

Investigating the use of Digital Technology (DT) in Teaching and Learning: A case of a Higher Education Institution in Lesotho

Papiso Irene Brown*

Limkokwing University of Creative Technology, Lesotho

*Corresponding author: brownpapiso@gmail.com

Received: 15 February 2025; Accepted: 13 June 2025; Published: 01 September 2025

Abstract: Digital technology (DT) is transforming teaching and learning in higher education (HE). This mixed-methods case study investigated students' use and knowledge of DT and lecturers' experiences of using it at Limkokwing University of Creative Technology (LUCT), Lesotho, guided by the technological pedagogical content knowledge (TPACK) framework. Data were collected in the 2023 academic year from 120 final-year students (questionnaire with open and closed items), 18 lecturers (face-to-face interviews) and six classroom observations across the six faculties. Students generally reported positive perceptions of DT, but rated lecturers' use of DT and access to DT resources lower. Lecturers cited unreliable internet, limited tools and insufficient training as barriers. DT is included in teaching and learning at LUCT, but infrastructure and training gaps remain. The study recommends that LUCT invest in training lecturers to use DT for teaching and learning.

Keywords: Digital Teaching Technology, e-learning, Higher Education, Teaching and Learning

INTRODUCTION

Higher Education Institutions (HEIs) are witnessing changes in the way teaching is imparted and in the way students learn. New technologies and pedagogies continue to form the basis of higher education (HE) systems, which are complemented by various online learning opportunities and a greater variety of providers in HE (Aresta et al., 2015). These new Digital Technologies (DT) and approaches to teaching and learning are already having a clear and positive impact on HE provisions (Sosa Neira et al., 2017). DTs within various institutions of higher learning have also begun to facilitate better education quality as educational resources globally become more freely accessible and interactive (Han & Shin, 2016). This clearly indicates that teaching with DT can now be designed to meet different individual needs in terms of progressing student feedback and performance.

Digital technology enables students to learn almost anywhere anytime. It is evident that students in Higher Education Institutions (HEIs) perform very well with anything that has to do with digital media whether it involves playing mobile games, e-books and journals, online magazines, and newspapers, making music, creating their own videos or social networking (Pinto & Leite, 2020). Institutions are reconsidering how they approach information dissemination, information seeking, learning and the role of peer and student assessment (Pedro et al., 2018). The fact remains that things are now done differently to accommodate the new educational technologies of teaching and learning.

The development of e-learning in HE is a relatively new aspect of academic and educational system in the curriculum implementation whose main purpose is to ensure sustainable practice of higher education and learning. The practice of e-learning in this regard is achieved through applications of DT and social computing that promote and enhance effective pedagogy and teaching

methods. The curriculum content for teaching and learning practices in HE is therefore presented through digital technologies. Furthermore, DT plays a key role in internationalizing of education by giving learners the opportunity to reach out to other learners across the globe (global classroom). Moreover, digital technology allows mobility for students by assisting to collaborate with others across the globe through social networks. Understanding and incorporating digital technology usage patterns in teaching and learning would allow institutions of higher learning to create conducive user-friendly environments that fit the individual needs of the students.

Literature Review

The current literature review follows research done in areas of digital technologies in higher education institutions to identify the inclusion of digital technologies used by lecturers in support of teaching and learning in higher education. Literature states that inclusion of digital technologies in everyday lectures depends on the willingness and adaptability of lecturers rather than on the technologies (Mishra, 2019). Therefore, in this sense its role in pedagogy stands out as it should be aimed at building knowledge and assisting learning (Willermark, 2018).

Barnard and van der Merwe (2015) showed that, at the University of Johannesburg, technological capability offered students different alternatives of learning with digital competency as another aspect of digital inclusion. Beyene et al. (2023) also view access, skills and content accessibility as important elements of digital inclusion. Thus, according to Sanders and Mukhari (2024), digital technology use is a vital aspect in identifying whether students' and lecturers' access to information and communication technology (ICT) skills are digitally included. A study conducted by Beyene et al. (2023) stipulate digital inclusion as accessibility of digital skills, accessibility to institutional websites, learning management systems, e-libraries and other educational resources and services. The authors further state that adoption of shared understanding of digital inclusion and formulation of strategies can help eliminate any form of digital barrier among lecturers.

E-learning practice is another form of DT which includes a wide range of ICT applications and strategies for exchanging information and gaining knowledge such as video conferencing, mobile computer devices, internet and web and electronic resources (Batista et al., 2016; Aktaruzzaman et al., 2011). For effective and sustainable development of e-learning in higher education, the lecturers must be knowledgeable and competent in the use of technology and pedagogical aspects, although studies indicate general lack of skills among the professionals (Kandiri, 2012; Wihlborg et al., 2018). However, according to Sharma and Loreman (2014), research findings have shown that lecturer's confidence is built through structured training in inclusive pedagogy and ICT integration which motivates them to apply digital strategies successfully in their classrooms. UNESCO IITE (2025) states that inadequate training leads to underutilised tools, reinforcing existing imbalances in DT usage.

Hence, Mihaescu et al. (2016) postulate e-learning as one of the most efficient pedagogical areas of teaching in education where the online curriculum is delivered in digital pedagogical method different from the traditional approach, but whose major factor of success depends upon the lecturer's technical competency.

In addition, Stewart and Ivala (2017) reported that 70% of students from the University of North Carolina agreed that DTs usage in classrooms allowed for frequent collaboration compared to the traditional face-to-face teaching and learning of which they also agreed that it was beneficial in communicating outside and inside the classroom. The authors further stated that at least 74% of the students further agreed that DTs allowed for more time to effectively reflect and comment on other student posts and that it was more convenient than teacher centred classes for sharing and discussing ideas. According to Grosch (2013) the diffusion of DTs into HE leads to persistent alterations within university learning environment that can strongly influence student learning behaviour. Hence why universities are at liberty to comprehensively understand and analyse media usage reforms of their learners. Grosch (2013) further states that DT usage for teaching and learning does not only include e-learning but also the use of text-based and other media such as prints as well as other electronics. Electrical tools including systems, devices and resources that process data

are considered as digital technologies including social media, online games applications and multimedia. Therefore, according to [Edyburn \(2020\)](#), most lecturers can affirm and attest to collaborative learning where students interact in manageable groups while using Augmented Reality (AR) applications to foster inclusion through Learning Management Systems (LMS), such as Google Classroom or Moodle, which allows lecturers to organize differentiated materials and monitor student progress.

Theoretical Framework

The study adopts [Mishra and Koehler's \(2006\)](#) theory of Technological Pedagogical Content Knowledge (TPACK) which focuses on teacher's need for knowledge to integrate and further develop technology into their day-to-day teaching and learning practices ([Hew et al., 2019](#)). The authors postulate the importance of engaging digital technology in everyday teaching and learning process that has been taken for granted. The technological advances of the 21st century and availability of new technologies including computers, pedagogical software and broadband have enabled the application of digital technology pedagogy into the teaching and learning activities ([Schmid et al., 2020](#)). As a result, TPACK is based on three main components: (a) Technology Knowledge (TK), (b) Pedagogical Knowledge (PK) and (c) Content Knowledge (CK), which enable lecturers to gain comprehensive understanding of the topics delivered, technology to be incorporated and the integrated pedagogy ([Lee & Kim, 2014](#)). However, Mishra and Koehler are of the view that technological content needs to be treated within a particular context in which the lecturer needs to familiarise him or herself with how technology relates to both pedagogy and content ([Schmid et al., 2020](#)). The theory stipulates that lecturers need to be knowledgeable of the concept representation with technology to focus on how technology can best assist difficult or easy learning based on the student's prior learning.

Problem Statement

While most universities globally are actively involved in social media initiatives they are faced with the transformation of teaching and learning that incorporates Digital Technology with the traditional teaching. The problem is that some universities in Lesotho are not yet ready for this change and have been slow in taking the lead in transforming teaching and learning that would allow flexibility in the facilitation of teaching and learning using digital media or technologies in classrooms ([Vassiliou et al., 2022](#)). Furthermore, Vassiliou et al. assert that new technologies within Higher Education (HE) have vast potential to effect change by enabling universities to meet a broader range of learner's needs through acclimatization of a mixture of traditional teaching methods, face-to-face and online learning possibilities that would allow learners to study anywhere anytime. This must be fully embraced to assure that HEIs provide the best learning experience for all students not only in Lesotho but across the globe.

Firstly, there is a lack of digital media awareness and knowledge among final-year students in most programmes at Limkokwing University of Creative Technology (LUCT). Indeed, evidence shows that in most institutions, teaching and curricula approaches remain unchanged, while the technology is typically poorly adopted and underused in the lecture rooms. For this problem to be confirmed among LUCT students, a comprehensive study among the LUCT final-year students and lecturers needed to be undertaken. Therefore, the problem that gave rise to this study was addressing the lack of awareness for inclusion of DT and the inability to use it in the HE setting. For this reason, the use of DT among students was determined looking at the current perspectives on DT reported locally, nationally, and internationally and how the possible shortcomings can be addressed.

The aim of the study is to establish the extent to which DT is included at LUCT to support teaching and learning, even in times of crisis. This is an apparent research gap which this study seeks to fill. Acknowledgement on the work of previous researchers is deployed in the use of DT influence in teaching and learning for HE's to be fully equipped for unforeseen circumstances that could hinder teaching and learning in the near future.

Based on the following research questions, the study's aim is to conduct a broad, organised, data related to lecturers' digital teaching approaches, methods, and techniques. It provides a crucial

contribution to the practice and knowledge of blended learning system. Stakeholders especially lecturers in Higher Education in particular can utilise this study to further guide for future planning and inclusion of digital technologies to positively impact on their students' learning experience.

Research Questions

To address the research problem, the following research questions were formulated:

RQ1: What perceived benefits and access do students and lecturers have toward utilising Digital Technologies in the classroom?

RQ2: What challenges do lecturers and students have towards the utilisation of Digital Technologies in teaching and learning?

RQ3: What impact do DTs have in increasing student learning competency and interactivity at LUCT?

Objectives

To explain the current situation of digital media usage from the perspective of final-year students and lecturers in relation to teaching and learning as offered at LUCT, the following objectives were developed:

Main Objectives of the Study

1. To find out the perceived benefits and access students and lecturers have towards Digital Technologies.
2. To find out the challenges of DT related activities that support teaching and learning at LUCT.
3. To understand the impact DTs have in increasing student learning competency and interactivity at LUCT.

METHOD

Research Design

This mixed method research design used LUCT as an institution of higher learning and private university of technology in Lesotho to ascertain the extent to which private universities were providing cutting-edge digital technologies to support education and learning practices. Purposive sampling was used to select respondents and classes for observations for gathering information from the academic community to gain better understanding on the changing nature of university teaching and learning in the modern digital environment and global internet economy. The study is premised on interpretivist paradigm which emphasises understanding individuals and their interpretations of the world and asserts that reality is socially created (Bogdan & Biklen, 1998). According to Strauss and Corbin (1990), the interpretivist paradigm allows data collection and analysis based on grounded theory and assumes a subjective epistemology, relativist ontology and a naturalist methodology and an axiology that is balanced (Kivunja & Kuyini, 2017).

Data Collection

Data was collected through a survey using a questionnaire as a data collection instrument. Students in the final year were randomly selected by selecting every 4th person appearing on the shared list. Hence, a total of $n = 120$ participants represented final-year students from all six faculties at LUCT. The faculties comprised the following: i) Faculty of Communication, Media & Broadcasting, ii) Faculty of Business and Globalisation, iii) Faculty of Information, Communication & Technology, iv) Faculty of Design Innovation, v) Faculty of Architecture and Built Environment and vi) Faculty of Creative Tourism and Hospitality. Data were collected during the 2023 academic year. The questionnaire comprised statements rated on a six-point Likert scale (quantitative data), supplemented with open-ended questions (qualitative data). The items were rated on a six-point Likert scale with the response options 1 = Strongly Agree, 2 = Agree, 3 = Agree Somewhat, 4 = Disagree Somewhat, 5 = Disagree and 6 = Strongly Disagree.

Face-to-Face (F2F) Interviews

Lecturers were purposively selected for the face-to-face interviews because most of them were expected to be directly involved in digital media courses. The interviewees were sampled from lecturers teaching in all six faculties at LUCT ($n = 18$). These comprised of eighteen lecturers, and six classroom observations that were randomly selected at LUCT. The interviews were conducted to answer the main and subsidiary research questions stated in this study. The reasons for conducting the interviews were to explain and elaborate on the inclusion of digital technology pedagogical approaches at LUCT. The interview schedule focused on the institutional response to digital technology inclusion in teaching and learning.

Classroom Observations

All available classes ($n = 6$) were selected for observation: Diploma in Creative Advertising (DCA), Diploma in IT (DIT), Diploma in Architecture (DAR), Degree in Professional Communication (BAPC), Degree in Human Resources (BAHR) and Degree in Tourism Management (BATM).

Other years of study and programmes were excluded because final-year students could share better information on the topic, having been through various forms of assessment and teaching. Also, the exclusion of other lecturers and classrooms was to allow for more manageable data otherwise data collection could be very much prolonged to complete the study.

Research Ethics and Use of AI

Permission to conduct the study was granted by Limkokwing University Research Ethics Committee. Students and lecturers also signed a consent form before engaging in the study. In the process, the research proceedings were explicitly explained to them, and were made aware that participation was voluntary, and that they could withdraw from the study anytime should they feel uncomfortable (Timans et al., 2019; Creswell et al., 2014). Anonymity of participants was ensured using codes while reporting the findings (Pinto & Leite, 2020).

RESULTS & DISCUSSION

The research design and methodology applied in this study were discussed; the main and subsidiary research question(s) which were formulated to establish DT usage by final-year students at LUCT. First, descriptive statistics regarding the demographic variables (gender and age) are provided as categorical variables. Second, the quantitative data gained from the questionnaires was discussed and lastly, followed by the qualitative data gained from the questionnaires was also discussed.

Data Analysis and Findings

This section discusses the key findings of the study by integrating both quantitative and qualitative data. The discussion is organized around the main themes emerging from the results, in line with the study objectives, and interpreted in relation to existing literature.

Frequency Procedure: Gender

The gender distribution of the study is provided in Table 1.

Table 1. Gender distribution of the LUCT final-year respondents in the sample ($N = 120$)

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Male	31	25.8	26.9	26.9
	Female	84	70.0	73.0	100.0
	Total	115	95.8	100.0	
Missing	System	5	4.2		
Total		120			

The sample size for the gender distribution results provided in Table 1 is 115, because 5 of the 120 respondents did not indicate their gender. Table 1 also demonstrates that the majority of

students in this category were female, who comprised 73.0% (valid percentage) as compared to 31 males (26.9%). Only 5 LUCT final-year students (4.2%) did not report their gender.

Frequency Procedure: Age

The age of the respondents varied between 18 and 44 years. The respondents were divided into the following four categories, namely: 18 to 24 years, 25 to 31 years, 32 to 37 years, and 38 to 44 years respectively as shown in [Table 2](#). The reason for starting the first category from the age of 18 years is because 18 years is the entry age for first-year students to enrol at universities in Lesotho.

Table 2. Age distribution of the LUCT final-year respondents in the sample (N = 120)

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
18–24 years	99	82.5	82.5	82.5
25–31 years	15	12.5	12.5	95
32–37 years	4	3.33	3.33	98.33
38–44 years	2	1.67	1.67	100.0
Total	120	100	100.0	
System	-	-		
Total	120	100		

The sample size for this result is 120 and only 116 questionnaires were valid for LUCT final-year students in the faculty of Communication. The respondents' age in this study is shown in [Table 2](#). It shows that 82.5% of the respondents were aged between 18 and 24 years, and those between the ages of 25 and 31 comprised only 12.5%; 32–37 years constituted only 3.33% and, lastly, 38–44 only 1.67%. Hence, most LUCT final-year respondents were aged 18–24 years. This indicates that the majority of the LUCT final-year students are relatively young, and they started studying immediately after completing Grade 12 or high school.

Access to Digital Teaching Technology

The quantitative findings show that 92.5% of students had access to digital devices, and 75% reported institutional internet access. However, both students and lecturers identified inconsistent connectivity and limited infrastructure as persistent barriers. This was also evident in classroom observations, where technical interruptions occurred in 2 out of 6 sessions. These findings reflect broader challenges in ICT infrastructure in Lesotho, where digital access remains uneven despite growing mobile phone penetration ([Khumalo, 2025](#)). While device ownership is relatively high, unstable internet service continues to limit the effective use of DT.

Descriptive Quantitative Analysis

Perceptions of DT Use

This section presents the findings related to students' perceptions of the usefulness of DT in supporting their academic tasks. The data was gathered through a questionnaire measuring agreement with four key statements using a six-point Likert scale, ranging from "Strongly Disagree" (1) to "Strongly Agree" (6). The results are analyzed to determine both the central tendency (mean) and the variability (standard deviation) of responses. These metrics provide insight into the overall student sentiment toward the relevance, effectiveness, and impact of DT responses on their productivity and quality of work. [Table 3](#) shows the frequency and percentage of responses to each statement, and [Table 4](#) summarises the means and standard deviations.

Table 3. Perceived usefulness of DT responses

Statement	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Agree (5)	Strongly Agree (6)
The DT responses helped me complete tasks more efficiently.	0 0%	0 0%	15 12.9%	21 18.1%	78 67.2%	12 10.3%
I find DT Responses to be relevant to my needs.	0 0%	0 0%	0 0%	11 9.4%	20 17.2%	85 73.2%
The DT responses improve my productivity.	80 68.9%	11 9.5%	1 0.86%	8 6.9%	13 11.2%	3 2.6%
I believe DT responses enhance the quality of my work.	0 0%	0 0%	6 5.2%	5 4.3%	13 11.2%	92 79.3%

The first statement revealed a positive perception ($M = 4.69$), lower than that of Statements 2 and 4. Statements 2 and 4 showed high perceived usefulness ($M = 5.64$ for both; $SD = 0.65$ and 0.78), indicating strong agreement and consistent responses. Statement 3 stands out with a low mean ($M = 1.90$) and a higher standard deviation ($SD = 1.43$), indicating many students disagreed that DT improves productivity, and responses were more dispersed as shown in [Table 4](#).

Table 4. Mean and standard deviation of responses

Statement	Mean	SD
1. Helped complete tasks more efficiently	4.69	0.81
2. Relevant to my needs	5.64	0.65
3. Improve productivity	1.90	1.43
4. Enhance quality of work	5.64	0.78

[Table 5](#) presents students' responses to five statements about DT integration in teaching and learning. The findings from [Table 5](#) show a generally positive perception of DT integration. Students strongly agree that DT promotes collaboration ($M = 5.02$) and boosts their confidence (4.62). There is also broad agreement that DT enhances understanding (4.29), though with greater variability ($SD = 2.03$), suggesting mixed experiences. The lowest scores relate to lecturers' use of DT (3.52) and access to resources (3.53), indicating room for improvement in implementation and infrastructure. Standard deviations across items indicate moderate variability, highlighting differences in access, teaching styles, or departmental support. Students also acknowledged the benefits, particularly for visualisation of abstract content and improved student participation. This aligns with previous research showing that digital tools can foster active learning environments and student-centered pedagogy ([Laurillard, 2013](#); [Bates, 2015](#)).

Table 5. Student responses on DT integration in teaching and learning

Item	Strongly Agree (%)	Agree (%)	Agree Somewhat (%)	Disagree Somewhat (%)	Disagree (%)	Strongly Disagree (%)
DT enhances my understanding of course content	34.38%	30.17%	12.93%	4.31%	2.58%	1.72%
Lecturers effectively use DT in the classroom	0%	39%	22.4%	3.4%	0.86%	25.9%
I feel confident using DT for academic tasks	50%	12%	8.6%	13.8%	10.34%	5.2%
DT promotes collaboration and interactivity in class	63.79%	15.5%	0%	1.72%	18.10%	0.86%
I have access to adequate DT resources at the university.	8.6%	12.93%	24.13%	31.03%	35.34%	9.48%

Qualitative Findings from the Questionnaire

The following findings emerged from open-ended item responses from the questionnaire. The statements quoted below indicate the diverse opinions of final-year students with using DT in their daily learning activities. Students indicated that it was easy for them to use the applications engaged for teaching and learning as it was available at all times and alluded to the fact that its storage allowed them to retrieve their work later and was easily accessible.

Benefits of Using DTs in an Academic Setting

Students indicated the following as benefits of using DTs as a component of teaching and learning. This is evidenced by the remarks quoted below:

- It is easy to use and very fast.
- Always available anytime anywhere.
- Gives a lot of information than having to listen to verbal lectures.
- Storage is good for later retrieval of information.
- Easy access to e-books, e-journals.
- Opportunities for interaction.
- Growth of ideas in terms of creating blogs, podcasts, videos, and gaming sites.
- Lectures tend to be easily understood.

Students also mentioned that lectures were easily understood through the use of DTs.

Students' Satisfaction with DT Use in Classrooms

It is evident that final-year students confirmed their satisfaction with DT incorporation into everyday teaching and learning (which are in line with the findings based on the following questionnaire responses):

- Satisfied because we are allowed to use any digital media applications in class or during lectures.
- Excessively satisfied because with Digital media, I find what I am looking for within minutes.
- Using Digital Teaching Technology especially the use of social media in class affords me the opportunity to get ideas from professionals such as scholars and professionals.

The findings further revealed engagement of teaching and learning through using various ICT tools including Google Classroom and Google Meet for online delivery and interacting with students. Lecturers indicated that they used blended learning from which they provided content in

digitally accessible formats to ensure information access and knowledge in their classrooms together with online components and found the mixture of both very flexible. This according to some lecturers made teaching very easy and enjoyable even though they were only introduced to it during the pandemic outbreak.

Thematic Analysis of F2F Lecturer Interviews

Data drawn from 18 semi-structured interviews with lecturers provided rich insights into the integration and effectiveness of Digital Teaching Technology (DT) in teaching and learning. Thematic analysis revealed five main themes including (a) perceived benefits of DT in pedagogy, (b) challenges in implementing DT and (c) digital competence and training needs.

Perceived Benefits of DT in Pedagogy

This hybrid approach was seen as a sustainable model that prepared students for digital workspaces and offered resilience in the face of future disruptions. Therefore, the integration of DT into higher education teaching is seen as both beneficial and necessary, especially in a post-pandemic context. Findings from the interviews indicated some benefits from some faculties with regard to using DTs. It was noted that inclusion of DTs in teaching and learning was crucial, as shown in the following statements:

“Using digital technology for teaching and learning is important”, (P4).

“I use it almost each day for teaching and learning as I have realised its impact on student learning in a very positive way” (P7).

Further findings revealed that tracking students’ growth becomes easier and students often stay motivated with the instant feedback they receive.

“Tracking students performance” (P11)

“I can track student's progress easier and faster and it also encourages me to do more.” (P16)

Findings also revealed that projecting on the screen assists learners to appreciate and comprehend information more than when they have imagined what is only been taught or fed to them without them to connect the dots on their own.

“It allows for rapid feedback to check on the students level of understanding while teaching and assist students to incorporate material shared more clearly when projecting on the screen.” (P4)

“The Technological tools allow me to craft activities for my students.” (P5)

Lecturers acknowledged that DT has enhanced student engagement and understanding, particularly through tools like videography, web technologies, and online communication platforms. Many programmes have been restructured to embed digital elements, especially in faculties like Business Globalisation and Design Innovation. Students reportedly benefitted from flipped classrooms and multimedia content (e.g., concept maps, audio-enhanced materials), which improved flexibility and content retention though there were still some challenges realised in the use of DT.

Challenges in Implementing DT

Challenges included unfamiliarity with digital platforms and limited student access to essential tools and reliable internet. Faculty members, particularly from Architecture and Built Environment, noted struggles with delivering practically intensive courses without on-campus resources or specialised software. Some lecturers admitted only becoming familiar with digital tools due to the pandemic. Lecturers mentioned that they were not currently engaging with digital

technology in their everyday teaching and learning because most of them were born before technology and having to use it for teaching they felt very much intimidated by the “digital natives” which are the students born during technology.

“I honestly do not feel comfortable at all to use most of the applications or platforms that truly can engage pedagogy in my classroom for fear of being taken for granted by students, when I use traditional methods I always feel in control” (P13).

Another identified issue from the findings stemmed from limited access to essential tools and internet that made it very difficult for lecturers to fully engage with digital technology in their teaching and learning. Some lecturers felt the institution had to invest in its infrastructure such that all lecturers have access to the essential tools, and the bandwidth must be increased to allow heavy traffic without any interruptions during classes.

“As much as I would like to engage digital technology in my classroom, we often face the challenge of very slow internet and when I’m busy trying to engage students into the learning the applications keeps buffering and by the time we are able to login class time is over” (P2).

Many lecturers admitted only becoming familiar with digital tools due to the COVID-19 pandemic. This lack of prior training created a steep learning curve for both lecturers and students. Several participants stressed the need for continuous professional development to improve digital literacy and competence in using educational technologies effectively. However, unfamiliarity with digital platforms also posed a challenge of incompetence in using the technological tools as identified due to lack of training.

Lack of prior training created a steep learning curve for both lecturers and students.

“During the pandemic, training was never offered but we had to find our way into incorporating the tools into our online teaching and this posed a major challenge as this was new to both the lecturer and the student” (P9).

“Since technology is ever evolving and new tools come up all the time, we need more training and introduction to more tools is needed even if it can be peer to peer training” (P1).

Participants stressed the need for continuous professional development to improve digital literacy and competence in using educational technologies effectively. The next section delves into interpretation of the findings aligning the findings as guided by the research questions to the literature review and the theory identified.

Classroom and Lab Observations

Assessment through classroom evaluation played a crucial role in the study to evaluate the possible learning experiences (Worthen, 1997). This was undertaken to determine whether the use of digital technologies was implemented in teaching and learning. The observations lasted for three hours in each of the six faculties at Limkokwing University. All the classrooms observed were mounted with whiteboards and the labs with computers ranging from Dell computers and iMacs (Apple Macintosh). From the observations, lecturers used the same technology throughout their lessons as discussed next.

The faculty of Business Globalisation lecturer had a projector and laptop for PowerPoint delivery which she used throughout her lesson until the three-hour lesson ended. Students in the classroom had low levels of concentration, looked very bored as they were not engaged in the lesson other than listening to the lecturer. Another observation from the classrooms that had whiteboards was that lecturers from the Faculty of Communication, Media & Broadcasting associated the whiteboards with the whole class instruction. The lessons were very much teacher

centred (teacher directed learning) rather than being student centred. This implied a high resistance to technology.

However, a change in delivery was realised in the classes conducted in labs which were very active and receptive. These included practical courses for the Faculties of Communication, Information Technology and Architecture. Unlike in classrooms where whiteboards were used, the lab tutorials at LUCT used digital technology and were very much student-centred, with the lecturer facilitating while students worked on their iMacs for editing. A similar situation was observed in Architecture 3D lab, IT Lab, Multimedia labs and the iMac labs.

Discussion and Interpretation

Digital Technology tools enhance pedagogy, and findings imply that virtual teaching and assessment platforms improve student progression, enabling lecturers to evaluate students' understanding and expertise in numerous delivery methodologies and content areas more efficiently. Numerous studies as highlighted in the literature suggest that the use of digital technology in teaching and learning becomes more effective when it challenges students' understanding. Therefore, this section interprets the findings through theory and the literature review while addressing benefits, challenges, competencies and implications for future practices. The discussion focuses on (a) the perceived benefits and access of DTs in the classroom, (b) the challenges faced while using DTs in the classroom and (c) the impact of DTs on students.

The finding that DTs enabled more collaboration than traditional teaching settings is supported by [Li et al. \(2023\)](#), whose study found improved student performance in classrooms, especially among students who were familiar with DTs. In addition, the findings of [Stewart and Ivala \(2017\)](#) corroborate this finding; they reported that 70% of students from the University of North Carolina agreed that DTs usage in classrooms allowed for frequent collaboration compared to the traditional face-to-face teaching and learning of which they also agreed that it was beneficial in communicating outside and inside the classroom. It also corroborates the study by [Schmid and Schoop \(2022\)](#), which asserts that gamification elements and other collaborative platforms such as Google Classroom have also shown positive impacts on active learning strategies.

In the present findings 85.5% of the students as compared to 18.5% learned better through DTs than listening to their academic advisor's lecture. This might suggest that other students might have difficulty with lower confidence levels to the use of DT. The lower confidence level may create barriers that limit the opportunities and choices for students in achieving a positive academic learning experience through DT. Research and theory confirm this by indicating that integrating digital media through the TPACK framework improved student engagement and retention ([Wang et al., 2018](#)).

The findings from the lab and classroom observations revealed and confirmed a higher engagement in DTs not merely because of leisure but for better access to information and improving on their studies. With technology moving out of the lab and into the classroom, DTs are immensely affecting teaching and learning practices with digital technological tools. As a result, the outcome suggests that final-year students are able to access information and knowledge resources from the comfort of the available digital technologies offered at LUCT.

This showed that the majority of lecturers were informed about using DTs including e-books, e-library, e-journals, online-newspapers as well as online-magazines for teaching but some never used DT in class. Literature has also confirmed that lecturers with strong TPACK background or competencies are able to leverage digital media technologies to enhance instruction, personalise learning and foster collaboration.

In summary, inclusion of DTs has also proven to work for quite a few modules though not for others such as theoretical modules. For practical modules such as those of architecture and some other practical modules from the Faculty of IT that require the use of a lab were realised to be challenged by online delivery but engaged many DTs through 5D models. DTs were both interesting and enjoyable, of which most lecturers confirmed the fact that students in general were very much willing to learn from the incorporated DT into their learning experiences. Despite the increased digital activity, the survey also revealed that the most effective teaching and learning strategies

within institutions of higher learning involved direct interaction with potential students through flipped or blended learning, adapted learning, and experiential learning.

However, as postulated from the findings in the F2F interviews from the lecturers who felt they did not have adequate competencies for using DTs felt much less in control of their classes, hence they used less technology and are unlikely to explore new DT possibilities if no training is offered. This is supported by Hughes (2005) who states that unfamiliarity with DT tools and platforms is likely to lessen interest in utilising and exploring its tools. This is also supported by Johnson et al. (2016), who state that if lecturers are not tech-savvy in that they lack any required experience of using Digital technology they are more likely to persist using more traditional methods than integrating both.

CONCLUSION

While some support was provided during the pandemic (e.g., Ministry of Education intervention for in-person access), lecturers emphasized the need for more proactive institutional policies on digital readiness. There is a notable gap in resource provision, infrastructure, and consistent support across faculties, particularly for those reliant on specialised digital tools. In this regard, blended learning was widely accepted across faculties. The Faculty of Business Globalisation reported ongoing use of tools like Google Classroom and Google Meet, helping students stay familiar with online environments. Faculties like Design Innovation and Fashion encouraged students to acquire software independently, making learning more flexible. While there are clear gains in engagement and learning flexibility, persistent issues around infrastructure, digital competence, and policy need to be addressed to ensure equitable and effective implementation across all faculties.

Even though various faculties were actively engaged in DT usage for teaching and learning, some lecturers were somehow still struggling to manage the joint initiative of integrating both traditional and digital media reform. The literature confirms that DT as a catalyst for teaching and learning is only effective when used to enable learning with richer content, more powerful pedagogy, more valid assessment and links between in and out-of-classroom learning. They support the idea that DT can be used as an effective tool for collaboration and to broaden access to education, online and hybrid educational environments are also used for their ability to shift the way lecturers conceive of teaching and learning. E-learning is also considered as one of the most efficient pedagogical reforms of teaching in education where the online curriculum is delivered in digital pedagogical method different from the traditional approach. The reforms of e-learning through DT in classrooms at the institution included but were not limited to flipped classroom and adaptive learning that enabled incorporating both the traditional classroom to digital technological learning.

This implies that lecturers and students from several faculties were comfortable with using and embracing digital technologies. As such they were aware of the importance of digital technology inclusion. This also indicates that the use of blended learning using digital technologies is still carried out even after the pandemic outbreak. Thus, technology enables continuity of learning even during severe crisis that can prohibit class attendance. From the observations it could be inferred that flexibility in teaching with technology can be increased with experience and with more sophisticated tools especially for the theoretical courses such as those for Business.

Pedagogy is likely to be effective when it is supported with immersive media that create virtual worlds that situate learning or augment the real-world with an overlay of computational information. LUCT Broadcasting and Journalism students view DT in HE as a very powerful tool in the assistance of collaborative learning that aids in the understanding of combined efforts in the imparting of knowledge and skills. In the techno era, new technologies have emerged and have the potential of reshaping and changing the pedagogical norms in terms of course delivery.

The TPACK framework remains a robust model for integrating digital media technologies in Higher Education. The new developments brought by these technologies include concepts such as the “flipped classroom, adapted learning, experiential learning and innovative approaches to instruction like gamified teaching and learning. Therefore, the concept of pedagogy applies to everything that has to do with teaching and learning that uses an application of a wide spectrum of

practices including blended and virtual learning, game-based learning and also accessing digital content, productivity applications and mobile devices. It does not only apply to media technologies used by the teacher or facilitator but also to media which are generally used by learners for self-controlled and informal learning outside and inside the classroom setting.

Recommendations

The study recommends that education and knowledge environments in academic institutions must provide innovative digital technology training to reduce the digital divide and increase learning opportunities to the new generation of students. DTs should be seen as a participatory learning paradigm that supports learners to enhance effective pedagogy. They should be used as a direct substitute of what is already happening in the classroom without changing any setting regarding teaching and learning allowing both the learner and facilitator to redesign any given task. Therefore, gaming as a pedagogical approach would have a positive impact on learning in the following ways:

- a. Fully engaging learners in various learning environments;
- b. Increasing student motivation;
- c. Increasing information retention; and
- d. Artificial intelligence (AI)-driven personalised learning and virtual reality (VR) can enhance simulations and further refine digital pedagogical approaches.

The study further recommends the use or engagement of “flipped” classroom model as a pedagogical approach where a lecture and homework of a course are reversed, and in-classroom experiences are reconstructed. This typically makes students rely less on passive learning (teacher-centred) and more on active engagement (student-centred). The idea behind the flipped classroom as a pedagogical approach has to do with accessibility and convenience as it allows studying anywhere at any time. The lecture in the flipped classroom can re-allocate the classroom time for other activities such as experiential or collaborative learning opportunities as opposed to being in front of the class lecturing students. This means that classroom time can instead be used to watch educational videos, play games, hold discussions, browse the internet and engage in group exercises or quizzes.

DECLARATIONS

Author Contributions. Conceptualization, P.I.B.; Methodology, P.I.B.; Investigation, P.I.B.; Writing – original draft, P.I.B.; Writing – review and editing, P.I.B.

Funding. This research received no external funding.

Ethical Clearance and Informed Consent. Permission to conduct the study was granted by the Limkokwing University Research Ethics Committee. Students and lecturers signed a consent form before participating.

Conflict of Interest. The authors declare no conflict of interest.

Declaration of AI Use. The authors did not use generative AI or AI-assisted tools in the preparation of this manuscript.

ACKNOWLEDGEMENT

My sincere gratitude goes to Limkokwing University Lesotho for supporting the completion of this article. The study would not have been possible without the university’s permission to collect data from its students and lecturers.

REFERENCES

- Aktaruzzaman, M., Shamim, M., & Clement, C. K. (2011). Trends and issues to integrate ICT in teaching learning for the future world of education. *International Journal of Engineering & Technology*, 11(3), 114-119.

- Aresta, M., Pedro, L., Santos, C., & Moreira, A. (2015). Portraying the self in online contexts: Context-driven and user-driven online identity profiles. *Contemporary Social Science*, 10(1), 70–85. <https://doi.org/10.1080/21582041.2014.980840>
- Barnard, Z., & van der Merwe, D. (2015). Bridging the digital divide: Case study of the distribution of tablets to first years at the University of Johannesburg. *Proceedings of the Informing Science & IT Education Conference (InSITE) 2015*, 479–491. <https://doi.org/10.28945/2162>
- Bates, A. (2015). *Transforming Education: Meanings, myths and complexity*. Routledge.
- Batista, J., Morais, S., & Ramos, F. (2016). Researching the use of communication technologies in higher education institutions in Portugal. In M. Pinheiro & D. Simões (Eds.), *Handbook of research on engaging digital natives in higher education settings* (pp. 280–303). IGI Global. <https://doi.org/10.4018/978-1-5225-0039-1.ch013>
- Beyene, W. M., Mekonnen, A. T., & Giannoumis, G. A. (2023). Inclusion, access, and accessibility of educational resources in higher education institutions: Exploring the Ethiopian context. *International Journal of Inclusive Education*, 27(1), 18–34. <https://doi.org/10.1080/13603116.2020.1817580>
- Bogdan, R. C., & Biklen, S. K. (1998). *Qualitative research for education: An introduction to theory and methods* (3rd ed.). Allyn & Bacon.
- Creswell, J. D., Pacilio, L. E., Lindsay, E. K., & Brown, K. W. (2014). Brief mindfulness meditation training alters psychological and neuroendocrine responses to social evaluative stress. *Psychoneuroendocrinology*, 44, 1–12. <https://doi.org/10.1016/j.psyneuen.2014.02.007>
- Edyburn, D. L. (2020). *Rapid literature review on assistive technology in education*. Department for Education.
- Grosch, M. (2013). Media use in higher education from a cross-national perspective. *Electronic Journal of e-Learning*, 11(3), 226–238.
- Han, I., & Shin, W. S. (2016). The use of a mobile learning management system and academic achievement of online students. *Computers & Education*, 102, 79–89. <https://doi.org/10.1016/j.compedu.2016.07.003>
- Hew, K. F., Lan, M., Tang, Y., Jia, C., & Lo, C. K. (2019). Where is the “theory” within the field of educational technology research? *British Journal of Educational Technology*, 50(3), 956–971. <https://doi.org/10.1111/bjet.12770>
- Hughes, J. (2005). The role of teacher knowledge and learning experiences in forming technology-integrated pedagogy. *Journal of technology and teacher education*, 13(2), 277–302.
- Johnson, A. M., Jacovina, M. E., Russell, D. G., & Soto, C. M. (2016). Challenges and solutions when using technologies in the classroom. In S. A. Crossley & D. S. McNamara (Eds.), *Adaptive educational technologies for literacy instruction* (pp. 13–30). Routledge. <https://doi.org/10.4324/9781315647500-2>
- Kandiri, M. (2012). *A survey on ICT access and use in Kenya secondary schools*. Summit Strategies.
- Khumalo, M. A. (2025). Enhancing digital literacy for learners in inclusive primary and secondary education in Lesotho. *European Journal of Education and Pedagogy*, 6(2), 12–21. <https://doi.org/10.24018/ejedu.2025.6.2.928>
- Kivunja, C., & Kuyini, A. B. (2017). Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education*, 6(5), 26–41. <https://doi.org/10.5430/ijhe.v6n5p26>
- Laurillard, D. (2013). *Teaching as a design science: Building pedagogical patterns for learning and technology*. Routledge.
- Lee, C. J., & Kim, C. (2014). An implementation study of a TPACK-based instructional design model in a technology integration course. *Educational Technology Research and Development*, 62(4), 437–460. <https://doi.org/10.1007/s11423-014-9335-8>
- Li, R., Lund, A., & Nordsteien, A. (2023). The link between flipped and active learning: A scoping review. *Teaching in Higher Education*, 28(8), 1993–2027. <https://doi.org/10.1080/13562517.2021.1943655>
- Mihaescu, V., Andone, D., & Vasiiu, R. (2016). An analysis of different MOOC environments from the students’ perspective. *Proceedings of the European MOOC Stakeholder Summit*, 417–424.
- Mishra, P. (2019). Considering contextual knowledge: The TPACK diagram gets an upgrade. *Journal of Digital Learning in Teacher Education*, 35(2), 76–78. <https://doi.org/10.1080/21532974.2019.1588611>
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017–1054. <https://doi.org/10.1177/016146810610800610>

- Pedro, L., Barbosa, C., & Santos, C. (2018). A critical review of mobile learning integration in formal educational contexts. *International Journal of Educational Technology in Higher Education*, 15(1), Article 10. <https://doi.org/10.1186/s41239-018-0091-4>
- Pinto, M., & Leite, C. (2020). Digital technologies in support of students learning in higher education: Literature review. *Digital Education Review*, (37), 343–360. <https://doi.org/10.1344/der.2020.37.343-360>
- Sanders, D. A., & Mukhari, S. S. (2024). The perceptions of lecturers about blended learning at a particular higher institution in South Africa. *Education and Information Technologies*, 29(9), 11517–11532. <https://doi.org/10.1007/s10639-023-12302-6>
- Schmid, M., Brianza, E., & Petko, D. (2020). Developing a short assessment instrument for Technological Pedagogical Content Knowledge (TPACK.xs) and comparing the factor structure of an integrative and a transformative model. *Computers & Education*, 157, Article 103967. <https://doi.org/10.1016/j.compedu.2020.103967>
- Schmid, A., & Schoop, M. (2022). Gamification of Electronic Negotiation Training: Effects on Motivation, Behaviour and Learning. *Group Decision and Negotiation*, 31(3), 649–681. <https://doi.org/10.1007/s10726-022-09777-y>
- Schmid, R. F., Bernard, R. M., Borokhovski, E., Tamim, R. M., Abrami, P. C., Surkes, M. A., Wade, C. A., & Woods, J. (2014). The effects of technology use in postsecondary education: A meta-analysis of classroom applications. *Computers & Education*, 72, 271–291. <https://doi.org/10.1016/j.compedu.2013.11.002>
- Sharma, U., & Loreman, T. (2014). *Inclusive Education: for enriching the process of learning*. Deshkal Publication.
- Sosa Neira, E. A., Salinas, J., & De Benito, B. (2017). Emerging technologies (ETs) in education: A systematic review of the literature published between 2006 and 2016. *International Journal of Emerging Technologies in Learning (IJET)*, 12(5), 128–149. <https://doi.org/10.3991/ijet.v12i05.6939>
- Stewart, K. D., & Ivala, E. (2017). Silence, voice, and “other languages”: Digital storytelling as a site for resistance and restoration in a South African higher education classroom. *British Journal of Educational Technology*, 48(5), 1164–1175. <https://doi.org/10.1111/bjet.12540>
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Sage Publications.
- Timans, R., Wouters, P., & Heilbron, J. (2019). Mixed methods research: what it is and what it could be. *Theory and society*, 48(2), 193–216. <https://doi.org/10.1007/s11186-019-09345-5>
- UNESCO IITE. (2022). *UNESCO IITE releases its new medium-term strategy for 2022–25*. Available online: <https://iite.unesco.org/wp-content/uploads/2022/03/UNESCO-IITE-Medium-Term-Strategy-2022-2025.pdf>
- Vassiliou, S., Papadima-Sophocleous, S., & Giannikas, C. N. (2022). *Formative assessment in second language learning: A systematic review and an annotated bibliography*. Research-publishing.net. <https://doi.org/10.14705/rpnet.2022.60.9782383720133>
- Wang, W., Schmidt-Crawford, D., & Jin, Y. (2018). Preservice teachers' TPACK development: A review of literature. *Journal of digital learning in teacher education*, 34(4), 234–258. <https://doi.org/10.1080/21532974.2018.1498039>
- Wihlborg, M., Friberg, E. E., Rose, K. M., & Eastham, L. (2018). Facilitating learning through an international virtual collaborative practice: A case study. *Nurse Education Today*, 61, 3–8. <https://doi.org/10.1016/j.nedt.2017.10.007>
- Willermark, S. (2018). Technological pedagogical and content knowledge: A review of empirical studies published from 2011 to 2016. *Journal of Educational Computing Research*, 56(3), 315–343. <https://doi.org/10.1177/0735633117713114>
- Worthen, W. B. (1997). *Shakespeare and the Authority of Performance*. Cambridge University Press.