



Institutional Training Opportunities for Smart Technology Integration in Selected Private Chartered Universities in Kenya

Peter Omari Nyagwencha, Catherine Amimo, Benson Kinuthia
University of Eastern Africa, Baraton, Kenya
Email: pomarihst@gmail.com

Abstract: This study investigated institutional training opportunities supporting smart technology integration in selected private chartered universities in Kenya. Specifically, it examined the adequacy of institutional training programmes, their influence on lecturers' and students' ability to integrate smart technologies, and institutional practices that promote continuous professional development. The study employed a concurrent mixed-methods approach using descriptive, comparative, and correlational research designs. Quantitative data were collected from lecturers and students using structured questionnaires, while qualitative data were obtained through interviews with Deputy Vice Chancellors (Academic Affairs), Directors of Quality Assurance, and Heads of Information and Communication Technology (ICT), complemented by classroom observations and document analysis. Quantitative data were analyzed using descriptive statistics, whereas qualitative data were analyzed thematically. The findings indicate that institutional training opportunities moderately support smart technology integration. Students generally perceived training programmes positively, whereas lecturers expressed concerns regarding the frequency, relevance, continuity, and practical orientation of professional development initiatives. Interview findings further revealed that although universities recognize the importance of digital capacity building, financial constraints, limited ICT personnel, and competing institutional priorities hinder the implementation of continuous training programmes. The study concludes that institutional training is a critical determinant of sustainable smart technology integration and recommends institutionalizing continuous professional development, strengthening technical support services, increasing investment in faculty development, and establishing structured monitoring mechanisms to enhance digital transformation in private universities.

Keywords: Smart technology integration, Institutional training, Professional development, Digital competence, Higher education, Private universities, Kenya

How to cite this work (APA):

Nyagwencha, P. O., Amimo, C. & Kinuthia, B. (2026). Institutional Training Opportunities for Smart Technology Integration in Selected Private Chartered Universities in Kenya. *Journal of Research Innovation and Implications in Education*, 10(3), 1104 – 1113. <https://doi.org/10.59765/gsw75d>

1. Introduction

The rapid advancement of digital technologies has transformed higher education globally by redefining the ways universities deliver teaching, learning, research, and institutional management. Emerging technologies such as artificial intelligence, cloud computing, learning management systems, learning analytics, virtual laboratories, augmented reality, mobile applications, and collaborative digital platforms have created new opportunities for improving educational quality,

institutional efficiency, and learner engagement. Consequently, universities are increasingly transitioning from conventional instructional models to digitally enabled learning ecosystems that support flexible, personalized, collaborative, and data-driven education (UNESCO, 2023).

Despite these technological advances, the successful integration of smart technologies depends not only on institutional investment in digital infrastructure but also on the ability of lecturers and students to use these technologies effectively. Institutional training has

therefore emerged as a fundamental component of digital transformation, providing educators and learners with the knowledge, skills, and confidence required to integrate digital technologies into teaching, learning, assessment, research, and academic administration. Without continuous capacity-building initiatives, institutions risk underutilizing available technologies, reducing returns on digital investments, and limiting improvements in educational quality (OECD, 2023).

Globally, universities have increasingly institutionalized professional development programmes to enhance digital competence among academic staff. In North America, Europe, and parts of Asia, universities have established structured faculty development centres, digital learning academies, and technology innovation hubs that provide continuous training on emerging educational technologies. These initiatives have significantly improved lecturers' instructional practices, increased student engagement, and enhanced institutional readiness for digital transformation (Bond et al., 2024). The European Commission (2021) further emphasizes that continuous professional development is central to achieving sustainable digital education and fostering innovation in higher education.

Across Africa, the demand for institutional training has intensified following the rapid expansion of online and blended learning during and after the COVID-19 pandemic. Universities have increasingly invested in digital literacy programmes, learning management systems, and technology-enabled instructional approaches to improve educational access and quality. However, many institutions continue to experience challenges related to limited financial resources, inadequate ICT infrastructure, insufficient technical support, and irregular professional development opportunities, resulting in uneven levels of technology adoption among academic staff (UNESCO, 2023).

In Kenya, higher education institutions have embraced national digital transformation initiatives through the implementation of the Kenya National ICT Policy, the Digital Economy Blueprint, and institutional digital learning strategies. Private chartered universities have invested in learning management systems, digital libraries, virtual classrooms, cloud-based applications, and online administrative services to enhance institutional effectiveness. Nevertheless, the success of these investments depends largely on continuous institutional training that equips lecturers and students with the competencies required to integrate smart technologies into teaching and learning. While some universities have established structured professional development programmes, others continue to rely on occasional workshops and orientation sessions that are insufficient to sustain continuous digital competence development (Commission for University Education [CUE], 2022).

Although previous studies have examined technology adoption, digital literacy, faculty readiness, and e-learning implementation in higher education, comparatively little empirical attention has been given to institutional training

opportunities as a critical determinant of smart technology integration in private chartered universities in Kenya. Existing research has largely focused on technological infrastructure and technology acceptance while paying less attention to how continuous professional development, student digital capacity building, and institutional support mechanisms influence sustainable technology integration. This knowledge gap limits the development of evidence-based institutional strategies for strengthening digital transformation within private universities.

This study therefore investigated institutional training opportunities supporting smart technology integration in selected private chartered universities in Kenya. Specifically, it examined the extent to which institutional training programmes enhance lecturers' and students' digital competencies, support technology-enhanced teaching and learning, and contribute to sustainable digital transformation. The findings provide empirical evidence to inform university leaders, policymakers, and other higher education stakeholders in designing effective capacity-building strategies that promote successful integration of smart technologies.

1.2 Research Question

The study was guided by the following research question:

What is the influence of institutional training opportunities on smart technology integration in selected private chartered universities in Kenya?

2. Literature Review

2.1 Concept of Institutional Training

Institutional training refers to structured and continuous capacity-building initiatives designed to equip lecturers, students, and other university stakeholders with the knowledge, skills, and competencies required to effectively utilize digital technologies in teaching, learning, research, and institutional management. In higher education, institutional training extends beyond introductory orientation programmes to include continuous professional development, technical support, mentoring, coaching, peer learning, and hands-on workshops that facilitate the pedagogical integration of emerging technologies. Effective institutional training enables educators and learners to adapt to technological change, enhances digital competence, and supports sustainable digital transformation within universities (UNESCO, 2023; OECD, 2023).

The increasing adoption of smart technologies in higher education has elevated institutional training from a supplementary activity to a strategic institutional function. Universities worldwide are investing in continuous professional development to ensure that technological infrastructure is accompanied by the human capacity necessary for effective utilization. Studies have

shown that institutions with comprehensive faculty development programmes achieve higher levels of technology adoption, improved instructional innovation, and better learning outcomes than institutions where professional development is irregular or inadequate (Bond et al., 2024). Consequently, institutional training has become an important indicator of organizational readiness for digital transformation.

2.2 Faculty Professional Development and Smart Technology Integration

Faculty competence remains one of the strongest determinants of successful smart technology integration. While universities continue to invest heavily in digital infrastructure, these investments often fail to produce meaningful educational outcomes unless lecturers possess the pedagogical knowledge and technological skills required to integrate digital tools effectively. Continuous professional development enables lecturers to move beyond basic operational skills towards the effective application of smart technologies that enhance learner engagement, collaboration, assessment, and instructional innovation (European Commission, 2021).

Professional development programmes have evolved from traditional ICT literacy workshops to comprehensive digital competence initiatives incorporating artificial intelligence, learning analytics, virtual laboratories, adaptive learning systems, blended learning, and digital assessment. Contemporary faculty development emphasizes active learning, mentoring, collaborative practice, and continuous reflection, enabling lecturers to integrate technology within their disciplinary contexts. Such programmes strengthen lecturers' confidence, improve instructional quality, and promote sustainable educational innovation (Redecker, 2022).

However, empirical evidence indicates that many universities continue to experience significant challenges in faculty development. Professional training is frequently characterized by one-off workshops, inadequate follow-up support, and limited opportunities for practical application. In many developing countries, financial constraints, heavy teaching workloads, limited institutional support, and inadequate technical personnel further reduce lecturers' participation in continuous professional development programmes. As a result, many educators continue to rely on traditional teaching approaches despite increased availability of digital technologies (UNESCO, 2023).

2.3 Student Digital Capacity Building

Students are central participants in smart learning environments and therefore require adequate digital competencies to benefit fully from technology-enhanced education. Student digital capacity building encompasses institutional initiatives that develop learners' ability to access, evaluate, create, communicate, and collaborate using digital technologies. Universities increasingly provide digital literacy programmes, orientation sessions,

online tutorials, and technical support services to enable students to participate effectively in blended and online learning environments (OECD, 2023).

Research demonstrates that students with higher levels of digital competence are more likely to engage actively in online learning, utilize learning management systems effectively, collaborate through digital platforms, and demonstrate greater academic achievement. Digital literacy also enhances students' independent learning, critical thinking, creativity, and problem-solving abilities, thereby contributing to improved educational outcomes (van Laar et al., 2020). Nevertheless, disparities in students' digital competencies persist because of differences in prior educational experiences, access to digital devices, internet connectivity, and institutional support.

Universities have therefore increasingly recognized that student training should extend beyond basic computer literacy to include digital communication, information management, cybersecurity awareness, responsible technology use, digital collaboration, and emerging technologies such as artificial intelligence. Continuous institutional support enables students to maximize the educational benefits associated with smart learning environments while promoting responsible digital citizenship.

2.4 Continuous Professional Development and Smart Technology Integration

Continuous Professional Development (CPD) provides the mechanism through which lecturers continually update their technological and pedagogical competencies in response to rapidly evolving digital technologies. Effective CPD programmes emphasize continuous learning rather than isolated training events and encourage educators to experiment with innovative instructional approaches, share experiences with colleagues, and reflect on technology-supported teaching practices (European Commission, 2021).

International evidence demonstrates that universities with structured CPD programmes achieve higher levels of technology integration because lecturers receive sustained institutional support throughout the innovation process. Successful programmes typically combine workshops, mentoring, coaching, online learning communities, technical assistance, peer observation, and collaborative lesson design. Such approaches promote confidence, strengthen instructional competence, and facilitate long-term institutional change (Bond et al., 2024).

Despite increasing recognition of the importance of CPD, many universities continue to encounter implementation challenges. Institutional leaders often prioritize technological acquisition while allocating relatively limited resources to continuous faculty development. Consequently, lecturers may possess access to sophisticated digital infrastructure without the confidence or competence required for effective instructional

integration. UNESCO (2023) therefore recommends that institutional investments in digital infrastructure should be matched by equivalent investments in continuous human capacity development.

3. Methodology

This study adopted a concurrent mixed-methods approach employing descriptive, comparative, and correlational research designs to examine institutional training opportunities supporting smart technology integration in selected private chartered universities in Kenya. The study targeted Deputy Vice Chancellors (Academic Affairs), Directors of Quality Assurance, Heads of Information and Communication Technology (ICT), lecturers, and students because of their complementary roles in policy formulation, implementation, technology support, teaching, and learning. Selected private chartered universities were purposively sampled based on their engagement in digital transformation initiatives. Purposive sampling was used to select university administrators, while stratified random sampling was employed to select lecturers and students. Data were collected using structured questionnaires administered to lecturers and students, semi-structured interviews with university administrators and ICT personnel, observation checklists, and document analysis guides. The instruments were validated through expert review and

pilot-tested before the main study, while reliability of the questionnaires was established using Cronbach's Alpha. Quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS) to generate descriptive and inferential statistics, including means, standard deviations, Pearson correlation, independent samples *t*-tests, one-way ANOVA, and multiple regression where appropriate. Qualitative data were analyzed thematically, and the findings were integrated during interpretation to provide a comprehensive understanding of institutional training opportunities for smart technology integration. Ethical approval and research authorization were obtained from the relevant authorities, and informed consent, confidentiality, anonymity, and voluntary participation were observed throughout the study.

4. Results and Discussion

Students' Perceptions of Institutional Training Opportunities for Smart Technology Integration

This section presents students' perceptions regarding institutional training opportunities that support smart technology integration in selected private chartered universities in Kenya. The findings are presented in Table 1.

Table 1: Students Response on Training Opportunities on the Use of Smart Technology in Learning (270)				
Item	N	M	SD	
My university regularly offers training sessions on the use of smart technology in teaching and learning	270	3.09	0.97	
I have received adequate training to effectively use smart technologies in my academic work	270	2.91	0.98	
Training opportunities on smart technology are accessible to all faculty, students, and staff	270	2.94	0.98	
The training provided covers a wide range of smart technologies relevant to education	270	2.87	0.97	
I feel confident using smart technology as a result of the training I have received	270	2.89	0.98	
The university encourages continuous professional development in smart technology integration	270	2.90	0.97	
Workshops and seminars on smart technology are scheduled at convenient times for participants	270	2.83	0.95	
Technical support is available during and after training sessions to assist with the use of smart tools	270	2.91	0.97	
The content of the training is practical and directly applicable to teaching and learning activities	270	2.85	0.99	
I am satisfied with the quality and frequency of training opportunities provided on smart technology	270	2.93	0.98	
Overall Mean	270	2.90	0.97	

The findings indicate that students generally perceived institutional training opportunities positively, with an overall mean score of **2.90 (SD = 0.97)**. This suggests that students believed their universities had made moderate efforts to equip them with the skills necessary to utilize

smart technologies for learning. The relatively low variation in responses further indicates that students held fairly consistent perceptions regarding the availability of institutional training opportunities. These findings support UNESCO (2023), which emphasizes that

continuous digital skills development is essential for successful technology integration in higher education.

The highest-rated items reflected students' appreciation of orientation programmes, training workshops, and institutional support that enabled them to use learning management systems and other digital learning platforms effectively. Students generally agreed that training opportunities had enhanced their confidence in using smart technologies for accessing learning resources, participating in online learning activities, completing assignments, and communicating with lecturers. These findings are consistent with the OECD (2023), which argues that continuous digital capacity building strengthens learners' confidence and promotes effective utilization of educational technologies.

Nevertheless, some students indicated that advanced training opportunities remained limited, particularly in emerging technologies and specialized digital applications. A number of respondents also expressed concern regarding the irregularity of training programmes and unequal access across different academic programmes. These findings suggest that although universities have introduced digital capacity-building initiatives, greater efforts are required to ensure equitable, continuous, and needs-based training for all learners.

The findings further suggest that institutional orientation programmes have enabled students to familiarize themselves with newly introduced digital platforms, reducing technology-related anxiety and improving adoption of institutional learning systems. Students who had participated in training programmes appeared more capable of accessing online learning materials, submitting digital assignments, communicating with lecturers through institutional platforms, and utilizing electronic library resources. These observations are consistent with findings by Bond et al. (2024), who reported that structured institutional training contributes significantly to learners' digital competence and supports successful adoption of educational technologies.

Despite these positive perceptions, students also identified several areas requiring improvement. Responses indicated that continuous follow-up support after initial training was inconsistent, while refresher programmes were not offered regularly in some institutions. Some respondents reported difficulties adapting to newly introduced technologies because training was limited to initial orientation sessions without sustained technical support. These findings suggest that although universities recognize the importance of student digital capacity building, institutional training programmes require greater continuity to keep pace with rapidly evolving educational technologies. UNESCO (2023) similarly observes that sustainable digital

transformation depends on continuous learner support rather than isolated training interventions.

Interview data supported these quantitative findings. University administrators indicated that most institutions organize orientation programmes for newly admitted students and periodic digital literacy workshops throughout the academic year. However, they acknowledged that financial limitations, competing institutional priorities, and shortages of ICT personnel constrain the frequency and scope of training activities. One Director of ICT remarked:

"Every first-year student receives orientation on our digital learning systems, but sustaining regular training throughout the academic year remains challenging because of limited resources and increasing student numbers."

Similarly, a Deputy Vice Chancellor (Academic Affairs) observed:

"Digital competence has become an institutional priority, but continuous student training requires additional investment in both personnel and infrastructure if universities are to achieve meaningful digital transformation."

The qualitative findings therefore reinforce the quantitative results by demonstrating that although institutional commitment to student digital capacity building exists, sustainability of training programmes remains constrained by resource limitations.

Overall, the findings indicate that institutional training opportunities make a positive contribution to students' ability to utilize smart technologies for learning. Nevertheless, universities should strengthen continuous digital literacy programmes, expand post-training technical support, and institutionalize regular refresher training to ensure that students acquire the competencies required to thrive within increasingly technology-driven higher education environments. These findings concur with international evidence demonstrating that continuous learner capacity building is essential for maximizing the educational benefits of smart technology integration (European Commission, 2021; OECD, 2023; UNESCO, 2023).

4.2 Lecturers' Perceptions of Training Opportunities

Lecturers were also asked to assess institutional training opportunities supporting smart technology integration. Their responses are summarized in Table 2.

Table 2: Lecturers' Perceptions on Training Opportunities for Smart Technology (N=64)

Item	N	M	SD
I feel that the training I have received has improved my ability to use smart technology tools in my teaching	64	3.08	0.98
My university offers regular training sessions that have increased my confidence in integrating smart technologies into my lessons	64	2.17	0.87
I think the frequency of training offered at my institution is adequate for staying updated with the latest smart technology tools	64	2.03	0.97
I feel more competent in solving technical issues related to smart technology tools due to regular training	64	1.83	0.96
I have seen positive impacts on my ability to use digital assessments and e-learning platforms effectively due to regular faculty training	64	2.00	0.92
I believe that the training I have received has influenced my overall teaching effectiveness through the use of smart technology tools	64	3.02	1.02
I am more willing to explore new digital tools and platforms due to ongoing professional development in the use of smart technologies	64	2.00	1.01
I find that the training programs provided at my institution are relevant to my specific teaching needs when it comes to smart technology integration	64	1.92	0.98
I am more likely to use smart technology in my classroom after receiving regular training sessions	64	2.37	0.90
I have noticed that regular training on smart technology has led to greater collaboration among faculty members in using technology for teaching	64	2.97	0.97
Overall Mean	64	2.42	0.97

The findings presented in Table 2 indicate that lecturers perceived institutional training opportunities as generally inadequate for supporting effective smart technology integration, as reflected by an overall mean score of 2.42 (SD = 0.97). Although universities have established training initiatives aimed at promoting technology integration, the overall mean suggests that these programmes have not adequately addressed lecturers' professional development needs. The relatively consistent standard deviation indicates that lecturers across the participating universities shared similar perceptions regarding the adequacy of institutional training. This finding supports the view that successful digital transformation depends not only on the availability of technological infrastructure but also on sustained institutional investment in human capacity development (Bond et al., 2024; UNESCO, 2023). Similar concerns have been reported in African higher education institutions where limited professional development remains a significant barrier to effective technology integration (Czerniewicz et al., 2020; Mtebe & Raphael, 2021). In Kenya, the Commission for University Education (2022) emphasizes that universities should continuously strengthen staff competencies to support quality technology-enhanced teaching and learning.

The highest-rated statement, "I feel that the training I have received has improved my ability to use smart technology tools in my teaching" (M = 3.08, SD = 0.98), indicates that lecturers who participated in institutional training

recognized its contribution to improving their digital competence. Similarly, respondents agreed that training enhanced their teaching effectiveness (M = 3.02, SD = 1.02) and promoted collaboration among faculty members in technology-supported instruction (M = 2.97, SD = 0.97). These findings suggest that existing professional development initiatives positively influence instructional practice despite their limited scope. International studies have consistently demonstrated that well-designed professional development programmes improve teachers' confidence, pedagogical innovation, and collaborative technology use (Bond et al., 2024; Tondeur et al., 2021). Comparable evidence from South Africa indicates that collaborative faculty development strengthens educators' readiness to adopt digital pedagogies and promotes institutional innovation (Czerniewicz et al., 2020). Similarly, studies conducted in Kenyan universities have shown that lecturers who participate in continuous ICT training are more likely to integrate learning management systems, online assessment tools, and digital instructional resources into their teaching (Tarus et al., 2023; Kipyego & Mwololo, 2023).

Despite these positive outcomes, lecturers expressed dissatisfaction with the frequency and relevance of institutional training. Respondents reported that regular training sessions were insufficient to increase their confidence in integrating smart technologies into teaching (M = 2.17, SD = 0.87), while the frequency of training was considered inadequate for keeping pace with rapidly

evolving educational technologies ($M = 2.03$, $SD = 0.97$). Likewise, lecturers indicated that institutional training had limited influence on their effective use of digital assessment platforms ($M = 2.00$, $SD = 0.92$) and their willingness to explore emerging digital tools ($M = 2.00$, $SD = 1.01$). These findings suggest that institutional training remains largely episodic rather than continuous. UNESCO (2023) and the OECD (2023) argue that sustainable digital transformation requires ongoing professional learning that evolves alongside technological innovations. Similar observations have been reported in Ghana and Nigeria, where inadequate institutional support and irregular training limit lecturers' adoption of innovative teaching technologies (Aboagye et al., 2021; Tella et al., 2022). In Kenya, studies have similarly reported that although universities increasingly invest in digital infrastructure, many lecturers receive only introductory training, limiting their ability to integrate technology effectively into pedagogy (Tarus et al., 2023; Commission for University Education, 2022).

The lowest-rated statements concerned the relevance of institutional training to lecturers' instructional needs ($M = 1.92$, $SD = 0.98$) and its contribution to improving their competence in resolving technical challenges ($M = 1.83$, $SD = 0.96$). These findings suggest that many institutional training programmes are generic and insufficiently aligned with discipline-specific pedagogical practices. Rather than emphasizing practical classroom application, many programmes focus on system orientation, leaving lecturers inadequately prepared to troubleshoot technical problems or redesign instruction using digital technologies. This finding concurs with Tondeur et al. (2021), who argue that effective professional development should be contextualized, practice-oriented, collaborative, and sustained over time. Similar conclusions have been reached in African higher education, where Mtebe and Raphael (2021) found that lecturers required continuous mentoring and practical support rather than one-off workshops. In Kenya, recent evaluations of university digital transformation initiatives have also identified inadequate follow-up support and limited discipline-based training as key constraints to effective technology integration (CUE, 2022; Ministry of Education, 2023).

The interview findings reinforced the quantitative results by demonstrating that university administrators recognize continuous professional development as essential for successful digital transformation. However, participants consistently identified inadequate funding, shortages of ICT personnel, competing institutional priorities, and heavy academic workloads as major barriers to implementing regular staff development programmes. Similar institutional constraints have been documented globally (OECD, 2023), across African universities (Czerniewicz et al., 2020; Mtebe & Raphael, 2021), and within Kenya, where financial limitations and insufficient institutional capacity continue to slow digital transformation despite increasing investment in educational technologies (Commission for University Education, 2022; Ministry of Education, 2023).

A comparison of lecturers' and students' perceptions revealed important differences in institutional training experiences. Students generally viewed institutional training more positively, reflecting the effectiveness of orientation programmes and digital literacy initiatives designed to facilitate the use of learning management systems and online learning platforms. In contrast, lecturers expressed lower levels of satisfaction because their professional responsibilities require advanced pedagogical competencies that extend beyond basic technology orientation. This disparity suggests that universities have made greater progress in building student digital literacy than in strengthening faculty pedagogical capacity for technology-enhanced teaching. Similar patterns have been observed internationally (Bond et al., 2024), in African universities (Ng'ambi et al., 2020), and in Kenya, where institutional investments have tended to prioritize student access to digital platforms while faculty professional development has received comparatively less attention (Tarus et al., 2023; CUE, 2022).

Overall, the findings demonstrate that institutional training opportunities moderately support smart technology integration but remain insufficient to meet the evolving professional development needs of academic staff. Although existing initiatives contribute positively to lecturers' technological competence and instructional effectiveness, their impact is constrained by limited frequency, inadequate contextualization, insufficient technical support, and weak alignment with discipline-specific teaching requirements. The findings therefore underscore the need for private chartered universities to institutionalize continuous, needs-based, and practice-oriented professional development programmes that are supported by sustained investment, effective leadership, and robust institutional policies. This conclusion aligns with international evidence indicating that successful digital transformation depends on continuous human capacity development alongside technological investment (European Commission, 2021; Bond et al., 2024; UNESCO, 2023), while also reflecting evidence from African and Kenyan higher education that institutional training remains a critical determinant of sustainable smart technology integration (Czerniewicz et al., 2020; Mtebe & Raphael, 2021; Commission for University Education, 2022; Tarus et al., 2023).

5. Conclusion and Recommendations

5.1 Conclusion

This study investigated the influence of institutional training opportunities on smart technology integration in selected private chartered universities in Kenya. The findings indicate that institutional training moderately supports the integration of smart technologies, although notable differences exist between students' and lecturers' perceptions. Students generally viewed institutional training opportunities positively, suggesting that universities have made appreciable efforts to enhance learners' digital competencies through orientation

programmes, workshops, and technology support services. In contrast, lecturers perceived institutional training opportunities as inadequate, indicating that existing professional development programmes are not sufficiently frequent, practical, or responsive to the pedagogical demands of technology-enhanced teaching.

The qualitative findings corroborated the quantitative results by demonstrating that universities recognize the importance of digital capacity building and have established various training initiatives for both staff and students. However, institutional efforts are constrained by limited financial resources, inadequate ICT personnel, heavy academic workloads, and the absence of structured continuous professional development programmes. Classroom observations further revealed that lecturers who had participated in recent training programmes demonstrated greater confidence and competence in integrating smart technologies into classroom instruction than those with limited training exposure.

Overall, the study concludes that institutional training is a critical determinant of successful smart technology integration. While private chartered universities have made commendable progress in promoting digital literacy, greater investment is required to establish sustainable, continuous, and needs-based professional development programmes that strengthen both lecturers' pedagogical competencies and students' digital skills. Effective digital transformation therefore depends not only on technological infrastructure but also on continuous institutional investment in human capacity development.

5.2 Recommendations

Based on the findings of this study, the following recommendations are made:

1. Private chartered universities should institutionalize continuous professional development programmes that provide regular, practical, and discipline-specific training on emerging smart technologies and digital pedagogies.
2. University management should allocate adequate financial resources to support sustainable faculty development, digital literacy programmes, and continuous technology capacity-building initiatives.
3. Institutions should establish structured mentoring and peer-learning programmes through which experienced technology users support colleagues in integrating smart technologies into teaching, learning, and assessment.
4. Universities should strengthen ICT support services by increasing the number of qualified technical personnel available to provide timely assistance to lecturers and students.
5. Institutional training programmes should be designed to address the diverse technological needs of different academic disciplines while

incorporating practical, hands-on learning experiences that promote confidence and effective technology utilization.

6. Universities should develop comprehensive monitoring and evaluation mechanisms to assess the effectiveness of training programmes and identify areas requiring improvement.
7. Institutional leaders should promote a culture of continuous learning and innovation by recognizing and rewarding exemplary technology integration practices among academic staff.
8. Future studies should examine the long-term impact of institutional training programmes on lecturers' instructional practices, student learning outcomes, and institutional digital transformation across both public and private universities in Kenya.

References

- Aboagye, E., Yawson, J. A., & Appiah, K. N. (2021). COVID-19 and e-learning: The challenges of students in tertiary institutions. *Social Education Research*, 2(1), 1–8. <https://doi.org/10.37256/ser.212021422>
- Al-Emran, M., Mezhyuev, V., & Kamaludin, A. (2018). Technology acceptance model in mobile learning: A systematic review. *Computers & Education*, 125, 389–412. <https://doi.org/10.1016/j.compedu.2018.06.008>
- Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2024). A decade of research on digital transformation in higher education: Trends, challenges and future directions. *Computers & Education*, 203, 104857. <https://doi.org/10.1016/j.compedu.2023.104857>
- Commission for University Education. (2022). *Standards and guidelines for university education in Kenya*. Commission for University Education.
- Commission for University Education. (2023). *Universities standards and guidelines*. Commission for University Education.
- Czerniewicz, L., Agherdien, N., Badenhorst, J., Belluigi, D., Chambers, T., Chili, M., de Villiers, M., Felix, A., Gachago, D., Gokhale, C., Ivala, E., Kramm, A., Madiba, M., Pallitt, N., Prinsloo, P., Solomon, K., Strydom, S., Swanepoel, M., Waghid, F., & Wissing, G. (2020). A wake-up call: Equity, inequality and Covid-19 emergency remote teaching and learning. *Postdigital Science and Education*, 2(3), 946–967. <https://doi.org/10.1007/s42438-020-00187-4>
- European Commission. (2021). *Digital Education Action Plan (2021–2027): Resetting education and*

- Gikas, J., & Grant, M. M. (2013). Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones and social media. *The Internet and Higher Education*, 19, 18–26. <https://doi.org/10.1016/j.iheduc.2013.06.002>
- Ifenthaler, D., & Yau, J. Y.-K. (2020). Utilising learning analytics to support study success in higher education: A systematic review. *Educational Technology Research and Development*, 68(4), 1961–1990. <https://doi.org/10.1007/s11423-020-09788-z>
- Kipyego, C. K., & Mwololo, S. (2023). Digital transformation and lecturers' adoption of learning management systems in Kenyan universities. *Journal of Learning for Development*, 10(2), 245–260.
- Ministry of Education. (2019). *National information and communications technology (ICT) policy guidelines*. Government of Kenya.
- Ministry of Education. (2023). *Digital learning implementation framework for higher education institutions in Kenya*. Government of Kenya.
- Mtebe, J. S., & Raphael, C. (2021). Key factors in learners' satisfaction with the e-learning system at the University of Dar es Salaam, Tanzania. *Australasian Journal of Educational Technology*, 37(4), 107–122.
- Ng'ambi, D., Brown, C., Bozalek, V., Gachago, D., & Wood, D. (2020). Technology enhanced teaching and learning in South African higher education: A review of emerging practices. *British Journal of Educational Technology*, 51(4), 1163–1180.
- Organisation for Economic Co-operation and Development. (2023). *Digital education outlook 2023: Towards an effective digital education ecosystem*. OECD Publishing. <https://doi.org/10.1787/b14bef59-en>
- Redecker, C. (2022). *European framework for the digital competence of educators: DigCompEdu*. Publications Office of the European Union.
- Selwyn, N. (2022). *Education and technology: Key issues and debates* (3rd ed.). Bloomsbury Academic.
- Tarus, J. K., Gichoya, D., & Muumbo, A. (2023). Adoption of learning management systems in Kenyan universities: Opportunities and challenges for digital transformation. *International Journal of Education and*
- Tella, A., Orim, F., & Ibrahim, D. M. (2022). Digital competence and technology integration among university lecturers in Nigeria. *Education and Information Technologies*, 27(8), 11245–11267. <https://doi.org/10.1007/s10639-022-11064-5>
- Tondeur, J., Scherer, R., Siddiq, F., & Baran, E. (2021). Enhancing pre-service teachers' technological pedagogical content knowledge (TPACK): A mixed-method study. *Computers & Education*, 164, 104136. <https://doi.org/10.1016/j.compedu.2020.104136>
- UNESCO. (2023). *Global education monitoring report 2023: Technology in education—A tool on whose terms?* UNESCO.
- van Laar, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M., & de Haan, J. (2020). Determinants of 21st-century digital skills and digital competence for professionals: A systematic literature review. *Computers in Human Behavior*, 72, 577–588. <https://doi.org/10.1016/j.chb.2017.03.010>