

Teachers' Perceptions of Using Digital Pedagogy in Higher Education Classrooms: A Narrative Review

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ABSTRACT

In recent years, pedagogical practices in higher education are shifting towards a more learner-centered approach due to the increasing use of information and communication technologies (ICTs). Digital pedagogy has drawn the attention of stakeholders because of its potential to support classroom interaction, participation and learning. This narrative review paper examines 60 Scopus-indexed publications including research articles, books and conference proceedings, and six other relevant peer-reviewed articles published in English between 2012 and 2026. The review focuses on teachers' perceptions and experiences of using digital technologies in teaching, the challenges they face, and possible ways to overcome these challenges. The publications were searched in the Scopus database and Google Scholar using the keywords: digital pedagogy, ICT integration, higher education, teacher perceptions, experiences, global south, South Asia and Nepal. The findings from the review suggest that digital tools can support interactive and learner-centered teaching, help students comprehend course content and develop critical thinking skills. However, effective use depends not only on the availability of technology but also on teachers' technological and pedagogical knowledge, self-efficacy, and beliefs. Teachers often face inadequate infrastructure, poor internet connectivity, limited professional development opportunities, and unequal access to digital resources. Addressing these challenges requires institutional support and commitment, context-specific professional development opportunities, and policies that promote equitable access to digital technologies.

Keywords: Digital pedagogy, higher education, ICT integration, student-centered learning, TPACK, Nepal

Introduction

Pedagogy and practices in higher education have undergone significant transformations in recent years due to the increasing use of digital tools and technologies. The adoption of smart digital technologies in education has created new possibilities for improving teaching and enhancing learning (Mhlongo et al., 2023). Traditional teacher-centered, passive, and print-based pedagogy has been complemented and replaced by more interactive, learner-centered, and multimodal methods called digital pedagogy. Multimedia platforms, learning management systems (LMS), and online collaboration enable student interaction and engagement through instructional methods previously impossible in traditional classrooms. (Silva et al., 2020). Digital pedagogy is considered effective in fostering critical thinking, problem-solving, and essential twenty-first-century learning skills, as it supports interactive communication among teachers, students, and content through platforms such as discussion forums, collaborative documents, and interactive exercises (Ali et al., 2025). Its multimodality recognizes the different semiotic modes, text, image, audio, and video- where meaning is produced in digital spaces (Ha, 2025).

Several studies have explored the impact of using digital tools in the classroom. Haziki et al. (2025) found that flipped classrooms improve student performance due to their learner-centred nature. Scherer et al. (2019) showed that teachers' technology adoption can be explained through factors such as perceived usefulness, attitudes, behavioural intentions, and technology use. The findings highlight the importance of teachers' perceptions and acceptance in explaining technology adoption. Subaveerapandiyana and Nandhakumar (2021) observed that Indian faculty with higher ICT skills adapted better to online education during the pandemic. Similarly, Maknun et al. (2025) reported that familiarity and ease of use of digital tools influence the desire to use them. As curriculum is a major driving force, involving teachers in its design helps create a clear roadmap for this purpose. Voogt et al. (2015) assert that collaborative curriculum design enables teachers to acquire and integrate technology into their teaching practices effectively.

Implementing digital technology in education can enhance learning, particularly in developing countries, but it is not straightforward. Schools and colleges face unreliable internet, limited technology, and inadequate support. They also face problems with appropriate curriculum integration, faculty readiness, resource constraints and professional development. Teachers' technological competency and their attitudes towards digital tools affect their readiness and ability to use ICT (Adegbenro & Olugbara, 2019; Istifci, 2019). A lack of training, support, and infrastructure prevents teachers from effectively using digital technologies in their teaching practice (Mpuangnan, 2024). Leadership development, professional development and policy support programs are important factors in the sustainable uptake of ICTs in learning institutions (Williams et al., 2022). In this regard, teachers in Nepal have also encountered difficulties such as a lack of adequate training programs, frequent power outages, unclear policies, external donor dependency, and limited resources, which prevent them from effectively utilizing ICT (Bahadur et al., 2024; Koirala, 2019; Dhital, 2018).

Most of the studies (Adegbenro & Olugbara, 2019; Koirala, 2019; Kandel, 2025; Rana & Rana, 2020; Laudari & Maher, 2019; Subaveerapandiyana & Nandhakumar, 2021; Önalán & Kurt, 2020; Moradi, 2025; Gunasinghe and Nanayakkara, 2021) have examined teachers' ICT competence, perceptions, experiences, practices, and the challenges of technology integration in educational contexts. They have highlighted the importance of teachers' digital competence and the infrastructural and institutional requirements for successfully integrating ICTs in education. However, research on teachers' perceptions and experiences of digital pedagogy in higher education settings in Nepal remains limited. The increased focus on digital tools in recent years has increased the need to explore

teachers' perceptions and experiences to understand the pedagogical shift and how to support it in effective teaching and learning. The specific research questions for this narrative review are: i) How do higher education institutions' (HEIs) teachers perceive digital pedagogy and the integration of ICT into their classrooms? ii) What are the major challenges associated with the integration of ICT tools in the classroom? iii) How can these challenges be addressed?

Methodology

This review examines 60 Scopus-indexed publications including research articles, books and conference proceedings, and six other relevant peer-reviewed articles published in English between 2012 and 2026 in peer-reviewed journals. The selected literature is concerned with teachers' perceptions and experiences of using digital tools in higher education classrooms in global, Asian and Nepalese contexts. The key search terms used for locating the selected literature in Scopus database and Google Scholar were 'digital pedagogy', 'ICT integration', 'higher education', 'teacher perceptions', 'experiences', 'Global South', 'South Asia' and 'Nepal'. Only studies covering digital technology or ICT integration in the classroom and providing evidence on teachers' perceptions, experiences, practices, challenges, or strategies were included. The 2012-2026 period was selected as a timeframe that addresses the research questions for this review and reflects the emergence of ICT-based research since the implementation of LMS, technology adoption during and after the COVID-19 pandemic, and the recent emergence of the use of generative artificial intelligence in higher education. The review primarily focused on peer-reviewed journal articles, while a small number of relevant book chapters, conference proceedings, and institutional reports were also included where they directly addressed the research questions

Use of Digital Technologies in Classroom Teaching

Global Context

The use of digital technologies in higher education has become a characteristic of contemporary teaching and learning worldwide, with both developed and developing countries investing considerable sums in technological infrastructure and pedagogical innovation (Mhlongo et al., 2023). In North American and Western European countries, the debate on digital pedagogy has shifted away from questions of access to more subtle questions of pedagogical transformation and teacher identity. The COVID-19 pandemic has accelerated institutional technology adoption. European Union initiatives, such as the Digital Education Action Plan, and frameworks such as INVITE show how theoretically grounded interventions, informed by Self-Determination Theory and active learning principles, can help educators develop learning experiences that facilitate intercultural competence and long-term student engagement (Hildebrandt et al., 2025).

The problems of technology use in Sub-Saharan Africa are qualitatively different, not so much in terms of pedagogical sophistication as in infrastructural constraints and the need to adapt to context. South African studies have revealed that although institutions have adopted learning management systems, the adoption has facilitated, not transformed, pedagogical practices. Sims (2025) found that the most prevalent institutional applications of LMS were communication and evaluation activities, with collaborative and interactive learning applications being marginal. A more positive case is the experiences of Tanzanians during the pandemic. Mtebe et al. (2021) stated that the University of Dar es Salaam, with assistance in strategic auditing of available resources and instructor-specific training, could continue education.

Asia-Pacific includes both highly digitized education systems and cases where access to basic technology remains uneven. Research in Singapore and South Korea focuses on enhancing advanced pedagogical applications and documenting technology-enhanced learning designs (Songkram et al., 2026). Ahmad et al. (2024) explored the application of ICT in higher education institutions in the underdeveloped Hazara region of Pakistan, which revealed that students demonstrated positive learning outcomes due to ICT use, although integration by faculty was uneven and constrained by infrastructural limitations.

Zuhri et al. (2026) found positive attitudes toward blended learning and existing issues among Indonesian English as a foreign language (EFL) lecturers: the absence of technological infrastructure, the impossibility of preparing online materials, and a lack of motivation among students. The COVID-19 pandemic exposed and worsened these inequalities. Institutions had to deal with connectivity gaps, low digital literacy rates, and a lack of institutional preparedness in some areas of China, Bangladesh, and Indonesia. Highlighting the HyFlex learning applications, Modise and Dlamini (2026) point out that flexible learning models, irrespective of their theoretical potential, must be negotiated within local technological, cultural, and institutional conditions rather than being forced as universal solutions.

In the Latin American context, Bergamini et al. (2025) found that, despite students' preference for face-to-face learning, properly designed active learning plans were effective in both online and in-class settings. Their research revealed that student variables, such as age, gender and professional experience, played a significant role in shaping their attitudes towards technology-supported education. This implies that a single pedagogical strategy can not be effective when working with a heterogeneous student population.

Table 1

ICT Use in the Global Context

Author & Year	Key Findings
Ahmad et al. (2024)	Students showed positive learning outcomes from ICT applications, but faculty integration was limited by infrastructural limitations.
Sims (2025)	Most prevalent LMS applications focus on communication and evaluation, whereas collaborative and interactive learning applications are marginal.
Bergamini et al. (2025)	Student variables such as age, gender and professional experience play a significant role in shaping attitudes toward technology-enhanced education.
Zuhri et al. (2026)	The faculty had positive perceptions of blended learning but faced challenges: limited infrastructure, difficulty preparing online materials, and low student motivation.
Modise & Dlamini (2026)	Flexible learning models must be negotiated within local technological, cultural, and institutional conditions.

South Asian Context

The use of digital technologies in South Asia has drawn the attention of stakeholders. Despite expected positive outcomes, academic institutions in Nepal, India, Pakistan, Bangladesh, and Sri Lanka face two main challenges: increasing access to digital facilities and overcoming issues related to infrastructure, economy, and pedagogical culture. Unlike peers in developed countries, where digital teaching has shifted from access issues to changes in teaching methods, South Asian institutions still deal with fundamental problems that limit technology-based teaching and learning.

The COVID-19 pandemic led to a significant rise in the use of digital tools in the region. However, it also worsened existing digital divides. This shows that successful digital integration depends on the physical conditions or infrastructure under which it occurs (Modise & Dlamini, 2026). While students in Nepal are eager to use blended learning methods, a lack of innovative strategies and digital infrastructure can limit their access to and use of these methods. This raises doubts about whether online learning models work everywhere, especially when they are designed in resource-rich settings (Curle and Paudel 2025).

Gyawali and Mehndroo (2025) found that integrating technology positively impacts instructional design. However, low digital literacy, poor infrastructure, and institutional obstacles pose challenges to effective adoption of technology. Khan et al. (2015) found four different conceptualizations of mobile learning by students, namely, storage, access to information, a learning tool, and a collaboration tool in the context of Bangladesh. Similarly, highlighting the Indian context, Subaveerapandiyan and Nandhakumar (2021) reported that although faculty had comparable ICT skills, age, and resource access, implementation challenges created significant differences in implementation, highlighting that the digital divide exists in multiple forms: institutional type, geography, and demographics. Gunasinghe and Nanayakkara (2021) found that technology anxiety had a significant negative impact on adoption intentions, which was moderated by age and gender. Hence, the need to take into account the emotional component of technology adoption, where faculty may have no prior experience, and institutional support is lacking in Sri Lanka.

Overall, this review reveals four themes in the South Asian context. First, the most overwhelming constraints are infrastructural, as unreliable electricity, poor connectivity, and inadequate technical support undermine pedagogical innovations. Second, the human factor, such as the digital literacy of teachers, their pedagogical ideology, and professional development, is also critical, as infrastructure cannot result in successful digital pedagogy without a long-term orientation toward the psychological and professional needs of educators. Third, institutional support mechanisms, clear policies, technical support, and professional development play a decisive role in shaping adoption patterns. Fourth, socio-cultural factors, including a lack of willingness to change and the urge to apply traditional teaching methods, greatly impact the acceptance of digital pedagogy, which means that technology cannot be applied to substitute for current methods.

Table 2

ICT Use in the South Asian Context

Author(s) and Year	Key Research Findings
Khan et al. (2015)	Students use mobile learning as a tool for storage, information access, learning and collaboration.
Gunasinghe and Nanayakkara (2021)	Technology anxiety negatively affects the intention to adopt, and this effect is moderated by age and gender.
Subaveerapandiyan and Nandhakumar (2021)	Indian teachers possess comparable ICT skills. However, factors such as age, access to resources, and implementation challenges lead to notable differences.
Curle and Paudel (2025)	Nepalese students desire blended learning. However, they face technological barriers and inadequate infrastructure.
Gyawali and Mehndroo (2025)	Technology integration improves instructional design and promotes student-centered approaches. However, low digital literacy, poor infrastructure, and institutional barriers hinder adoption.

Nepalese Context

The implementation of digital pedagogy in Nepalese higher education continues to face significant infrastructural, institutional, and professional challenges. A major problem in ICT integration is infrastructural constraint. In this regard, Dahal and Khadka (2025) found that the availability of infrastructural facilities such as reliable electricity, adequate bandwidth, and working devices was the most important determinant of ICT use, while institutional support and teachers' readiness were less important than infrastructural accessibility. The unavailability of computers, projectors, and reliable internet is the major obstacle to using technology in teacher education in Nepal (Laudari & Maher, 2019; Rana & Rana, 2020). In addition, policy reviews suggest that long-standing gaps between national ICT policies and material conditions in institutions of higher learning have hindered implementation because of inadequate funding and infrastructure. (Joshi et al., 2024)

The effectiveness of classroom delivery depends on teachers' readiness and infrastructure. Complex psychological and social factors affect teachers' use of ICT in the classroom. They show that resistance to change, expectations of effort, expectations of performance and social influence are strong predictors of attitudes and facilitating conditions (Shahi & Chaudhary, 2025). It highlights the importance of considering faculty motivation and practice through peer sharing and institutional support. University teachers expressed a strong desire for improved ICT infrastructure, adequate resources, and professional development opportunities, while also reporting challenges related to insufficient resources, skills, infrastructure, and training (Kandel, 2025).

Supporting institutions go beyond articulating policies. It requires developing both infrastructure and pedagogy. In this regard, Dahal and Manandhar (2024) identified four key success factors of LMSs: sign-in, learning and resource management, content management, and integration. They also identified five failure aspects: content creation and sharing, communicative features, course structures, learning engagement, and assessment. Lee and Sparks (2014) found that teachers were not using digital tools in transformative ways and identified several contextual and pedagogical hurdles

to technology integration.

Shrestha, et al. (2020) studied the effect of COVID-19 on online education for 208 faculty members of dental colleges of Nepal. During the pandemic and the accompanying 'Lockdown', a need was identified to find alternative ways to deliver the curriculum online. While 94.8% of the faculty members reported that they had good or satisfactory access to the internet, 95.2% reported that the online class environment was interactive, 86.5% felt online classes were not as effective as the live classroom class. Also, 79.4% said it was hard to keep track of students' attendance. The study also brought up issues regarding the practical and clinical simulations and University exams being administered online, and training in e-learning and strategies for online education in institutions. The same issues were faced in studies of distance learning in universities. It revealed high responsibility and commitment of teachers regarding self-directed learning. It helped them keep teaching online even when they experienced power outages, limited technical support, and unclear university policies (Laudari et al., 2021).

Students in rural areas and low-income communities faced a shortage of digital devices and poor connectivity during the COVID-19 pandemic, which indicates the existing problem of the digital divide among students. It increased existing inequalities in access to higher education (Gyawali & Mehndroo, 2025). The recent rise of generative artificial intelligence (AI) brings new challenges. However, it raises questions about how students in resource-limited settings can use technologies that require uninterrupted internet access and high levels of digital skills. In this regard, Bahadur et al. (2024) examined the intentions of 578 university students to use generative AI. The findings showed that habit, perceived learning value, and social influence positively predicted the intention to use AI.

Table 3

ICT Use in the Nepalese Context

Author & Year	Key Findings
Laudari and Maher (2019)	Resource scarcity, such as computers, projectors, and reliable internet, is a barrier to technology use.
Shrestha et al. (2020)	Online learning was perceived as less effective than face-to-face learning, and monitoring student attendance was a major challenge.
Laudari et al. (2021)	Professional responsibility and self-directed learning help maintain online teaching.
Dahal and Manandhar (2024)	Four components of LMS success are sign-in functionality, resource management, content management, and integration.
Joshi et al. (2024)	A long-standing disparity between national ICT policies and material conditions exists due to insufficient funding and inadequate infrastructure.
Dahal and Khadka (2025)	Infrastructural accessibility is the most significant determinant of ICT use.
Kandel (2025)	Teachers expect improved ICT infrastructure and professional development, while they continue to face challenges related to inadequate ICT resources, infrastructure, skills, and training.
Shahi and Chaudhary (2025)	Resistance to change, effort expectancy, performance expectancy and social influence augment attitudes.

Teachers' Perceptions and Experiences of ICT Use

Teachers' attitudes toward integrating technology seem positive, as they understand how technology can engage students and provide interactive learning experiences. However, a significant gap exists between positive perceptions of classroom technology and its actual implementation. Teachers' integrated technological, pedagogical, and content knowledge indicates more meaningful technology integration, whereas a lack of knowledge in any area leads to failure to move beyond basic tool use. Professional and structured training is beneficial to pre-service teachers, and in-service teachers may be reluctant to change their current teaching practices. Even institutional and teacher readiness aren't the best predictors of ICT use in resource-constrained settings where infrastructural accessibility is crucial. Teachers who receive administrative support, technical assistance, and opportunities to collaborate with colleagues are more successful at integrating technology.

Studies of teachers' implementation of digital pedagogy indicate that ICT-based teaching practices are shaped by a complex interplay of personal beliefs, skills, attitudes, and contextual factors that vary considerably across settings. Greene and Jones (2018) investigated the teaching methods of four ESL teachers and their reasons for using technology to teach oral communication skills, and found that teachers' pedagogical methods determined how much technology they used in the classroom. The teachers showed greater mean scores in technological content knowledge, technological pedagogical knowledge, and TPACK, even though they reported lower technological knowledge, indicating that pedagogical reasoning overrides technical proficiency in effective technology integration (Greene & Jones, 2018). Equally, Schmid and Whyte (2012) examined the adoption of interactive whiteboard technology by non-native-speaking EFL teachers in French and German state schools and found that teachers adopted the technology to implement a wide range of strategies, ranging from traditional grammar-translation to more communicative and constructivist models. Teachers modified or disregarded hegemonic pedagogies to create their own images of technology that better aligned with their curricular and personal objectives (Schmid & Whyte, 2012).

The beliefs, competencies, and attitudes of teachers are key determinants of technology integration practices in the classroom practices. Önalán and Kurt's (2020) study found that teachers had positive attitudes toward using technology in their teaching, high self-confidence in integrating technology, and a positive school climate among colleagues. Nevertheless, they claimed that the administration was not very supportive, particularly regarding technological infrastructure and instructional support. This gap between individual readiness and institutional support highlights the ongoing challenges of using technology. Pazilah et al. (2024) extended the technological, pedagogical and content knowledge (TPACK) model for English as a second language pre-service teachers with the addition of 21st-century skills and pre-service teachers' self-confidence. Successful technological integration demands more than competence or knowledge.

Classroom strategies for ICT use vary widely based on available resources, institutional support, and teachers' professional development experiences. Kelsch and Wang (2021) conducted action research to evaluate the substitution, augmentation, modification and redefinition (SAMR) model during the transition from fully online instruction to blended learning in an EFL context at a Chinese higher education institution. Their findings challenge the notion of SAMR as a strict step-by-step process. Instead, they propose that the model can guide teachers toward effective technology-based education. Shiu (2025) also investigated how technologies can be used in teaching by combining TPACK and SAMR in ESL classrooms, which created a framework that helps categorize teachers from beginners to experts based on their ability to integrate technology.

Professional development programs have influenced teachers' enactment practices. Sabourianzadeh

and Ahmadi (2023) examined the transformative potential of technology integration for the professional development of pre-service and in-service EFL teachers. Their 10-session program showed strong benefits for pre-service teachers, who reported reduced anxiety and a significant increase in confidence in choosing and using appropriate technological tools, creating engaging digital activities, and coping successfully with technological challenges (Sabourianzadeh & Ahmadi, 2023). In contrast, in-service teachers did not experience a significant decrease in anxiety, reported fewer benefits from integrating technology, and were more likely to stick to traditional teaching strategies because of difficulties changing established practices (Sabourianzadeh & Ahmadi, 2023). Chen (2023) explored the obstacles to implementing mobile-assisted language learning among Taiwanese university EFL instructors and found that the instructors experienced moderate barriers, with the time they spent on MALL daily emerging as a key determinant of successful implementation.

Researchers have discussed certain digital tools in relation to teachers' practices. Issa (2024) examined the use of infographics as an educational tool in EFL writing classes. The study found that students believed infographics supported collaborative learning and teamwork, and that their use differed by gender. Amal & Madini (2026) examined the responses of Master of Arts in Teaching of English as a Second Language (TESOL) students towards QuillBot, an AI paraphrasing and writing assistant. They found that students could utilize the tool to solve common language problems and can boost their writing productivity. However, there were also concerns among students regarding excessive reliance and ethical concerns.

The literature shows differences in enactment across geographical settings. The study by Gyawali and Mehndroo (2025) examined the application of technology based professional development for transformative teaching and learning for English teachers in Higher Education Institutions in Nepal, India and Bangladesh. Their results showed that technology integration enhances the design of instruction, encourages innovative and student-centered methods, and enhances teacher confidence and classroom performance. They did however discover a number of challenges – not enough digital literacy, poor infrastructure, institutional barriers to longer-term technology adoption in the region.

Caldwell (2024) studied perceptions of ICT use among Japanese tertiary educators and found that educators saw the potential of technology to facilitate independent learning and student interaction, with leadership support, better ICT infrastructure, and the willingness of the educator to use ICT being identified as influences on technology use, while beliefs, traditional teaching methods, and cultural issues were identified as barriers to ICT use.

Studies of pre-service teacher enactment indicate that gaps remain between teacher training programs and classroom realities. Prasojo et al. (2018) studied ICT integration that student teachers applied in their teaching activities in four high schools in Indonesia. Although the participants reported high competency levels and experience with technology use, the results showed they did not incorporate ICT into their teaching practices, with school conditions cited as the primary factor behind the absence of technology use. Merc (2015) examined technology use by student teachers in practice teaching in Turkey and found that the primary factors limiting technology use were inadequate training, absence of basic facilities in practicum schools, and individual decisions of student teachers, which indicated a discrepancy between teacher training programs and classroom realities that required more integration of technology in EFL teacher training and more connections between placement schools and universities.

The connection between teacher enactment and student outcomes has also been discussed. Dai and Wang (2024) investigated the relationships between classroom emotions of Chinese EFL learners

and their engagement in technology-based EMI classrooms and discovered that technology-enhanced learning is a strong mediator in the relationship between classroom emotions and academic engagement of learners, with 69 percent of the variation in learners' academic engagement mediated by the interaction of learners' emotions and their perceptions of technology and EMI. These findings have clear implications for pedagogical practices in various cultural settings. Al-Wossabi (2024) highlighted the importance of self-directed learning in fostering autonomy and lifelong learning skills in Saudi EFL settings and found that a persistent issue, reliance on teaching practices that do not support autonomous learning, is a barrier to effective language acquisition and encourages surface-level learning.

The review shows that teachers' application of digital pedagogy varies greatly across situations, depending on individual beliefs, competencies, attitudes, and institutional conditions. Theoretical frameworks, professional development programs, and institutional support all play a role in enabling or hindering teachers' technology integration practices. These findings indicate an immediate need for context-specific professional development to address teacher needs. They include a clear connection between the teacher's plan and actual classroom work, as well as infrastructure and administrative support for effective content delivery.

Table 4

Teachers' Perceptions and Experiences

Author(s) and Year	Key Findings
Merc (2015)	Inadequate training, lack of facilities, and individual decisions limit technology use.
Greene and Jones (2018)	Teachers' pedagogical approaches determine the extent of technology use.
Caldwell (2024)	Leadership support, ICT infrastructure, and teachers' willingness influence technology use.
Önalán and Kurt (2020)	Teachers' attitudes and self-confidence were positive. However, the administration did not provide infrastructure or instructional support.
Sabourianzadeh and Ahmadi (2023)	Effective training increases teachers' confidence and reduces anxiety.
Al-Wossabi (2024)	Dependence on teaching practices that do not foster autonomous learning is a barrier to effective language acquisition.
Dai and Wang (2024)	Technology-enhanced learning mediates relationships between classroom emotions and academic engagement.
Issa (2024)	Infographics facilitate collaborative learning and teamwork.
Pazilah et al. (2024)	Implementing technology requires confidence, knowledge, and skills in a changing environment.
Gyawali and Mehndroo (2025)	Technology integration enhances instruction. However, low digital literacy, poor infrastructure, and institutional obstacles hinder adoption.

Major Factors Shaping Digital Pedagogy in the Classroom

Technology integration in higher education classrooms is a complex interplay among institutions, teachers, students, and technology. Studies show these are interconnected parts of a larger system of digital pedagogies, conversations, and ongoing support. The initial step in integrating digital pedagogy is addressing institutional factors. Internet connectivity, devices, and Learning Management Systems (LMS) are considered fundamental infrastructure requirements. Dahal and Khadka (2025) state that infrastructural accessibility is the most significant predictor of ICT usage among teachers in Nepal, more important than institutional support and teacher readiness. However, research conducted at Ethiopian universities reveals that the utilization of ICT by teachers is superficial, as inadequate

infrastructure becomes insufficient without a strong support system (Ferede et al., 2022)

Li and Wang's (2021) study revealed that inadequate technical support can lead to technostress, which negatively affects teachers' work performance. Similarly, professional development and training are crucial for teachers. Effective professional development should focus on teaching as design strategies and train teachers as learning designers (Asensio-Pérez et al., 2017). Teachers' ICT readiness is closely linked to their digital competence. Information literacy, digital content creation, communication, and problem-solving skills are significant predictors of their attitudes towards integrating ICT into their teaching (Rahimi & Tafazoli, 2022). While teachers generally have positive attitudes towards ICT, their digital literacy and pedagogical competence are still insufficient for successful integration (Moradi, 2025). Furthermore, differences in digital skills, digital ethics, ICT anxiety, and intention to use ICT can influence the adoption and utilization of digital tools (Guillén-Gámez et al., 2021).

Students' digital skills greatly differ across countries and contexts. Despite the robust ICT infrastructure in Thailand, students lack digital skills, which is a major problem in the university context (Somabut et al., 2025). Likewise, in Portugal, the digital competence of students in subjects other than ICT is uneven (Nikolova et al., 2026). The use of ICT in Indian government colleges and private colleges varies greatly, with private colleges showing more widespread use (Chaturvedi et al., 2025). In response to COVID-19, universities in Sub-Saharan Africa quickly adopted technology for teaching, despite limited resources (Mtebe et al., 2021).

Readiness and motivation affect students' engagement in learning. Pedrosa's (2024) study in Portugal shows that future teachers lack the skills needed to support self-regulated and co-regulated learning. Ferede et al. 's (2022) study showed that ICT is mainly used by instructors to support courses rather than to change teaching methods in Ethiopia. The use of ICT is also limited by a lack of resources and investment (Mtebe et al., 2021). The resistance to change sometimes stems from a lack of training and confidence, and because of the mismatch between technology and beliefs that underlie teaching (Loqo, 2017). This resistance can be mitigated through long-term support that helps teachers see how technology can enhance their current practices, not replace them. (Asensio-Pérez et al., 2017).

Table 5

Factors Shaping ICT Use in the Classroom

Author and Year	Key Findings
Asensio-Pérez et al. (2017)	Teacher training programs that treat teachers as learning designers promote innovation in teaching.
Loqo (2017)	Teachers need in-depth training to motivate them to integrate digital technologies.
Li and Wang (2021)	Techno-insecurity and techno-complexity negatively influence work performance.
Mtebe et al. (2021)	Technology-enhanced teaching needs continued investment.
Vergara et al. (2023)	Lack of competence prevents the complete integration of digital technologies in teaching.
Pedrosa (2024)	The current teacher education program does not equip future teachers with skills to facilitate self-regulated and co-regulated learning.
Dahal and Khadka (2025)	Infrastructural accessibility is the most significant determinant of ICT use.
Milkova et al. (2025)	Students' attitudes to ICT tools vary depending on the course content and their own digital competencies.
Moradi (2025)	Although teachers show positive attitudes toward ICT integration, their digital literacy and pedagogical skills are insufficient for successful integration.

Major Findings from the Review

The analysis of previous studies shows that ICT integration can transform teaching and learning practices in higher education by creating more interactive and student-centered learning environments. However, developing countries like Nepal face challenges of inadequate infrastructure and other institutional constraints that continue to affect the use of digital technologies. The review revealed that teachers' positive attitudes towards technology do not necessarily lead to effective use of digital tools in the classroom. Teachers with stronger technological and pedagogical knowledge who feel more confident integrating technology are more likely to use digital tools effectively. Thus, teachers need relevant professional development programmes to enhance their competencies in using digital tools in the classroom.

The review also uncovered the usage of a wide range of digital tools and platforms, such as LMS, collaborative annotation systems, digital humanities platforms, and AI writing aids to gamification. Among these tools, blended learning approaches were favored by students and teachers for their flexibility and autonomy. However, effective implementation was linked to teachers' digital competencies, limited institutional support, and inadequate infrastructure.

The review also identified several challenges hindering the effective use of digital tools. These include unreliable Internet connectivity, limited devices, and power outages. Professional-level issues include a lack of training, technology stress, and resistance to technology. A mismatch exists between national ICT policies and actual practices. Social disparities in digital access are associated with geography, socioeconomic status and gender. These challenges are further compounded in Nepalese higher education due to the gap between ICT integration policies and their actual implementation. Furthermore, digital access also varies according to geographical location and socioeconomic status. Teachers should therefore be involved in curriculum design and decisions about technology use, rather than simply being expected to use technologies provided by their institutions.

Conclusion

Digital pedagogy can enhance pedagogical practices by making them more interactive and learner-centred. However, its effectiveness depends on a number of factors including the digital infrastructure, institutional support, teachers' competence in TPACK, and attitude towards technology. Furthermore, continuous professional development programmes are necessary so that teachers can find appropriate approaches to using technology in meaningful ways. Teachers can also share their experiences using collaborative design approaches in developing technology-enhanced modules. The blended learning and synchronous discussions can support student involvement when they are designed around student-centred learning approaches.

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