



E-Learning Adoption: Bridging the Knowledge and Operational Skills Gap among Instructors in the selected Higher Learning Institutions in Tanzania

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Abstract

The integration of e-learning in higher education, especially in Tanzania, has transformed knowledge delivery. Its effectiveness relies on instructors' knowledge and skills in using e-learning platforms. This study assesses the level of knowledge and skills for the operation of e-learning among instructors in HLIs. A quantitative approach and cross-sectional research design were employed, and data were collected through structured questionnaires from a sample size of 237 instructors. Descriptive techniques were employed in the analyses conducted to determine the levels of knowledge and skills for the operation of e-learning among the instructors. A pilot study was conducted to test the main study, with questionnaire development guided by content validity and internal reliability measured using Cronbach's alpha. Ethical considerations, including informed consent, voluntary participation, anonymity, and confidentiality, were upheld throughout. Findings reveal that while there is a growing familiarity with e-learning systems such as Moodle and other Learning Management Systems (LMS), significant disparities exist in the depth of knowledge and technical skills among the instructors'. On the other hand, instructors face challenges in content creation, online pedagogy, and integrating multimedia resources into their teaching practices. Furthermore, the study identifies unreliable internet, limited support, and inadequate training as key barriers to effective e-learning adoption. It emphasizes the need for targeted capacity-building, improved infrastructure, and supportive policies. Despite efforts by OUT and IAA, operational gaps persist, requiring continuous training, infrastructure investment, and institutional incentives to achieve sustainable e-learning integration in Tanzanian higher learning institutions.

Keywords: E-learning adoption, perceived knowledge and skills, lecturers, students, the Open University of Tanzania, and digital education.

1. Introduction

The rapid integration of technology into education worldwide has led to the widespread use of e-learning platforms in higher education institutions. Globally, e-learning has become a key tool in the global education

development, driven by digital technology and the growing demand for a more flexible and affordable learning environment. According to Lubuva et al (2022), e-learning has proved to be useful in increasing access to education, particularly where traditional methods are

hampered by physical or geographical barriers. The ongoing global digital transformation of education is changing the way knowledge is delivered, with countries worldwide integrating online and blended learning models into higher education curricula to meet the needs of a diverse student population (Kuleto et al., 2021). This transformation is essential to address the global challenge of educational inequality and to equip students with the skills needed in the digital economy (Kalyani, 2024).

However, as e-learning continues to grow, teachers need to develop not only theoretical knowledge of digital tools but also the operational skills needed to integrate these technologies effectively in the classroom. Amendment of the dormant law by Andersson et al. (2014), e-learning provides a flexible and scalable means of delivering education, allowing learners to access materials and engage in educational activities virtually anywhere. The COVID-19 pandemic further accelerated the adoption of e-learning, compelling institutions worldwide to quickly shift from traditional classroom settings to online and hybrid learning formats (Dhawan, 2020). However, despite the advantages, the success of e-learning largely depends on instructors' knowledge and skills in using e-learning tools effectively (Abu-ali, 2024). Studies across various regions show that inadequate e-learning literacy, poor infrastructure, and limited access to reliable internet have posed significant challenges to the effective use of e-learning platforms (Adedoyin & Soykan, 2023).

The study by Abu-ali (2024) found that technical issues were the most important, followed by the lack of

knowledge and technical skills of lecturers and the inadequacy of their teaching methods for the online environment. The findings also show a link between knowledge and skills in e-learning and the academic achievements of students. The relationship between knowledge and skills in e-learning between teachers and students in high income countries such as Italy may differ from that in Tanzania, as the level of e-learning investment is different between Italy and Tanzania. In countries with a high level of investment in e-learning, the level of perceived knowledge and skills was higher than in countries with lower levels of investment.

Across Africa, the adoption of e-learning has gained significant pull as HLIs' institutions recognize its potential to overcome numerous challenges in the educational sector. According to Eom, (2023) digital technologies are viewed as essential to enhancing education quality, improving access, and increasing student engagement. While countries such as South Africa, Kenya, and Nigeria have made considerable strides in the implementation of e-learning platforms, many others continue to face obstacles related to infrastructure, digital literacy, and teacher training (Mnyanyi et al., 2010). The lack of reliable internet access and the digital divide between urban and rural areas have hindered the widespread adoption of e-learning in many African countries (Boateng et al., 2016). Furthermore, many instructors face challenges in developing the necessary technical competencies to deliver effective e-learning, pointing to the need for more targeted professional development initiatives (Kuleto et al., 2021).

In Tanzania, Studies by (Baynit et al., 2025; Salema, 2023; Mwakyusa & Ngwebeya, 2022; Mnyanyi et al., 2010, and Mnyanyi, 2016) indicated that e-learning is necessary in higher education institutions to increase the quality of instruction and services. According to several studies, Tanzania's recent e-learning initiatives have enhanced access to infrastructure, e-learning content, and competent users (Salema, 2023);(Mwakyusa & Masome Ng`webeya, 2022). However, it has been noted that teachers use digital technology (ICT) sparingly, and it is unclear how well it works to meet students' learning objectives.

The extent of e- learning use in training is determined by several factors, including ICT infrastructure (Angeli et al., 2022), e-competence personnel availability (Mattar et al., 2022; ERGÜL & TAŞAR, 2023), and e-technology adoption (Puteh et al., 2017; Mtebe & Gallagher, 2022). Teaching and learning methods around the world have changed as a result of the quick adoption of e-technologies in the classroom. Concerns over the suitability and efficacy of teachers' e-training methods in improving students' learning outcomes are, nevertheless, becoming more widespread. Although digital tools can enhance personalized learning, boost engagement, and elevate academic performance, their effectiveness largely depends on the instructors' skill in using them properly.

Although 90% of educators recognize the value of digital skills in contemporary education, the study by (Shengelia, 2024) shows that only 20% of them feel sufficiently prepared to incorporate e-tools into their teaching practices. Studies also show that there is a big

disconnection between the practical skills needed for successful classroom implementation and the online training that instructors receive. For example, according to a poll by Pedro (2019), 45% of teachers worldwide do not have access to sufficient professional development programs that emphasize e-pedagogy.

Lack of thorough e-learning often leads to under-utilisation of the technology, which prevents the intended gains in learning outcomes. For example, according to a study by (Mwakyusa & Mwalyagile, 2016), only 30 percent of e-learning implementations in classrooms have led to a quantifiable increase in student performance, mainly due to insufficient training of teachers and lack of alignment with learning objectives. The issue is all the more urgent given the global disparity in education. The difference in educational outcomes is much more pronounced in low- and middle-income countries, where access to technology and e-learning materials is limited. The aim of this study was therefore to assess the level of knowledge and skills of e-learning practitioners in the High Level Institute of Tanzania.

2. Literature Review

2.1 Theoretical literature review

The integration of e-learning in higher learning institutions(HLIs) have been studied through various theoretical frameworks however, this study is guided by the Technology Acceptance Model (TAM) as developed by (Davis, 1989).The Technology Acceptance Model (TAM) posits that perceived usefulness and perceived ease of use are primary determinants of technology adoption. In the context of e-learning, instructors are more inclined to engage with e- learning platforms if they

find them beneficial and user-friendly. The basic TAM model included and tested two specific beliefs: Perceived Usefulness (PU) and Perceived Ease of Use (PEU). Perceived Usefulness is defined as the potential user's subjective likelihood that the use of a certain system (for example single platform E-payment System) will improve his/her action and Perceived Ease of Use refers to the degree to which the potential user expects the target system to be effortless (Davis, 1989). The belief of the person towards a system may be influenced by other factors referred to as external variables in TAM.

The Technology Acceptance Model (TAM) is a widely used framework for understanding technology adoption, emphasizing two key constructs: perceived usefulness and perceived ease of use. Its strengths include simplicity, strong predictive power, empirical validation across various contexts, and adaptability to different technological settings. However, TAM has notable weaknesses, such as its limited consideration of external factors like infrastructure and institutional policies, its assumption of rational user behavior, and its inability to fully capture social or cultural influences. Despite these limitations, TAM is highly relevant to this study as it aligns with the quantitative research design and provides a clear basis for examining instructors' acceptance and use of e-learning technologies in Tanzanian higher learning institutions. Its adaptability also allows for the inclusion of additional context-specific factors such as training, ICT access, and institutional support.

2.2 Empirical Literature review

E-learning adoption has been a focal point of research globally, with studies emphasizing the role of technological infrastructure, pedagogical skills, and

institutional support in its effectiveness. A study by (Kakepoto et al., 2021) in emerging economies examined the critical barriers affecting e-learning, revealing that the absence of proper learning management systems (LMS), limited access to computers, and poor digital literacy among educators significantly constrained its effectiveness. The study emphasized the need for institutions to invest in continuous training programs to enhance e-learning skills among faculty members (Kakepoto et al., 2021). Similarly, (Osman et al., 2024) examined the adoption of e-learning among lecturers in Somalia and found that perceived usefulness, institutional support, and positive attitudes toward technology adoption were critical factors influencing the shift from traditional classrooms to digital platforms. However, the study highlighted that inadequate training in e-learning platforms remained a major barrier.

A study by Boateng et al. (2021) in Ghana explored the relationship between e-learning usage and academic performance, showing that students who received structured training on digital learning platforms performed better than those who learned through self-navigation (Boateng et al., 2016). The study by (Osman et al. (2024) assessed lecturers' preparedness for online teaching and found that while most educators appreciated the importance of e-learning, their limited e-learning competency, inadequate technical support, and resistance to adopting new pedagogical techniques impeded full utilization of digital platforms. The study recommended structured faculty training programs to enhance e-learning proficiency (Mtebe & Gallagher, 2022).

Tanzania has made efforts to integrate e-learning into higher education, yet adoption remains slow due to multiple institutional and technological challenges. The study by Mtebe & Raisamo (2014) investigated e-learning adoption across Tanzanian universities and found that the lack of ICT infrastructure, technical support, and digital literacy among students and lecturers hindered the effective use of e-learning platforms. The study recommended increased investment in digital learning resources and faculty training programs.

A more specific study at the Open University of Tanzania (OUT) by Mnyanyi et al. (2010) explored students' and lecturers' perceptions of their knowledge and skills in using e-learning platforms. The study revealed that while students found digital learning flexible and resourceful, many struggled with low digital literacy, poor internet connectivity, and a lack of structured online assessments. Instructors, on the other hand, cited insufficient training, inadequate institutional support, and challenges in online student engagement as major obstacles (Mnyanyi et al., 2010). Likewise, OUT instructors had an average self-perceived competency score of 2.97, but students had a lower score of 2.25, according to Kwame et al., (2014), suggesting a general lack of ability with e-learning tools. To close the e-learning gap, the study found that more interactive online teaching approaches, better digital infrastructure, and structured training programs were required.

The study by Masue (2020) found limited e-learning applicability in Tanzanian Higher Learning Institutions

due to poor attitudes, lack of skills, and insufficient ICT infrastructure. The study aimed to address perceived knowledge and skills gaps in e-learning, focusing on students' academic achievement at The Open University of Tanzania. Instructors' digital training practices involve the use of different approaches and techniques that are used by instructors in higher learning institutions (HLIs) to incorporate digital technologies into their teaching. This encompasses skills in navigating Learning Management Systems (LMS), creating online activities, and successfully interacting with students through digital platforms. Research conducted by Mtebe & Raphael (2018) revealed that numerous instructors in Tanzania need additional training to create and utilize online resources effectively, highlighting a lack of digital skills among educators.

The traditional face-to-face training delivery method is giving way to digital training delivery worldwide. Information and communication technology (ICT) has been used in training at higher education institutions (HLIs) since the 1990s (Riaz & Rashid, 2023). The limitations put in place by numerous governments worldwide in response to the COVID-19 pandemic, which included the temporary closure of schools, colleges, and universities to slow the virus's rapid spread, compelled the transition (Li, 2022; Adedoyin & Soykan, 2023).

Additionally, it has been discovered that learners' digital literacy, experience, and internet affordability have an impact on how teaching is delivered, which in turn affects the respective outcomes (Swan, 2017). According to the results of the quasi-experimental study by (Baynit et al.,

2025); Mwakyusa & Ng`webeya (2022), there was no discernible difference in the exam scores of third-year students who used digital technology for learning compared to those who did not. Multiple simultaneous uses of the technology were blamed for the homogeneity seen. Similarly, there was no discernible link between students' academic achievement and the amount of time they spent on social media or other digital devices (Irumva, 2023). According to the study by Aziz et al., (2022), 40.5% of the variation in the efficiency of online training may be explained by the characteristics of the trainers.

Although digital technology has been used by Tanzanian instructors to facilitate instruction over the years, it is not particularly spectacular or appealing (Mwakyusa & Ngwebeya, 2022; Salema, 2023). Concerns regarding instructors' digital training facilitation competencies, as well as the usability and framework of digital infrastructure in accomplishing training goals, are significant in light of the worldwide dynamics of digital technology growth and the COVID-19 pandemic. A precise framework of knowledge and skills for using e-learning to improve training objectives is necessary because the dynamics of technology use must align with the goals of education. Therefore, this study aimed at assessing the level of knowledge and skills for the operation of e-learning possessed by instructors in higher learning institutions (HLIs in Tanzania).

The studies reviewed provide important insights into the barriers to e-learning adoption in Tanzania and other parts of Africa. However, there is a significant gap in understanding how individual perceptions, specifically

perceived usefulness and ease of use, key constructs of the Technology Acceptance Model (TAM), affect the practical adoption of e-learning tools by instructors in Tanzanian higher learning institutions. While previous studies have focused on technical challenges like internet connectivity and training, fewer have explored the psychological factors influencing the actual use of e-learning tools in the classroom. Additionally, most studies have not sufficiently considered how institutional support and infrastructure interact with instructors' perceptions and skills to affect adoption. This study aims to fill this gap by examining the TAM constructs within the Tanzanian context, focusing specifically on how instructors' perceptions influence the practical integration of e-learning technologies in Tanzanian HLIs.

3. Methodology

The study used a quantitative approach and used a cross-sectional design, which has been shown to be appropriate for estimating prevalence of a trait in a population (Creswell, 2023) . In this case, the study looked at the knowledge and skills of instructors in the use of e-learning tools in their training. The study was focused on selected higher education institutions in Tanzania, in particular the Open University of Tanzania (OUT) with its centres in Arusha, Manyara, Dodoma and Dar es Salaam, and the Institute of Accounting in Arusha (IAA) with centres in Dodoma, Babati, Dar es Salaam and Arusha. The selection is based on their experience with the hybrid mode and the digital learning process. The study found a significant gap between the knowledge of e-learning tools and the ability of instructors to use them effectively in their teaching. This gap is largely due to insufficient professional

development, inadequate infrastructure, and a lack of institutional support for e-learning adoption. Despite the growing awareness of e-learning's potential, many instructors struggle to use these technologies effectively in their classrooms, hindering the full realization of digital learning opportunities.

The study population consisted of all employed academic staff of the two selected academic institutions who are engaged in online teaching, regardless of their specialization. The two selected Institutions are estimated to have more than 583 academic staff with designations ranging from tutorial assistant to full professor, who are currently engaging in teaching and research activities in the selected higher learning institutions.

Table. 1: Study population as per selected institutions

S/No	Institution Name	Population
1	Institute of Accountancy Arusha	260
2	Open University (Dodoma, Dar es Salaam, Manyara and Arusha)	323
Total		583

A sample size of 237 academic staff was derived from an estimated population of 583 employed academic staff from the two selected higher learning institutions based on the Yamane formula of 1967.

$$n = \frac{N}{1+Ne^2} \dots\dots\dots 1$$

Where n is the sample size, N population size is the level of precision. The formula assumes that p=.05 (maximum variability). The desired confidence level is 95%, and the degree of precision/sampling error accepted is 5%. Therefore;

$$n = \frac{583}{1+583e \times 0.05^2} \dots\dots\dots 2$$

n = 237

Every element in the sample was selected by using simple random sampling, where a proportion of the population of each selected institution was equally and randomly picked from the employment records through the lottery method. The procedure considers the sampling elements to have homogeneous characteristics since all are academic staff. However, the key informants and focus group participants were purposively selected.

Table 2: Sample Size

S/No	Institution Name	Population	Sample Size
1	Institute of Accountancy Arusha	260	$\frac{260}{583} \times 237 = 106$
2	Open University	323	$\frac{323}{583} \times 237 = 131$
Total		583	237

Both primary and secondary data were collected in this study. Data were collected using a structured, self-administered questionnaire comprising both closed-ended and Likert-scale items. The primary data collected

includes socio-demographic characteristics of the respondents, specialization background, years of teaching experience, and instructors' digital operation competencies (knowledge and skills). For the case of secondary data, scholarly works indicating digital tools operations were reviewed. A total of 237 open and closed self-administered questionnaire copies for the selected academic staff were developed to cover the study objective. The content development of questionnaires was guided by the TAM framework (Davis, 1989). TAM customized five Likert scale tool with additional items developed to collect data. The pretesting of the questionnaire was carried out on at least five percent of the selected sample size. The selection of the questionnaire has several benefits, including: Questionnaires offer an efficient and cost-effective means of gathering data from a large number of participants simultaneously, a crucial advantage when faced with resource constraints (Gomm, 2008). Descriptive techniques were employed in analysing the data based on its nature and research objectives, respectively. Therefore, the employed quantitative data analysis techniques include frequencies and percentages in analyzing socio-demographic characteristics.

To ensure the instrument covers all the components and valid information, the entire process of developing the questionnaire was guided by the content validity. This type of validity was ensured through reviewing the previous studies in assessing the adequacy and accuracy of what it measures. Reliability encompasses the consistency of a research study and the

reproducibility of findings in the future. The research results that were consistently duplicated or reproduced they considered reliable. Internal reliability of items for the self-administered questionnaire was measured by Cronbach alpha (Fami 2000). The reliability of the variables was measured by the value of Cronbach's alpha (alpha) greater than 0.70. When conducting the reliability analysis, a randomization method was applied to the initials of the adjective. In this study, Cronbach's alpha was used to assess the internal consistency of the survey tool, measuring key constructs of the technology acceptance model, such as perceived utility and perceived ease of use. A Cronbach's alpha value of 0.7 or higher is generally considered to indicate acceptable reliability. A reliability analysis produced a Cronbach alpha of 0.821, indicating that the scale has a sufficient degree of internal consistency, thus confirming the reliability of the tool used to assess the instructors' acceptance of e-learning. Therefore, in this study, reliability was focused on the consistency of the answers to questions on repeated measurements, which is in line with the precision and accuracy of the tool.

4. Findings and discussions

Three socio-demographic characteristics concerning respondents who participated in the study were established. These include age, sex, and the name of the institutions. The attributes were considered to influence the adoption of e-learning with the respective operational knowledge and skills.

The findings are indicated in Table 3 below

Table 3: Sociodemographic characteristics of the respondents

Variable	Attribute	frequency	Percent
Sex	Male	160	67.5
	Female	77	32.5
Age category	Below 30	22	9.3
	30 to 39	105	44.3
	40 to 49	85	35.9
	50 to 59	23	9.7
	Above 59	2	0.8
	Name of the higher learning institution	OUT	115
	IAA	122	51.5

The findings indicate that male instructors outnumber female instructors in Tanzanian higher learning institutions, a reflection of historical gender biases in education, where girls faced barriers to access, such as early marriages and societal expectations, limiting their ability to transition to secondary and higher education. This gender disparity aligns with a study by the Tanzania Commission for Universities (2023), which also shows more male instructors than females. Regarding age, the majority of instructors are between 30 to 39 years, a group more likely to be proficient in digital technology due to growing up in the technology revolution era, while less than 10% are above 50 years, who may have limited digital skills due to their exposure to traditional face-to-face teaching. The distribution of instructors across the selected institutions is fairly even, with IAA leading in staff numbers, though the digital usability may vary based on the institutions' governance, training policies, and program offerings.

4.1 Area of Specialization

Instructors' specialization indicated that Computer science has the highest representation among the most represented fields (about 14%), suggesting that there is a considerable level of interest or presence in this area. Closely behind (about 13%) is accounting and finance, indicating its importance in the dataset. The significant representation of education (about 11%) indicates how important it is to the people polled.

Fields with a notable presence and modest interest or involvement include mathematics and statistics, business management, and economics ($\approx 6-10\%$). Though at lesser degrees, language, law, procurement, and sociology (about 4-6%) are all represented. Least Represented Fields: The following fields have lower participation rates: Engineering Science, Marketing and Public Relations, Library Studies, Environmental Science, and Banking and Finance ($\approx 2-4\%$). HR and Development Studies are the least represented (about 2%). The "Others" category (\approx

9–10%) implies a wide variety of other fields that aren't specifically included.

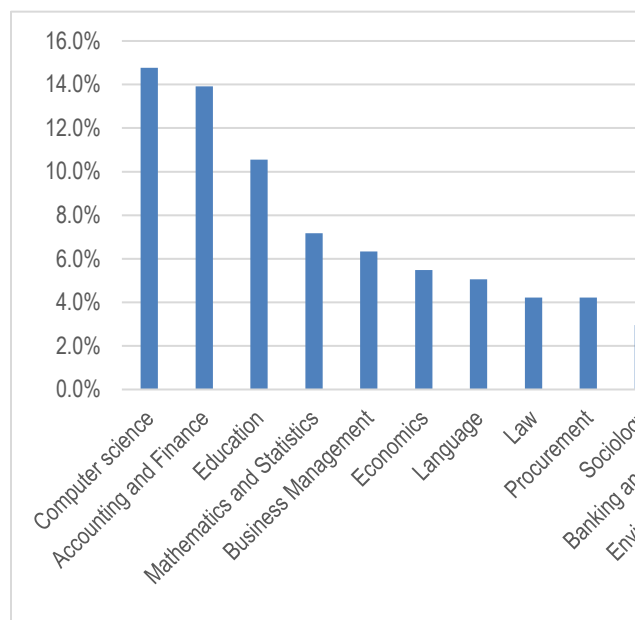


Figure1: Instructors' background specialization

4.2 Instructors possessed Operational knowledge and skills for e- learning in the selected higher learning institutions in Tanzania

The levels of knowledge and skills concerning the operation of e-learning among the instructors in selected higher learning institutions were assessed using five Likert scale that ranged from not sure to excellent. The findings in table 4 below generally indicate moderate to good level of knowledge and skills possession for the operation of e-learning with “Setting up and using laptops/computers for presentations” (4.48) reported being "Very Good" followed by Transmission tools (Email, Zimbra, Outlook, etc.) (4.23).

Table 4. Instructors possessed Operational knowledge and skills for e- learning in the selected higher learning institutions in Tanzania

Item	Not sure (%)	Moderate (%)	Good (%)	Very Good (%)	Excellent (%)	Mean
I can set up and use a Laptop/ Computer for presentations or lectures	0	3.4	5.5	30.8	60.3	4.48
I use a Learning management system such as Blackboard, Canvas, and Moodle (Text writing, PDF, Word, JPG)	1.3	6.8	13.5	35.9	42.6	4.12
I am capable of using Video conferencing software: tools like Zoom, Microsoft Teams, and Google Meet for online classes, meetings, and webinars	3.4	8.9	17.7	34.6	35.4	3.9
I am capable of using Presentation software: PowerPoint, Prezi, and Google Slides.	1.3	6.8	13.1	32.5	46.4	4.16
I am capable of using Document collaboration software: Google Docs, Microsoft Office 365, and Dropbox for creating and sharing.	3.8	10.1	20.7	32.1	33.3	3.81

Combined (text, audio, video)	8.9	15.2	25.3	26.6	24.1	3.42
I am capable of educational games and simulations: Kahoot, Quizlet, and Minecraft for engaging students and enhancing learning	17.7	19.4	21.5	25.7	15.6	3.02
I can use Special software programs, e.g., SPSS, R software, ANOVA, and social ups e.g., WhatsApp, accounting bills	8.4	17.3	25.7	27.8	20.7	3.35
I am capable of searching tools and ups Google Scholar, Firefox, and Chrome	1.3	5.1	16.9	33.3	43.5	4.13
I am capable of using Transmission tools, e.g., email, Zimbra, Outlook, etc.	0.8	6.8	10.1	32.9	49.4	4.23
I am capable online assessment and grading software: Turnitin, SARIS, ISMS, GradeCam, and odmondo for grading, assessing, and providing feedback on assessments.	3.4	8.9	17.3	34.6	35.9	3.91
I can use Education content creation software: Camtasia, Audacity, and Adobe Creative Suite for creating educational videos, Slides, podcasts, and other multimedia content.	16.9	16.9	19	31.2	16	3.13
I am capable of using Mind mapping and brainstorming software: mindmeister, google and bulb.us to visualize and organize ideas	16.5	14.3	27	27	15.2	3.1
I poseses Programming and cording skills: Scratch, python, java for teaching programming and coding.	18.6	9.3	24.1	24.5	23.6	3.25
I can use Language learning software: Duo lingo, Rosetta stone and babble for language learning and practice.	17.3	9.7	29.5	21.9	21.5	3.21
Aggregate						3.68

Key: Mean interpretation (0 - 1.4 = Not sure; 1.5 – 2.4 = Moderate; 2.5 – 3.4 = Good; 3.5 to 4.4 = Very Good ; 4.5 to 5 = Excellent)

The table presents the self-assessment of instructors in selected higher learning institutions in Tanzania regarding their ability to adopt e-learning tools and

technologies. The assessment is categorized into different digital skills and tools, with responses recorded in five proficiency levels: Not sure, Moderate, Good, Very Good, and Excellent. The mean score for each skill is also provided. Instructors demonstrate strong competency in setting up and using laptops/computers for presentations (Mean: 4.48). The use of transmission tools such as email, Zimbra, and Outlook is also well adopted (4.23). Learning management systems like Blackboard, Canvas, and Moodle are widely used (4.12), along with searching tools such as Google Scholar and Chrome (4.13). Presentation software like PowerPoint and Prezi is also well utilized (4.16).

Instructors have moderate skills in using video conferencing tools like Zoom and Microsoft Teams (3.90). Online assessment and grading software such as Turnitin and ISMS is moderately adopted (3.91). Document collaboration software like Google Docs and Office 365 also shows moderate adoption (3.81). The lowest adoption rates are observed in educational games and simulations (Kahoot, Quizlet, Minecraft) with a mean score of 3.02. Mind mapping and brainstorming tools also have a low adoption rate (3.10). Programming and coding skills (Scratch, Python, Java) are relatively weak among instructors (3.25). Education content creation software (Camtasia, Audacity, Adobe Creative Suite) has a low mean score (3.13), indicating limited proficiency.

The aggregate mean score of 3.68 suggests a moderate adoption level of e-learning tools among instructors. While foundational tools such as laptops, email, and presentation software are well integrated, there is a

notable skills gap in advanced digital tools such as educational content creation, programming, and game-based learning. This highlights the need for targeted training programs to bridge the knowledge and skills operation gap.

The findings show that the teaching staff of selected HEIs in Tanzania are moderately receptive to e-learning, with a strong competence in basic digital tools, but gaps in more advanced and interactive technologies. While teachers are proficient in basic tools such as laptops, e-mail, learning management systems (LMS) and presentation software, they are limited in advanced e-learning tools such as content creation, programming and gamification. This indicates the need for structured capacity building programmes to increase the digital skills of teachers, in particular in the areas of educational content creation, coding and game-learning. The low level of proficiency in educational games, mind mapping tools and simulation software suggests that instructors may not fully exploit student-centred, interactive and innovative learning methods. This could lead to less engaged learning experiences, which could potentially affect the motivation and learning outcomes of students. Institutions should encourage the integration of interactive tools to facilitate brainstorming.

Despite moderate adoption of online assessment tools (Turnitin, ISMS, GradeCam, etc.), their usage is not yet fully optimized. This could affect the efficiency, transparency, and effectiveness of assessments and feedback. Training on these tools would streamline grading processes, improve feedback quality, and enhance academic integrity.

The low competency in specialized software like SPSS, R, and statistical tools suggests a gap in data-driven decision-making, research capabilities, and academic writing support. Enhancing instructors' proficiency in these tools would improve research quality and analytical skills, benefiting both instructors and students.

The variation in skill levels suggests that some instructors may lack access to necessary resources, infrastructure, or institutional support to effectively integrate e-learning tools. Higher learning institutions must ensure adequate infrastructure, reliable internet connectivity, and access to digital tools to facilitate smooth e-learning adoption.

Although there has been some basic acceptance of e-learning, complete integration has not yet been attained, according to the moderate aggregate mean score (3.68). Organizations must create a strategic plan to improve digital literacy by means of professional development initiatives. Use gaming, simulations, and content production technologies to implement dynamic and captivating teaching strategies. Boost online evaluation and feedback systems to improve student assessment and Make the required infrastructure investments to guarantee a smooth rollout of e-learning.

The results show a considerable skills gap in sophisticated e-learning applications, even though instructors exhibit proficiency with fundamental digital technologies. Improving teaching effectiveness, student engagement, and overall learning experiences requires closing this gap through infrastructural investment, institutional support, and training. To guarantee a

comprehensive, technologically advanced educational system that is in line with contemporary digital.

The moderate aggregate mean score (3.68) suggests that while basic e-learning adoption is in place, full integration is yet to be achieved. Institutions should develop a strategic plan to enhance digital literacy through professional development programs, incorporate interactive and engaging teaching methods using gaming, simulations, and content creation software, strengthen online assessment and feedback mechanisms for better student evaluation, and invest in necessary infrastructure to ensure seamless e-learning implementation.

While instructors demonstrate competence in basic digital tools, the findings indicate a significant skills gap in advanced e-learning applications. Bridging this gap through training, institutional support, and infrastructure investment is essential for improving teaching quality, student engagement, and overall learning experiences. Institutions must take proactive measures to ensure a holistic, technology-driven education system that aligns with modern digital learning standards.

The findings from this study indicate that the majority of instructors in selected higher learning institutions in Tanzania possess moderate to good operational knowledge and skills in using e-learning tools, with an overall mean score of 3.68. This aligns with the Technology Acceptance Model (TAM), which emphasizes perceived ease of use as a critical determinant of an individual's willingness to adopt technology (Davis, 1989). Instructors who are already

proficient in essential digital tools such as laptops for presentations (mean = 4.48) and transmission tools like email and Zimbra (mean = 4.23) are more likely to perceive e-learning systems as user-friendly, and thus, are more open to adopting them in their teaching practices.

Furthermore, the study reveals that a majority of instructors show strong competence in using presentation software (mean = 4.16) and learning management systems (LMS) like Moodle and Canvas (mean = 4.12). These results are consistent with the work of (Angeli et al., 2022), who noted that Tanzanian instructors are increasingly engaging with LMS platforms for content delivery and classroom management, particularly in response to the shift toward digital education during and after the COVID-19 pandemic. Similarly, Almaiah & Alyoussef, (2019) reported that increased familiarity with LMS platforms often correlates with more positive attitudes toward e-learning integration, especially when instructors receive institutional support and training.

However, the minority of instructors demonstrated sufficient proficiency in more specialized and interactive e-learning tools, such as educational games and simulations (mean = 3.02), content creation software like Camtasia (mean = 3.13), mind-mapping tools (mean = 3.10), and programming skills (mean = 3.25). These findings are particularly significant because, while basic e-learning operations are being adopted, the use of tools that enhance student engagement, creativity, and higher-order thinking remains limited. According to Alenezi (2023), the ability to integrate interactive

technologies into teaching not only enriches learning but also increases learner motivation, an aspect that is underutilized when instructors lack advanced digital skills.

The minority representation in these skill areas suggests a gap between basic adoption and innovative use, where instructors are comfortable with standard tools but less confident or trained in advanced e-learning functionalities. From a theoretical standpoint, this reflects a potential barrier within TAM's construct of perceived usefulness. If instructors do not see the added value or do not feel adequately equipped to use these advanced tools, they may be less likely to integrate them into their pedagogical practice, regardless of their availability.

Moreover, the findings may point to institutional limitations, including the lack of comprehensive ICT training programs or unequal access to digital resources. The study by Lashayo et al., (2023); Boateng et al., (2016) argues, effective adoption of e-learning technologies in developing countries requires not only user willingness but also institutional readiness, which includes training, incentives, and reliable digital infrastructure. The uneven skill levels observed in this study may also reflect disparities across academic departments, where some fields (e.g., Computer Science or Business) may offer more exposure to digital tools than others.

It becomes clear that while progress has been made in building foundational digital skills among Tanzanian instructors, the journey toward full e-learning integration

is still incomplete. The majority's confidence in essential tools is encouraging and suggests a solid base for expansion. However, the minority's limited engagement with more advanced or interactive tools reveals a critical gap that must be addressed if institutions aim to transform teaching and learning through digital platforms. Without addressing this disparity, e-learning adoption may remain surface-level, serving only to digitize content rather than innovate pedagogy.

Therefore, future efforts should focus on targeted professional development programs, not only to equip instructors with technical skills but also to reshape their perceptions of the usefulness of advanced tools. Institutions can empower instructors not just to use e-learning, but to leverage it meaningfully to improve educational outcomes.

5. Conclusions

The study reveals a moderate level of e-learning adoption among instructors in selected higher learning institutions in Tanzania. While basic digital tools such as laptops, emails, learning management systems (LMS), and presentation software are widely used, there are significant gaps in the adoption of advanced e-learning technologies, including educational content creation software, programming tools, gamification, and data analysis software. These findings highlight that while instructors have foundational digital skills, there is a need for further capacity-building efforts to fully integrate e-learning into teaching and learning processes. Therefore, e-learning adoption remains uneven, with more traditional and familiar tools being well-utilized, whereas more interactive and student-centered

technologies are underused. This suggests a need for targeted interventions to enhance instructors' digital competencies, improve teaching methodologies, and maximize the benefits of technology in higher education.

6. Recommendations

The study recommends that the government, particularly through the Ministry of Education and Vocational Training, to provide regular digital training programs to improve instructors' proficiency in advanced e-learning tools, such as educational content creation software, programming languages, and gamification. It also suggests incorporating multimedia content into teaching, training on research and data analysis tools, and integrating online grading and plagiarism detection tools. Investment in digital infrastructure, digital resource centers, clear policies on e-learning adoption, and collaboration with government bodies, technology providers, and international organizations can support seamless e-learning adoption. Future studies should focus on student perspectives, e-learning adoption varies across universities, and the role of AI in e-learning.

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