zenodo.10492434

[13] Halder, I. (2023). Innovation Pedagogy of 21st Century: Challenges and Opportunities. *International Journal for Multidisciplinary Research (IJFMR)*, *5*(3), ISSN: 2582-2160. https://eric.ed.gov/?id=EJ1056080

[14] Kivunja, C. (2014). Do You Want Your Students to Be Job-Ready with 21st Century Skills? Change Pedagogies: A Pedagogical Paradigm Shift

from Vygotskyian Social Constructivism to Critical Thinking, Problem Solving and Siemens' Digital Connectivism. *International Journal of Higher Education*, *3*(3). https://doi.org/10.5430/ijhe.v3n3p81

[15] Kivunja, C. (2015). Exploring the Pedagogical Meaning and Implications of the 4Cs "Super Skills" for the 21st Century through Bruner's 5E Lenses of Knowledge Construction to Improve Pedagogies of the New Learning Paradigm. *Creative Education*, *06*(02), 224–239. https://doi.org/10.4236/ce.2015.62021

[16] Libardoni, P. J., & Da Cunha Iribure, H., Junior. (2024). POR UMA PEDAGOGIA DIGITAL: UM NOVO ENSINAR e UM NOVO APRENDER. *Revista De Gestão Social E Ambiental*, *18*(9), e07319. https://doi.org/10.24857/rgsa.v18n9-122

[17] Liesa-Orús, M., Latorre-Cosculluela, C., Vázquez-Toledo, S., & Sierra-Sánchez, V. (2020). The Technological challenge facing Higher Education Professors: Perceptions of ICT tools for developing 21st century skills. *Sustainability*, *12*(13), 5339. https://doi.org/10.3390/su12135339

[18] Mardiana, H., & Mardiana, H. (2021). Teaching with digital technology and the impact on pedagogical changes. *Social Science and Humanities*. https://doi.org/10.31124/advance.16528959.v1

[19] Mishra, N., & Aithal, P. S. (2023). Modern Multidisciplinary Education: Challenges and Opportunities of Modern Learning Pedagogy. *International Journal of Case Studies in Business IT and Education*, 269–280. https://doi.org/10.47992/ijcsbe.2581.6942.0319

[20] Saykili, A. (2019). Higher Education in the Digital Age: The impact of Digital Connective Technologies. *Journal of Educational Technology and Online Learning*, *2*(1), 1–15. https://doi.org/10.31681/jetol.516971

[21] Siregar, L. A., & Siregar, S. (2024). Assessing Teacher Competency and Preparedness for Integrating Digital Media in 21st-Century Education: An Exploratory review. *AL-ISHLAH Jurnal Pendidikan*, *16*(4). https://doi.org/10.35445/alishlah.v16i4.5619

[22] Teo, P. (2019). Teaching for the 21st century: A case for dialogic pedagogy. *Learning Culture and Social Interaction*, *21*, 170–178. https://doi.org/10.1016/j.lcsi.2019.03.009

[23] Tucker, S. Y. (2014). Transforming Pedagogies: Integrating 21st century skills and Web 2.0 technology. *Turkish Online Journal of Distance Education*, *15*(1). https://doi.org/10.17718/tojde.32300

[24] *View of TRANSFORMATION IN 21ST CENTURY EDUCATION: DIGITAL PEDAGOGY AND LEARNER-CENTERED TEACHING TRENDS.* (n.d.). https://www.gejournal.net/index.php/IJSSIR/article/view/2679/2568

[25] Zou, Y., Kuek, F., Feng, W., & Cheng, X. (2025). Digital learning in the 21st century: trends, challenges, and innovations in technology integration. *Frontiers in Education*, *10*. https://doi.org/10.3389/feduc.2025.1562391