

Exploring the Effectiveness of Digital Tools for Teachers' Training: A Study of Lecturers' Experiences and Perspectives in Colleges of Education in Ghana

Abdul Kadir Salifu¹

Sulemana Iddrisu (PhD)²

Kadir Fuseini³

Ayendago Charles Mbawineh⁴

Abstract

This paper examines the effectiveness of digital tools in teacher training from the perspectives of lecturers at three Colleges of Education in Ghana: Tamale College of Education, Bagabaga College of Education, and Accra College of Education. Amid global educational digitalisation, Ghanaian teacher education institutions are increasingly integrating digital technologies to enhance instruction, curriculum engagement, and professional development. Using a qualitative design, data were collected through semi-structured interviews with 18 lecturers and analysed thematically using Braun and Clarke's (2006) six-step approach, guided by the Technological Pedagogical Content Knowledge (TPACK) framework. Findings indicate that lecturers generally perceive digital tools as beneficial for interactive learning, improved access to instructional resources, simulation-based teaching, and enhanced student engagement. Digital technologies were also seen as supporting continuous professional development and innovative teaching practices. However, challenges such as inadequate infrastructure, unreliable internet connectivity, limited institutional support, insufficient training, and weak motivational systems were identified. A persistent gap between ICT policy and implementation further constrained effectiveness. The study recommends sustained investment in infrastructure, capacity building, supportive policies, and improved digital literacy for both lecturers and students to strengthen teacher education in Ghana.

Keywords: Digital Tools, Teacher Training, Lecturers' Perspectives, Professional Development, Institutional Support.

1 Tamale College of Education, Ghana abdulkadir.salifu@yahoo.com

2 Tamale College of Education, Ghana sulesakabu@yahoo.com

3 Savelugu Senior High School, Ghana fuseinikadir2022@gmail.com

4 University for Development Studies, UDS, Ghana charlesay2253@uds.edu.gh

1.0 Introduction

In a modernised education system, the incorporation of digital tools into teacher training is increasingly seen as a means of improving both the quality of instruction and pupils' participation (Mardian, 2024). This is particularly significant in Ghana, where the government has placed greater emphasis on modernising teaching and learning as part of its efforts to meet global standards and the classroom requirements of the 21st century. The development of the national ICT Competency Framework for Teachers, with UNESCO's support, is indicative of this pledge; it offers a clear framework for preparing teachers to utilise technology tools (Manu et al., 2024). In addition to responding to evolving technologies, this has become part of a global strategy to enhance the quality of education, introduce new teaching approaches, and prepare teachers for the challenges they will face in increasingly complex learning environments. The threats and opportunities presented by this digital transformation further underscore its relevance.

Digital tools are innovative for interactive, student-centred learning, but will only be successful within a certain scope of digital transformation, depending on factors such as reliable infrastructure, institutional support, and educators' skills in using these tools (Yusuf et al., 2024). Research indicates that although lecturers perceive the advantages of using digital tools, challenges such as a lack of continuing education, reluctance to adopt new tools, and disproportionate access to tools frequently hinder their effective use (Yulin & Danso, 2025). Specifically, the discrepancy in provision between well-resourced and under-resourced institutions also raises questions about fairness in access, which would require more information to understand how lecturers perceive these challenges and how they are being addressed. The research question is: How do Ghanaian Colleges of Education lecturers conceptualise the potential of digital tools to improve the quality of teacher preparation, and what advantages and disadvantages do they assign to their implementation? In examining three institutions, Tamale College of Education, Bagabaga College of Education, and Accra College of Education, this study probes lecturers' lived experiences to gain an in-depth understanding of the real-world context of the use of digital instruments in teacher preparation. These colleges, situated in diverse geographical and socio-economic contexts, offer an integrative perspective on the factors influencing the adoption of digital technology within Ghana's teacher training scheme.

Previous research has considered the role of digital tools in teacher education from a higher perspective. The Teacher Education and Enhancement Programme (TEEP) in Ghana demonstrated the potential of online training to develop teachers' skills in digital pedagogy and assessment (Sarpong et al., 2022). Similarly, the Commonwealth of Learning's commitment to Open and Distance Learning (ODL) and Technology-Enabled Learning (TEL) has also highlighted the need for institutional capacity in this regard (Gacicio et al., 2024). But this research often focuses on program effects or the policy framework and is limited to the work of lecturers who use these tools daily. This study aims to address this gap by providing an in-depth exploration of lecturers' perspectives, adding to our understanding of the effectiveness of digital tools in teacher education.

2.0 Literature Review

2.1 Integration of Digital Tools in Teacher Education

Globally, digital tools have been transformative in teacher education, reshaping teaching practices and redefining the skills educators need. In Ghana, the process is anchored in the ICT Competency Framework for Teachers (ICT CFT), developed through a partnership among UNESCO, the Ministry of Education, the National Council for Curriculum and Assessment (NaCCA), and the Ghana Education Service. These frameworks promote the development of teachers' competence in infusing technology into teaching, thereby enhancing the relevance of global norms and the quality of education in the 21st century (Manu et al., 2024). Organised around four strands: people, policy, curriculum, and technology, the ICT CFT also sets 14 proficiency standards across three progression levels to ensure that teachers are not only proficient with digital tools but also able to integrate them into practical contexts in their teaching and learning (Midoro, 2013). Digital tools offer the potential for learner-centred, interactive approaches to teaching and learning, but their effectiveness must be underpinned by infrastructure, institutional support, and teacher skills. Indeed, some teachers are eager to use these tools, yet they face barriers to seamless access, including insufficient professional development, resistance to technology, and inequities in access to resources (Yulin & Danso, 2025). Against this backdrop, understanding lecturers' practical experiences of integrating technology is essential. Ghana's national policies also lean towards digital integration as a key element in the teacher education process, as part of the country's broader transition to a knowledge-based economy.

Finally, the ICT for Accelerated Development (ICT4AD) from 2003 and the ICT in Education Policy (2015), among other policies, stress the necessity for teachers to bring in technology that aligns with the students' needs for pedagogy and the preparation to contribute to national knowledge economies and global knowledge economies (Abedi, 2024). However, this disconnection exists between policy expectations and educators' expectations of students regarding classroom practices, and constraints in infrastructure, resources, and professional training prevent these ideas from being realised meaningfully (Atabek, 2019). Without institutional support, professional development, access to tech support, and leadership encouragement, these barriers are likely to persist. However, Ntim (2024) noted that providing specific training, technical support, and leadership support is essential to increasing the extent to which lecturers implement digital technologies in their teaching. Under this framework, institutions can also enable educators to collaborate by fostering a supportive classroom climate that improves teacher education outcomes in the embedding of digital teaching tools.

2.2 Lecturers' Experiences and Perspectives on Digital Tools in Teacher Training

Lecturers at Ghana's Colleges of Education claim both excitement and alarm about the incorporation of digital tools. Boateng et al. (2022) indicated that more than two-thirds of lecturers use personal computers, projectors, social media, and Learning Management Systems (LMSs) for scientific research, lesson preparation, and information retrieval. These tools, like technology education, promote professional teaching and productivity, with mobility, access, and ease of use as advantages. Yet instructors face limitations such as low digital literacy, technical issues, and fear of change. Mardiana (2024) claims that

the tendency to depend on colleagues or even students for help is well established, but widespread unease about software glitches/connectivity problems also makes adoption challenging. Resistance arises from a lack of confidence in or fear that technology might imperil established pedagogical methods. Institutional support, professional development, and individual attitudes about technology shape lecturers' perceptions. Ning and Danso (2025) state that, as a lack of training and support can limit the adoption of digital tools, it is important to have structured initiatives and supportive policies to cultivate positive attitudes toward technological integration.

In resource-limited settings, the adoption of new technologies, such as VR, offers insights. Nyaaba et al. (2024) found that pre-service teachers perceived VR as beneficial for experiential learning, yet encountered obstacles due to limited infrastructure, unreliable internet connections, and limited access to equipment. The development of digital literacy is an important element for successful integration. Taner (2018) showed that student teachers' personal devices and communication tools, including WhatsApp, improved their performance, so informal learning and peer support supplement formal training. Lecturers' experiences with digital tools are strongly influenced by institutional factors, such as leadership support, access to resources, and professional development. Younger faculty are more inclined to engage with technology, and faculty workload and teaching experience influence the level of engagement (Ntim, 2024). Self-directed, peer-supported professional development is critical for developing digital competencies. Yusuf et al. (2022) found that lecturers used online resources, search engines, and peer collaboration to acquire skills, emphasising the need for proactive measures to address the relatively limited availability of formal training opportunities.

2.3 Benefits and Challenges of Digital Tools in Teacher Training

There are multiple benefits in teaching with digital tools, and lecturers acknowledge this. Digital tools can improve teaching efficiency, make resources available, and support lesson planning and research activities (Boateng et al., 2022). Through multimedia presentations, interactive platforms, and online assessments, they also enable student-centred learning, increasing engagement and improving learning outcomes (Mardiana, 2024). Differentiated instruction using digital tools enables lecturers to accommodate students' diverse needs. Lecturers also gain professional benefits from exposure to technology, acquiring new skills and competencies through self-guided and peer-led learning (Yusuf et al., 2022). Open Educational Resources (OERs) enable lecturers to supplement class materials, especially in resource-poor settings, thereby enhancing curriculum delivery and students' learning opportunities.

However, a number of challenges remain. Poor infrastructure, such as spotty internet, a lack of computer labs, and obsolete equipment, is one factor that hinders the meaningful adoption of such tools (Loglo, 2024). The absence of a targeted professional development approach further limits lecturers' capacity to incorporate digital tools effectively, as most have neither pedagogical knowledge nor relevant experience in digital integration (Yusuf et al., 2022). Resistance to change, varying levels of digital literacy, and the increased workload resulting from digital integration also pose challenges (Ning & Danso, 2025; Loglo, 2024).

2.4 Institutional Support and Policy Frameworks

Institutional support, comprising infrastructure, professional development, and administrative support, is vital to digital integration. Research indicates that reliable internet access, modern laboratories, and resources make lecturers more willing to embrace technology (Boateng et al., 2022). Technical support personnel and pedagogical workshops build confidence and reduce resistance (Yusuf et al., 2022). Recognition and rewards for innovative teaching also incentivise professors to use digital tools. Ghana has an educational policy that integrates ICT at the national level, but implementation varies across institutions. Clear ICT policies, including objectives, action plans, and evaluation systems, provide a blueprint for digital adoption (Loglo, 2024). Policy challenges arise when policies remain silent, are miscommunicated, or have insufficient practical application, which, in turn, create incoherence or inconsistencies. Economic obstacles, bureaucratic impediments, and a lack of strategic vision obstruct progress, underscoring the need for coordinated, well-supported efforts to facilitate digital adoption (Yulin & Danso, 2025).

2.5 Theoretical Framework

One such framework is the Technological Pedagogical Content Knowledge (TPACK) model (Mishra & Koehler, 2006), which offers a more comprehensive view of how lecturers integrate digital tools into their teacher training. The TPACK model emphasises the convergence of the three aspects, technology, pedagogy and content, and argues that optimal digital integration therefore has to incorporate all of these domains. This model is particularly well-suited to Ghanaian Colleges of Education, as it suggests a need for lecturers' capabilities that extend beyond domain knowledge to mastering the material through appropriate pedagogical approaches and digital resources.

Also, the framework considers contextual factors, including institutional policies, infrastructure, and professional development, which align with the study's focus on lecturers' experiences and challenges. Using this framework, the study adopts TPACK to elucidate the complexities of digital tools integration in teacher education and to understand how lecturers relate to these domains within the context of their respective institutions. Such theoretical orientations provide a well-founded framework for deciphering the nexus among technological, pedagogical, and content-oriented knowledge regarding the impact of digital tools on teacher education programmes in Ghana.

3.0 Methodology

This study utilised a qualitative, multiple-case study design, employing only semi-structured interviews, to investigate lecturers' experiences and perspectives on the usefulness of digital tools in teacher training at Ghanaian Colleges of Education. A qualitative approach was chosen as it allowed the researcher to capture in-depth, detailed accounts of lives lived and to develop the meaning participants construct through their lived experiences. The research was conducted in three selected Colleges of Education: Tamale College of Education, Bagabaga College of Education, and Accra College of Education, based on their different geographic locations and levels of digital infrastructure and support. The participants were selected through purposive sampling from lecturers with extensive

experience using digital tools in teacher training programmes. Eighteen (18) lecturers from each college were interviewed.

The semi-structured interview guide focused on theme-relevant topics that reflected the aims of the study, such as lecturers' experiences, perceived benefits, and barriers to the use of digital tools. Interviews were conducted face-to-face, audio-recorded and transcribed verbatim with participants' consent. Data were subject to thematic analysis using Braun and Clarke's (2006) six-stage methodology to identify, analyse, and report patterns of interest. Such an approach allowed one to gain a deeper understanding of individuals' perspectives whilst remaining comfortable exploring new themes. Ethical approval, confidentiality, anonymity, and voluntary participation were maintained. This approach enabled the methodology to offer greater insight into the practical realities and contextual dynamics that influence the integration of digital tools in teacher education.

4.0 Findings/Results

The report details the findings of semi-structured interviews with 18 lecturers at three Ghanaian Colleges of Education: Tamale College of Education, Bagabaga College of Education, and Accra College of Education. Five common themes were identified through thematic analysis: (1) Lecturers' Experiences with Digital Tools, (2) Perceived Benefits of Digital Tools in Teacher Training, (3) Challenges in Integrating Digital Tools, (4) Institutional Support and Policy Frameworks, and (5) Professional Development and Capacity Building. These insights are expanded upon, and quoted examples and interpretations are used to illustrate lecturers' views.

4.1 Lecturers' Experiences with Digital Tools

Lecturers' experiences varied widely, but their opinions were often influenced by their familiarity with, confidence in, and exposure to particular digital tools in their teaching and classes. Lecturers are very excited about how digital tools can create opportunities for interaction and communication with students, but some have been cautious due to concerns about technology issues and a lack of institutional support. One lecturer described how embracing digital platforms had slowly changed the way teaching and communication happen, saying, *"I've completely changed how I communicate, going electronic and using things like Moodle; it's been much more interactive since"* (Respondent 1). It reflects that the incorporation of digital platforms has not merely augmented standard pedagogical approaches but has gradually seeped into a broader pedagogical framework, compelling lecturers to have students engage in online interactions, share their material through school discussion boards, and participate in virtual learning exercises. Conversely, some lecturers admitted that the use of digital tools has increased certain administrative aspects of teaching, such as assessment and feedback processes. One of the participants shared how their understanding of remote assessments changed as time went on, saying, *"Initially, I wasn't sure online assessment was a good match for me, but it has been super streamlined in terms of grading and feedback as a result of it"* (Respondent 3). These observations demonstrate how a reluctant student and teacher have learnt about the productivity and convenience offered by digital tools in academic work. Lecturers can now automate

grading, feedback, and course materials, replacing time-consuming, resource-intensive manual processes, freeing up time to focus on instructional delivery.

Nevertheless, a number of the lecturers mentioned the need to avoid the problems of unreliable infrastructure, which could interrupt teaching and trust the students in digital systems. But, as one lecturer put it: *"You can do it and do it the way you want, but sometimes the bad thing is that the system can break down or it cannot work right"* (Respondent 10). Another lecturer also explained that *"Hardware does not function independently, and when software fails, the entire lesson is disrupted"* (Respondent 5). These encounters demonstrate that, to the extent that digital technologies can be instrumental for students, their success is largely determined by the quality of the infrastructure they use, rather than by the technologies themselves. Disruptions due to faulty hardware, unstable internet, or running programmes may interrupt the course and affect its continuity, and therefore the student's learning.

Additionally, lecturers expressed concern about the lack of formal training to build their competence in using digital tools effectively in teaching. "I had no formal training for these tools, so I learned on my own," one participant said, "and sometimes I would ask my colleagues to help me practise with them when I could" (Respondent 2). These comments indicate that lecturers often rely more on self-management, peer support, and a trial-and-error approach to becoming comfortable with new technologies. This self-directed learning illustrates the adaptability and commitment of lecturers but also highlights the shortcomings of institutional support structures that should ideally provide structured professional development programmes and continuous learning opportunities. The pedagogical potential of digital tools, as per the educational paradigm, should not be neglected because of insufficient technical support, which is often required but not feasible when lecturers lack proper educational training. This will slow the practice of embedding technology in education. In lecturers' stories, a paradox is evident: enthusiasm for the potential benefits of digitally operated tools, combined with concerns about their technical robustness and insufficient institutional support. Yet while many lecturers recognise that digital technologies have enhanced interactions between students and faculty and increased the efficiency and management of academic work, the successful integration of these technologies into teaching practice relies, in large part, on robust infrastructure, appropriate training, and consistent institutional backing.

4.2 Perceived Benefits of Digital Tools in Teacher Curriculum

Several notable benefits reported by lecturers in relation to utilising digital tools in teacher education and training programmes were identified, including improved quality of learning experiences, wider access to teaching resources, and increased student engagement in class. Digital technologies enabled the simulation of real classroom environments and allowed new teacher trainees to use instructional techniques that were infeasible in traditional teaching settings, as many described. For example, according to one lecturer, "The digital simulations enable students to simulate teaching situations without the need for physical classrooms" (Respondent 2). This highlights the increasing importance of technology in constructing authentic learning environments in which learners can try out classroom-learning tools, classroom-learning approaches, room management strategies, and lesson

delivery in a controlled or semi-safe environment before they move on to real school level. Not only do such experiences give students the chance to build confidence in their teaching talents, but they also enable them to practise their teaching in an environment where mistakes are welcomed and corrected. Lecturers claimed that not only were simulated teaching experiences possible, but that digital tools also widened the variety of instructional materials for teaching and learning.

At present, most of the course content is based on textbooks and printed materials, and that information is spread thin across what lecturers can feasibly provide and, ultimately, what students can access. But now, with the advent of digital platforms, educators can include a wide range of online resources in the curriculum. As another lecturer described it, *"Online resources have broadened what I am able to use, not just textbooks"* (Respondent 7). Another participant commented that *"I can also share materials with students through online platforms"* (Respondent 18). This demonstrates how technology has also enabled lecturers to deliver a more varied pool of teaching materials, whether it be videos, research articles, presentations, or interactive learning modules for the learning of the topic, resulting in a more comprehensive learning environment and allowing for exposure to diverse points of view, resources, and materials.

Digital tools were also cited as a benefit that enabled the capture and sustained student attention during lessons. Multimedia presentations, movies, animations, and other interactive components were used and generated greater student interest than traditional lecture-based methods, as noted by some lecturers. According to one participant, *"students pay more attention during multimedia presentations, and they are more willing to listen than during the normal face-to-face lecture format"* (Respondent 14). This suggests that digital tools play a significant role in enhancing participation and motivation in classrooms by making lessons more dynamic and visually appealing. When students are engaged in presenting information, they often raise their hands to discuss what will be taught, ask questions, or deepen their understanding of the material. Lecturers also emphasised that teaching and learning are flexible due to the opportunities that digital technology provides, most notably the ability to record lessons and deliver them at other times. According to one lecturer, *"recording lectures has helped students who miss classes and those who want to revise the lessons later"* (Respondent 8). This practice helps students who are otherwise sick, have other commitments, or struggle to attend a lecture still have access to the information and keep up with their activities.

Moreover, recorded lectures allow students to review challenging topics at their own pace, making them more comfortable with the material and better able to remember it. Digital tools not only facilitate synchronous and asynchronous learning but also enable students to access educational resources more easily (and flexibly) due to the diversity of learning needs and circumstances. The responses collected by the lecturers ultimately indicate that when digital tools are integrated into teacher education programmes, they can provide meaningful learning experiences by enhancing teaching methods and techniques. Through simulation-fuelled learning, enriched educational resources, more varied instructional methods, and flexible learning strategies, digital technologies are gradually transforming how teacher education is delivered and experienced in modern educational environments.

4.3 Challenges in Incorporation with Digital Tools

However, even when these teachers recognised the potential advantages of digital technologies in teaching and learning, they also pointed out an array of practical barriers to their implementation. One educator said, *"Because of limited internet connectivity, many people don't use online platforms"* (Respondent 10). This remark refers to entrenched infrastructure bottlenecks and the absence of dependable technological resources needed to maximise the use of online platforms, particularly in institutions and areas where technology is scarce. Another lecturer said, *"When the technology develops problems during lessons, there is no institutional support available"* (Respondent 17). Such an observation hints at the lack of technological support in teaching and technology at universities' service centres, as well as a gap in support structures for lecturers facing technological difficulties in teaching. Another participant comments, *"Some students were not tech-savvy, making it challenging to use some virtual tools"* (Respondent 16). This evidence indicates that there are varying degrees of digital literacy among students and that basic ICT competence is required to enable all students to learn proficiently with technology, regardless of the technology used. Another lecturer also said, *"The curriculum is already demanding, and the time available to learn new applications is very limited"* (Respondent 1). This expresses the dilemma encountered by lecturers between the dual mandate to teach and teach new skills, and learn a toolbox where they bring new digital learning and bring that new, technical knowledge within the teaching context, the push and pull between the students' eagerness to adopt new innovative approaches and the pressure of work and timeliness.

4.4 Policy Frameworks and Institutional Support

Institutional policies and support networks appeared to be key to the adoption of digital tools. "E-learning policy statement on college, but no implementation plan." This indicates that the policy does not align with implementation reality, meaning it does not translate into operational and practical strategies. Another lecturer said: "We do not have IT people to assist us in carrying out technology within our classrooms" (Respondent 4). They pointed to a shortage of in-school technical support staff and explained how a lack of support (or no support) can impede the adoption of digital technologies in instruction or discourage the adoption of new teaching methods. A respondent also said that "the digital tools are also hard to find due to budget constraints" (Respondent 11). This illustrates the financial challenges institutions face in acquiring and maintaining digital infrastructure, suggesting that effective, lasting technology integration in education requires ongoing institutional investment. A lecturer also noted that those who make the effort to use digital tools effectively often receive no recognition or reward. This reflects the absence of internal motivational mechanisms within institutions to support technology adoption and suggests a lack of correlation between institutional digital transformation plans and individual lecturers' incentives with the institutions' intentions.

4.5 Capacity Building and Professional Development

Continuous professional development is essential for teachers to advance their digital skills. "Workshops on digital pedagogy have been really helpful in improving my teaching approaches," one lecturer said. These specific training programmes highlight their significance in shaping teachers as professionals in the effective use of digital devices in the

classroom. Another participant stated, “Peer learning sessions have been invaluable as well in aiding them in learning to use new tools better” (Respondent 8). This shows that teachers must cooperate and that informal knowledge sharing within institutions can also be a means of developing skills. Moreover, one instructor added, “Continuous training is necessary to stay current with the fast-changing technologies” (Respondent 1). An observer has said that, although these digital tools are evolving too rapidly, continuing education is the only guarantee that instructors who wish to remain current and have their practice meet the needs will be able to succeed in adopting these tools. Lastly, a lecturer said, “With online learning, you can take courses at your own pace according to your professional needs” (Respondent 12). This is indicative of how flexible learning opportunities, as an integral aspect of professional learning, are now a core component of professional development, with enormous effects on teachers, a role in which self-directed learning is added to formal institutional learning. As such, this integration was not necessarily successful, as although lecturers at the Ghanaian Colleges of Education can identify the transformative potential of the digital tools recommended for teacher training, its success remains contingent on overcoming these infrastructure issues, ensuring institutional support systems are in place, and continuing to enhance teacher training. These findings are important for policymakers and educational leaders seeking to promote digital education in teacher training institutions.

5.0 Discussion

The results of this study contribute to and extend the ideas derived from the literature review by empirically verifying the realities of integrating digital tools into teacher training from lecturers’ perspectives at Ghanaian Colleges of Education. As prior studies have indicated, lecturers expressed both excitement about and challenges in the practical use of digital tools. As noted by Boateng et al. (2022), many lecturers use various technologies, such as learning management systems, multimedia resources, and personal devices, in their teaching. This aligns with the study’s results, which found that lecturers reported technological platforms like Moodle improved interaction and student engagement, and that multimedia presentations enhanced student engagement, further supporting their earlier statement that technology could strengthen teaching practices and curriculum delivery.

The study’s results also support claims about the advantages of using digital tools to improve teaching efficiency and student engagement. The use of simulations and recorded lectures by lecturers aligns with earlier suggestions for creating flexible, learner-centred learning environments, as put forward by Mardiana (2024) and Yusuf et al. (2022). These tools can also help your professor tailor his lessons to various types of learners, giving students opportunities to refer back to course content when they need it. The increased use of digital tools for lesson planning and online instructional materials also supports previous arguments that digital integration increases instructional options and access to learning materials, as in Taner (2018) and Boateng et al. On the other hand, the results also corroborate multiple obstacles reported in the literature. According to studies by Loglo (2024) and Atabek (2019), the main obstacles to incorporating technology were

infrastructural limitations and insufficient ICT facilities, respectively. Lecturers also voiced similar concerns in this study regarding unreliable internet connectivity and outdated equipment. Despite this, the infrastructural barrier still impedes the effective implementation of digital technologies and supports the claim that unequal access to digital resources remains a significant issue, especially in institutions with limited investment. Additionally, the research corroborates previous evidence on the impact of readiness and institutional support on the adoption of digital systems. Ning (2025) and Gacicio et al. (2024) noted that lecturers were often self-reliant in developing digital skills, particularly given limited formal training opportunities.

In the present study, some authors reported the need for an independent learning process or support, findings also reported by Yusuf et al. (2022) and Taner (2018). Moreover, the lack of incentives for lecturers who introduce digital innovations demonstrates a disparity between the institution's intended policies and the extent of support available to them, a point also made by Ntim (2024) and Abedi (2024).

There are also similarities in the results obtained using the Technological Pedagogical Content Knowledge model proposed by Mishra & Koehler (2006). Following this framework, successful technology integration takes into account technological, pedagogical, and subject content knowledge. The teachers in the study indicated that digital tools prompted them to revisit their teaching practices, including classroom management, assessment methods, and content delivery. This reflects how the framework highlights the interplay among the domains of knowledge within an environment of institutional support, a pattern increasingly evident among teacher education providers in Ghana. Results highlighted institutional and policy issues identified in the literature.

Despite national efforts such as the ICT Competency Framework for Teachers (2024), this was found to lack institutional strategies for implementation by lecturers. This result corroborates Abedi's (2024) assertion that policy and practice often seem to move at different paces. Other lecturers' issues included insufficient numbers of ICT support staff, limited financial resources and policy constraints, and old-fashioned mindsets and perceptions, all of which are consistent with the common contention in the literature that institutional investments, and continued investment, are needed for the successful integration of digital tools. Ultimately, these findings emphasise the importance of lifelong learning in developing the skills required to help learners adopt digital technologies. As in the previous work by Yusuf et al. (2022), Ning (2025), and Danso (2025), this study further emphasises the need for continued teacher-specific training to ensure the successful use of technology. In light of this research, participants in this study also requested regular workshops, peer sharing, and access to online courses to improve their digital skills. For lecturers, reliance on formal training and informal peer support may indicate that, while educators are taking steps to address their shortcomings, educational institutions also need to adopt more tangible, sustainable support measures.

6.0 Conclusion

This study aimed to explore lecturers' perceptions and experiences in three Colleges of Education (CoEs) in Ghana regarding the use and effectiveness of digital technologies for teacher training. Based on a thematic analysis of semi-structured interviews, it was found that while lecturers recognised the role of digital tools as a facilitator of transformative interventions in learning and teaching, their use was a patchwork of personal initiative, institutional support, structural factors, and gaps in policy implementation. Faculty noticed that using digital tools for classroom interaction promotes access to a broader range of academic resources, more flexible learning styles, and professional development. There are still a number of obstacles to successful use, however. Poor infrastructure, inconsistent institutional support, insufficient professional development, and ineffective policies were common barriers. It is the case that lecturers' self-study to provide peer help is feasible in a context where learning a skill at no cost or with minimal training is possible, but a lack of incentives or adequate administrative support has prevented adoption. Using the TPACK framework, the findings underscore the need to align technological, pedagogical, and content knowledge in a collaborative educational setting. Ghana's teacher training institutions must leverage digital tools, with support from policymakers and institutional leaders, by investing in infrastructure, developing strategic policies, and implementing integrated, institutionalised continuing professional development. Such practical application will bring the technological potential to fruition and facilitate lecturers' delivery of innovative, accessible, and meaningful teacher education in the digital era.

7.0 Recommendations

However, based on the results of this study, several suggestions are proposed to integrate digital tools into teacher-training programmes at Ghanaian Colleges of Education. Schools should first invest in digital infrastructure, including reliable internet connections, modern computer laboratories, multimedia teaching tools, and online learning platforms, ensuring that instructors and trainees have regular access to all required tools for effective digital teaching and learning. Secondly, there should be the institutionalisation of a continuing professional development programme for teachers on the use of digital tools in education. They must extend beyond the initial ICT training to incorporate a range of practical applications in lesson planning, lesson delivery, and the measurement of participant learning, possibly including workshops, peer/advisor mentoring, and self-paced, module-based online instruction, to ensure that lecturers are proficient and comfortable with technology. Third, leadership in institutions should have explicit, locally adapted digital education policies. Though national policies offer direction, for example, through the ICT Competency Framework for Teachers, they need to be adopted in schools to reflect community needs and involve lecturers in the policy implementation and monitoring phase. Recognition and motivation mechanisms should also be developed to support lecturers who engage with, leverage, and innovate with digital tools, such as awards, promotions, or reduced workloads. Ultimately, colleges need to encourage students' digital literacy to help bridge the digital divide and establish inclusive, effective learning spaces. All four of these measures, taken together, encompass the technological, pedagogical, institutional, and human-oriented elements that underpin sustainable technology transformation of teachers towards digitalisation.

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