Evaluating ICT Staff Technical Readiness for Online Learning Transformation in Public Universities in Kenya

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ABSTRACT

This study evaluated ICT staff technical readiness for online learning transformation in public universities in Kenya. Despite increased adoption of digital learning, many institutions continue to experience challenges related to inadequate technical skills among ICT personnel, limiting the effective implementation and sustainability of online learning systems. The study aimed to determine the technical competencies possessed by ICT staff and examine how these skills influence online learning delivery. It focused on selected public universities and specifically assessed competencies in LMS management, software installation, digital applications, and system maintenance. The study was anchored on the Unified Theory of Acceptance and Use of Technology (UTAUT2) as the primary theoretical lens and supported by the Technology–Organization–Environment (TOE) framework. A descriptive quantitative research design was employed. The target population comprised students, registrars, and ICT staff, from which 537 respondents were sampled using stratified and simple random sampling. Data were collected using structured questionnaires and analyzed using SPSS through descriptive and inferential statistics. Findings revealed that ICT staff possess essential technical skills but demonstrated uncertainty in advanced competencies such as LMS development. The study concludes that ICT staff readiness significantly affects online learning transformation. It recommends enhanced training programs, investment in ICT infrastructure, and strengthened institutional support systems to improve digital learning outcomes in Kenyan public universities

Keywords: ICT readiness, online learning, LMS management, technical skills, digital transformation.

INTRODUCTION

Background of the study

Globally, higher education institutions have increasingly embraced digital learning as a core component of modern pedagogy. Advances in educational technology, coupled with the need for flexible and inclusive learning environments, have accelerated investments in online learning systems worldwide. The COVID-19 pandemic further underscored this shift, compelling universities to adopt digital platforms rapidly and rely heavily on ICT personnel to sustain virtual instruction (UNESCO, 2020). Effective online learning implementation therefore depends not only on technological infrastructure but also on the technical competencies of ICT staff who support, maintain, and innovate digital learning environments (Hodges et al., 2021).

Regionally, across Sub-Saharan Africa, universities continue to struggle with uneven technological capacity, limited digital skills, and infrastructural gaps that hinder the effective deployment of online learning. Despite increased interest in digital transformation in African higher education, the region still faces challenges such as inadequate ICT staffing, limited technical expertise, and inconsistent institutional support for digital teaching tools (Tibugari & Mtebe, 2022). Research shows that universities with skilled ICT personnel achieve better adoption of Learning Management Systems (LMS) and improved e-learning outcomes for both students and academic staff (Adera & Waema, 2023).

Locally, Kenyan public universities are at different stages of implementing online learning. While government policies have encouraged digital transformation, disparities in infrastructure, ICT staffing levels, and technical

capacity remain significant obstacles (Wambua, 2022). ICT staff are central to managing LMS platforms, troubleshooting technical challenges, installing software, and supporting users. Assessing their technical readiness is therefore crucial for determining how effectively universities can sustain online learning and enhance academic performance in the digital era (Kariuki & Muthee, 2023).

Statement of the problem

The rapid growth of online learning in higher education has increased the demand for strong technological support systems managed by competent ICT staff. Globally, universities rely heavily on ICT personnel to maintain Learning Management Systems (LMS), troubleshoot digital platforms, and provide user support essential for online learning continuity (Hodges et al., 2021). However, despite widespread investment in digital transformation, many institutions particularly in developing contexts struggle with insufficient ICT skills and limited technical capacity, which undermines the effectiveness of online learning (Adera & Waema, 2023). Regionally, Sub-Saharan African universities continue to face skill gaps among ICT staff, including inadequate LMS development skills, limited software management expertise, and challenges in supporting digital learning tools (Tibugari & Mtebe, 2022).

In Kenya, public universities have adopted online learning at varying rates, but concerns persist regarding the readiness of ICT personnel to support these systems sustainably. Recent studies highlight shortages in technical competencies such as LMS management, software installation, system maintenance, and digital application proficiency (Wambua, 2022). Despite these concerns, limited empirical evidence exists on the specific technical skills ICT staff possess and how these skills influence online learning transformation.

This study addresses this gap by evaluating the technical competencies of ICT staff in public universities and examining how these skills affect the successful implementation of online learning

Objectives

i. To determine the technical skills possessed by ICT staff in public universities in relation to online learning transformation.

ii. To examine the influence of ICT staff technical competencies on the effectiveness of online learning implementation in public universities

Scope of the study

This study focused on examining the technical skills possessed by ICT staff in Kenya's public universities and how these competencies influence the effectiveness of online learning implementation. It covered seven purposively selected public universities and targeted registrars, ICT staff, and students as key respondents. The study specifically assessed skills related to LMS management, software installation, system maintenance, and digital application use. Geographically, it was limited to Kenyan public universities, and conceptually, it centered on ICT readiness for online learning transformation. The study did not examine private universities or non-technical institutional factors influencing online learning.

Limitation of the study

This study was limited to seven selected public universities, which may restrict the generalizability of the findings to all higher education institutions in Kenya. The study focused solely on technical skills and did not explore other factors influencing online learning transformation, such as institutional policies, funding, or pedagogical readiness. Data were collected through self-reported questionnaires, which may be subject to respondent bias. Additionally, the study did not include private universities or middle-level colleges, thereby narrowing its scope. Despite these limitations, the findings provide valuable insights into ICT staff competencies within the public university context

Significance of the study

This study is significant because it provides evidence on the technical competencies of ICT staff, a critical factor in the successful implementation of online learning in Kenya's public universities. The findings offer valuable insights for university administrators and policymakers seeking to strengthen ICT capacity and enhance digital learning environments. By identifying specific skill gaps, the study supports targeted training, resource allocation, and strategic planning for online learning transformation. Additionally, the study contributes to existing literature by offering empirical data on ICT readiness in the Kenyan context, informing future research and guiding national efforts toward sustainable digital education

LITERATURE REVIEW

The integration of online learning in higher education has intensified globally, driven by technological advancements and the demand for flexible learning environments. Recent studies emphasize that the success of online learning relies heavily on the technical capacity of ICT staff who support digital systems and provide user assistance (Almeida & Simoes, 2021). Their competencies influence the stability, accessibility, and usability of learning platforms, making them central to digital transformation initiatives in universities. Globally, universities with skilled ICT teams demonstrate smoother LMS uptake and improved learner satisfaction (Cruz & Carvalho, 2023).

In the African context, the expansion of online learning has revealed persistent gaps in ICT infrastructure and human capacity. Research highlights that, while institutions have attempted to integrate online systems, many struggle with inadequate ICT staffing and limited technical expertise, which hinders seamless adoption of digital teaching tools (Nyamao & Kemboi, 2021). Sub-Saharan universities specifically face challenges in LMS maintenance, software integration, and technical support services, all of which require well-trained ICT personnel (Afolabi & Shonola, 2022).

At the local level, Kenyan public universities are increasingly investing in digital platforms; however, disparities in ICT competencies remain a significant barrier. Recent evidence indicates that many institutions lack personnel with the advanced technical skills needed to manage LMS platforms, install educational software, and troubleshoot digital learning systems (Mutisya & Rotich, 2024). As universities expand online learning, the technical readiness of ICT staff becomes essential for sustaining high-quality digital education. Consequently, understanding the existing skill levels and identifying gaps is critical for guiding capacity-building interventions and strengthening online learning outcomes in Kenyan public universities.

Theoretical review

This study is guided by two key theories that explain technology adoption and organizational readiness for online learning transformation. The Unified Theory of Acceptance and Use of Technology (UTAUT2) serves as the anchor theory because it provides a comprehensive framework for understanding how users adopt and interact with digital systems. UTAUT2 posits that technology acceptance is shaped by factors such as performance expectancy, effort expectancy, facilitating conditions, and users' behavioral intentions (Venkatesh et al., 2020). In the context of online learning, the technical competence of ICT staff directly influences facilitating conditions by ensuring that Learning Management Systems (LMS) are functional, accessible, and user-friendly. Recent studies affirm that institutions with strong ICT support experience higher levels of system acceptance and smoother digital transitions (Kumi-Yeboah & James, 2022). Thus, UTAUT2 is suitable as the central theoretical lens because it links technical readiness to technology use and institutional digital success.

The second theory is the Technology–Organization–Environment (TOE) Framework, which explains how institutional adoption of technology is influenced by technological capability, organizational capacity, and external pressures (Baker, 2021). Within Kenyan public universities, TOE highlights how factors such as ICT infrastructure, staff competencies, administrative support, and national digital policies shape the adoption and sustainability of online learning platforms. Recent scholarship applying TOE in higher education contexts shows that technical human resource capacity especially ICT staff skills is a critical enabler of successful digital transformation (Osei & Ackon, 2023). Together, these theories provide a strong foundation for understanding

how ICT staff competencies influence the implementation and performance of online learning systems in public universities.

METHODOLOGY OF THE STUDY

This research adopted a descriptive quantitative approach to assess the level of ICT preparedness for online learning transformation within public universities in Kenya. Guided by a pragmatist philosophical standpoint and applying a deductive line of inquiry, the study aimed to examine how established technology adoption theories operate in higher education environments. The study population consisted of both students and staff drawn from all 39 accredited public universities, out of which seven institutions were intentionally selected for participation. A total of 537 individuals 384 students and 153 staff were included in the sample through a combination of stratified sampling and simple random selection to ensure proportional representation. Data were primarily gathered using structured questionnaires and interviews, supplemented with secondary information sourced from relevant institutional documents and reports. Prior to the main data collection, a pilot test with 20 participants was undertaken to evaluate and refine the research tools. Instrument reliability was confirmed through Cronbach's alpha scores ranging from 0.762 to 0.778, indicating strong internal consistency. To establish validity, the instruments underwent expert assessment followed by exploratory factor analysis. The collected data were analyzed using SPSS, employing both descriptive statistics and inferential methods such as correlation tests, ANOVA, and logistic regression to explore patterns and relationships among study variables. Ethical approval for the study was granted by the National Commission for Science, Technology and Innovation (NACOSTI). Participation was voluntary, and respondents were assured of confidentiality and informed consent before taking part in the study.

RESULTS

Gender of the Respondents

The findings are illustrated in Table 1

Table 1: Gender of the Respondents

	Frequency	**Percent**
Male	105	68.6
Female	48	31.4
Total	**153**	**100.0**

Male respondents constituted 68.6% of the sample, whereas female respondents accounted for 31.4%**.** This distribution suggests that the study did not exhibit gender bias, as the proportions closely mirror the actual gender composition of the wider student population.

Age of the Respondents

The results are illustrated in Table 2

Table 2: Age of the Respondents

		Frequency	**Percent**
ICT staff	20-30 years	3	18.8
	31-40 years	9	56.3

	41-50 years	3	18.8
	51-60 years	1	6.3
	Total	**16**	**100.0**

Analysis of the registrars' age distribution shows that the largest proportion (47.4%) falls within the 31–40 years bracket. This is followed by 31.6% who are aged 51–60 years, 15.8% in the 41–50 years category, and a smaller group (5.3%) aged 61–70 years.

For ICT staff, the majority (56.3%) are within the 31–40 years age group. Respondents aged 20–30 years and 41–50 years each represent 18.8%, while only 6.3% fall within the 51–60 years group.

Among the students, most participants (85.6%) are between 20–25 years, which is consistent with the typical age range found in undergraduate programs. Other age categories include 15–19 years (10.2%), 26–30 years (3.4%), and 31–35 years (0.8%).

In addition, the study draws responses from a broad range of age groups across different categories of participants. This diversity strengthens the credibility of the findings, as it allows the study to capture varied perspectives relevant to assessing how the shift toward online learning may influence academic performance in Kenya's public universities

Level of Education of Registrar and ICT staff

The results are shown in Table 3.

Table 1: Level of Education of ICT staff

	Frequency	**Percent**
Certificate	5	14.3
Diploma	3	8.6
Degree	15	42.9
Masters	8	22.9
PhD	4	11.4
Total	**35**	**100.0**

The findings indicate that the highest proportion of registrars and ICT personnel hold a bachelor's degree, representing 42.9% of the respondents. Another 22.9% have attained a master's qualification, while 14.3% possess a certificate. Additionally, 11.4% have completed doctoral studies, and 8.6% hold a diploma.

This distribution demonstrates that the registrars and ICT staff involved in the study have adequate academic qualifications. Their educational background equips them to provide informed, credible, and authoritative perspectives on issues related to institutional readiness and the implications of adopting online learning systems for academic performance in Kenya's public universities

Position of the Respondents

The findings are illustrated in Table 4.

Table 5: ICT staff

		Frequency	Percent
ICT staff	Lecturer	2	12.5
	ICT staff	14	87.5
	Total	**16**	**100.0**

The results show that among the registrars surveyed, 36.8% reported serving in ICT-related roles, while 31.6% indicated that they also work as lecturers. Additionally, 21.1% occupy administrative positions, and 10.5% identified their role strictly as registrar.

For the ICT staff category, the vast majority (87.5%) are employed directly within ICT departments, whereas 12.5% also take on lecturing responsibilities.

These findings suggest that both registrars and ICT personnel involved in the study are actively engaged either directly or indirectly in supporting or implementing online teaching and learning initiatives within their institutions. Their professional roles place them in strategic positions to offer reliable insights into how the transition to online learning may influence academic performance in Kenya's public universities. The distribution also aligns well with the intended target group for this research, reinforcing the credibility of the responses obtained.

Technical Skills Possessed by ICT Staff

To determine how the technical abilities of ICT personnel influence the shift toward online learning in public universities, respondents were asked to rate their agreement with several statements related to ICT competencies. This component of the study aimed to gauge whether ICT staff have the necessary skills to support and enhance online learning initiatives within their institutions. A summary of the responses is presented in Table 5.

Table 5: Statements on Technical Skills possessed by ICT Staff

ICT staff	**Mean**	**Std. Dev.**
I am able to develop a University LMS	2.563	1.031
I am able to manage a University LMS	2.063	0.929
I am able to maintain a University LMS	1.938	0.680
I have a mastery of presentation software	2.250	1.065
I have knowledge on device installation	1.563	0.964
There is a provision of discipline-specific software	2.063	0.929
I am proficient in social network applications	1.813	0.750

The study applied a coding framework in which the mean scores were interpreted on a five-point scale. A mean value below 5 indicated *strong agreement*, while scores ranging from 1.5 to 2.5 signified *agreement*. Mean scores between 2.5 and 3.5 were interpreted as *uncertainty*, values from 3.5 to 4.5 indicated *disagreement*, and any mean above 4.5 represented *strong disagreement*. Based on this scale, the results in Table 4.10 show that ICT staff expressed agreement that they possess several essential technical skills. These include competence in device installation (mean = 1.563), proficiency in social networking applications (mean = 1.813), ability to

maintain a university LMS (mean = 1.938), capacity to manage an LMS (mean = 2.063), availability of discipline-specific software (mean = 2.063), and mastery of presentation tools (mean = 2.250). However, respondents reported uncertainty about their ability to develop a university LMS, as indicated by a mean score of 2.563.

Furthermore, the findings suggest that ICT staff in public universities demonstrate a range of technical capabilities that are important for supporting online learning initiatives. Skills such as installing learning software, managing LMS platforms, and navigating digital communication tools are essential for ensuring effective implementation of online education. The results confirm that technical expertise among ICT personnel plays a significant role in the success of online learning transformation. This aligns with observations by Keengwe and Kidd (2010), who emphasized that the competence of ICT staff is crucial for establishing, sustaining, and optimizing digital learning environments. The study therefore underscores the need for universities to invest in strengthening these competencies to support ongoing and future online learning efforts.

CONCLUSION

The study set out to assess the technical skills possessed by ICT staff in public universities and determine how these competencies influence online learning transformation. The findings revealed that ICT personnel demonstrate competence in essential areas such as device installation, LMS management, LMS maintenance, presentation software use, and proficiency in digital applications. However, uncertainty was noted regarding more advanced skills such as LMS development. These results show that while ICT staff have foundational skills necessary to support online learning, gaps remain in higher-level technical capabilities required for full digital transformation. In addition, the study concludes that ICT staff competencies significantly shape the effectiveness, reliability, and sustainability of online learning systems in public universities. Strengthening these competencies is therefore critical for enhancing digital learning environments, supporting institutional readiness, and improving students' academic experiences in an increasingly technology-driven education sector

RECOMMENDATIONS

Based on the study findings, several recommendations are proposed. First, public universities should invest in continuous professional development programs for ICT staff, focusing on advanced technical skills such as LMS development, system integration, and digital infrastructure management. Second, institutions should allocate adequate resources to strengthen ICT departments, including upgraded equipment, software licenses, and reliable internet connectivity to support online learning. Third, collaboration between ICT units, academic departments, and university management should be enhanced to ensure that technical skills align with pedagogical needs. Fourth, national bodies such as the Ministry of Education should provide policy support and funding frameworks that promote ICT capacity-building across universities. Finally, universities should introduce mentorship and peer-learning initiatives to encourage knowledge sharing among ICT professionals. These efforts will collectively enhance the technical readiness of ICT staff and improve the effectiveness of online learning implementation.

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