

Education Innovation in Teaching and Learning among Lecturers and Students in Selected Higher Education Institutions in Dar es Salaam, Tanzania

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Abstract: Higher education is regarded as one of the most innovative subsectors. However, the adoption and implementation of educational innovations in teaching and learning within higher education institutions remain inadequate. This study investigated the utilisation of educational innovation in teaching and learning activities. It was conducted in selected higher education institutions in the Dar es Salaam region and was guided by Rogers' Diffusion of Innovation Theory (DIT). The target population comprised lecturers and second- and third-year Bachelor's degree students in Social Sciences programmes. The study employed a cross-sectional descriptive research design with a quantitative approach. Probability sampling techniques were utilised, with systematic random sampling employed to select 385 study participants. Major findings indicated a high utilisation of digital technological tools, including institutional academic management systems, course management tools, learning management systems, and mobile learning tools. Conversely, low usage was reported for assessment tools, as well as animation and simulation tools. The face-to-face learning approach was identified as the primary delivery method for teaching and learning, while blended learning

and online learning exhibited low utilisation. The study recommends the adoption of innovative teaching tools that enhance interaction and efficiency in teaching and learning activities. Additionally, it calls for the integration of new technologies for teaching and learning within higher education institutions.

Keywords: Education innovation, teaching and learning, higher learning institutions, Tanzania.

1. Introduction

Innovation in education has changed the teaching and learning processes in higher education institutions worldwide (OECD, 2021). A shift in teaching and learning is considered important for preparing students to face the challenges of the 21st century (Khahro & Javed, 2022). However, innovations in education do not always produce the desired changes in teaching and learning (Serdyukov, 2017). Consequently, the ways in which higher education institutions prepare their students for academic and professional careers are also changing (Sanchez & Vazquez, 2023). Educational innovation is expected to improve learning outcomes and the provision of quality education. Innovation in education includes changes in curriculum, new and improved pedagogies, changes in how learning is assessed, and new teaching methods (OECD, 2021). Therefore, changes in teaching methods contribute to transforming the education process (Lancrin et al., 2017).

The use of innovative methods in developing skills and knowledge contributes to improving education and fostering creativity among learners in higher education institutions (Gaunt & Treacy, 2020). In addition, educational innovation helps transform and reconstruct learning, raises critical and creative thinking, and focuses on the role of the teacher as well as teacher training (Findikoglu & Ilhan, 2016). A shift towards teaching approaches that focus on developing skills and encouraging problem-solving is emphasised. This enables students to apply knowledge in real-life experiences.

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Equally important, the service aspects of human and social interactions are highlighted when using new pedagogies and technologies (Baumann et al., 2016; Rubalcaba, 2022). Interactive learning experiences are emphasised, as they allow students to apply knowledge in real-life situations while targeting career and self-employment (Gaunt & Treacy, 2020).

The Sustainable Development Goal 4 emphasises the achievement of universal access to higher education. It also aims to expand the number of scholarships, enrolment in higher education, and the use of information and communications technology (UNESCO, 2021). Moreover, the Tanzanian Government is committed to using technology and innovation for sustainable education. This commitment is clearly outlined in the Science and Technology Policy of 2016 and the National Digital Education Strategy (URT, 2016; URT, 2025b). Likewise, the National Innovation Framework aims to ensure effective adoption, promotion, and investment in innovation for a meaningful contribution to national development (URT, 2022; URT, 2025a). This study sought to examine the technological tools and approaches used in teaching and learning delivery in higher education institutions. Therefore, this study contributes practical insights for higher education institutions to enhance technology adoption and usage in teaching and learning activities.

1.1 Problem statement

The way higher education institutions prepare their students for academic and professional pursuits is undergoing a transformation (Sanchez & Vazquez, 2023). Higher education curricula necessitate pedagogical methods that are grounded in active and dynamic approaches. Innovation and divergent thinking are vigorously encouraged, and teaching methodologies are required to enhance creativity (Liu et al., 2020). Nevertheless, although higher education is regarded as the most innovative sub-sector, its commendable level of innovation does not guarantee the effective application of such innovations (OECD, 2021).

In Tanzania, over 80 per cent of higher education institutions are employing various educational technologies in their teaching and learning processes (Mtebe et al., 2011; Mtebe & Raisamo, 2014), including Learning Management Systems (LMS) and Mobile Learning Systems (MLS) (Shemahonge & Mtebe, 2018; Mwandosya et al., 2019). Consequently, the widespread adoption of educational technologies has transformed instructional practices by facilitating flexible content delivery, communication, and access to learning resources (Mwandosya et al., 2022). However, despite the increased utilisation of educational technologies, evidence from teaching and learning within higher education institutions indicates that their utilisation is primarily focused on content delivery and communication tools (Mwandosya et al., 2022). Furthermore, delivery approaches, including blended learning and online learning, have seen limited adoption. Additionally, technologies such as assessment tools, animation, and simulation tools that offer assessment feedback, promote visualisation, practical understanding, and experiential learning remain underutilised (Sanchez & Vazquez, 2023).

The disparities in adoption imply that the potential of educational technologies to enhance learning outcomes, critical thinking, practical skills, and continuous assessment is not being fully realised. Moreover, the limited use of assessment, animation, and simulation tools may diminish opportunities for timely feedback, active engagement, and the development of higher-order thinking skills. Therefore, despite the valuable insights provided in previous studies (Shemahonge & Mtebe, 2018; Mwandosya et al., 2022), a significant gap persists in the utilisation of technologies in teaching and learning and their promotion for effective integration into pedagogical practices in higher education institutions.

1.1.1 The study aims and objectives

The study aims to assess the use of educational innovation in teaching and learning within higher education institutions in Tanzania. Specifically, the study intends to:

- Examine the use of technology in teaching and learning-related activities in higher education institutions.
- Examine the delivery approaches used for teaching and learning in higher education institutions.

The following research questions were also applied:

- How do higher education institutions use technology tools in the teaching and learning process?
- What delivery approaches are used in teaching and learning?

1.2 Conceptual framework

This study was conceptualised within the framework of Rogers' Diffusion of Innovation Theory (DIT), developed in 1962. The research utilised this theory as an interpretive lens for understanding the adoption of educational innovation in higher education institutions. Consequently, it was not operationalised as a theoretical model to be tested. Instead, the theory provides a conceptual perspective that guides the interpretation of quantitative findings and situates these findings within the extensive literature on innovation adoption. A critical aspect of adoption is the ability to perceive the idea, behaviour, or product as new or innovative.

The process of adoption varies among individuals, as some are inclined to adopt innovations earlier than others (Miller, 2015). Thus, it is imperative to understand the characteristics of the target population, as these factors can either facilitate or impede the adoption of an innovation. Rogers categorises a population into five groups: innovators, early adopters, early majority, late majority, and laggards, with the majority typically falling within the middle group. He also elucidates the concepts of compatibility and complexity, which are essential in the decision-making process regarding the adoption and utilisation of innovations (Rogers, 1995). The theory posits that an idea perceived as incompatible with traditional concepts will not be adopted unless it aligns with existing values and past experiences. In the context of this study, educational innovation is perceived as challenging to adopt and use, as it necessitates considerable effort and technical knowledge. Additionally, complexity may pose challenges for users who encounter difficulties in learning how to utilise the innovation. In higher education institutions, this reflects the degree to which educational innovations support teaching methods, curriculum requirements, and technological infrastructure. Consequently, when substantial effort is required, the adoption of the innovation may occur gradually (Rogers, 2002). Therefore, this study employed Rogers' theory to elucidate the adoption of educational innovation in teaching and learning within higher education, focusing on the concepts of compatibility and complexity, which are considered crucial for the adoption of educational innovations.

2. Literature Review

This section presents a review of the theoretical and empirical literature on the integration of educational innovation in teaching and learning within higher education institutions.

2.1 Higher education institutions and education innovation

Higher education institutions in this study refer to university institutions and middle-level tertiary institutions offering bachelor's degree programmes (TCU, 2021). Furthermore, innovation is defined as the introduction of a new or improved product or process. This concept is further delineated in the educational context, where product innovation encompasses new educational resources, instructional methods and techniques, revised curricula, and textbooks (OECD, 2021; Serdyukov, 2017). Within the scope of this study, innovation specifically pertains to instructional methods and techniques as well as the utilisation of technological tools. Moreover, educational innovation denotes the practice of incorporating the latest advancements within the educational framework,

representing a transformative change aimed at supplanting existing traditional practices to better align with the educational needs of contemporary society (Dilobarkokhon, 2019). It also means to do new things; it can be in quality or quantity. It requires three major steps: an idea, its implementation and an outcome that results from the execution of the idea and produces a change (Serdyukov, 2017).

2.2 Education innovation in teaching and learning

Digital innovation in higher education involves knowledge of key digital learning applications and a pedagogical shift to online environments, where learners access content on various devices such as desktops, laptops, tablets, and smartphones (Nermend et al., 2022; Teixeira et al., 2021). Thus, digital innovation in higher education has resulted in the transformation of various actors and dimensions, including teaching and learning, human resources, and research. The effective delivery of teaching and learning requires being informed by innovation to guide operations and data-related procedures (Katyeyudo & de Souza, 2022; Tungpantong et al., 2022).

Moreover, the OECD (2016) categorises innovation in education into four types: First, new services or products, such as new curricula, educational resources, or books; second, new processes in the delivery of services, such as the use of technology in e-learning activities; third, new approaches or activities in organisation, such as the use of ICTs to interact with stakeholders; and fourth, new marketing techniques, such as the cost for each course at a university.

According to UNESCO (2021), education innovation is: *.....a deliberate and planned act of problem – solving that aims at achieving a higher quality of students' learning, exceeding the traditional paradigm. It entails transcending academic knowledge and shifting from the students' passive learning to an idea of interactive learning that is built in everyone* (2021, p.3).

In the context of education, innovation is perceived as a novel methodological approach, pedagogical theory, teaching technique, instructional tool, and institutional structure that, when implemented, engenders significant changes in teaching and learning practices. Innovation encompasses various characteristics, including teaching methods (a service), which may necessitate new delivery methods, such as the utilisation of computers (a good) and new software to monitor students' performance and attendance (a process) (Serdyukov, 2017). Furthermore, innovation is a crucial pillar of education, involving the evolution of teaching and learning to enhance educational methodologies. Innovations in education catalyse changes within the education system and have a profound impact on the advancement of the educational framework for a more promising future. Evolution incorporates innovations such as teaching methodologies, educators, organisational support, and methodological support within the educational process (Mykhailyshyn et al., 2018; Serdyukov, 2017).

Moreover, innovation entails the execution of novel concepts, which can manifest in either quality or quantity. It necessitates three fundamental stages: the generation of an idea, its implementation, and the resultant outcomes of executing the idea to effect change (Serdyukov, 2017). Consequently, innovation aspires to foster alterations in both quantity and quality. Thus, there exist quantitative and qualitative factors influencing learning outcomes. Quantitative factors aim to enhance learning parameters and encompass the volume of skills and competencies developed, the amount of information acquired, college enrolment figures, measured student performance, class sizes, as well as cost and time efficiency. On the other hand, qualitative factors pertain to improvements in knowledge, value dispositions, character development, and job performance (Rikkerink et al., 2016; Serdyukov, 2017).

The advancement of science and technology, alongside persistent social challenges, has led to a continuous ideal of innovation suitable for teaching and learning within higher education institutions (Moreira et al., 2020). The emergence of new modalities for constructing and disseminating knowledge provides an immediate response to the demand for more convenient

teaching and learning processes (Haleem et al., 2022). Therefore, the adoption of such innovative practices in higher education institutions is indispensable.

OECD (2021) highlights the importance of educational innovation, which involves improving learning outcomes, the quality of education, and enhancing equity and equality. In addition, educational innovation has positive effects on efficiency. It also updates the educational system in response to inevitable societal and economic changes (OECD, 2016). Essentially, educational innovation promotes the democratisation of knowledge, including the promotion of inclusive educational institutions and societies (Norman-Acevedo, 2019). Furthermore, the innovation opportunities available today are effective for developing attractive higher learning, capable of promoting lifelong learning and quality assurance (Mykhailyshyn, 2018). Educational innovation fosters quality assurance through various ventures that can assess and review the quality of education. Therefore, innovation in educational institutions is ideal for promoting the efficiency and productivity desired in the 21st century (Faud et al., 2020). Higher education institutions in Tanzania need reform to accommodate such technological mediation to improve and promote a convenient teaching and learning process.

According to scholars, innovation goes hand in hand with new learning goals, activities, and pedagogies. Teachers' willingness is considered important in determining change and the adaptation of their practice. Thus, teaching and learning are regarded as cognitive and emotional processes, where students' quality of life and the teaching and learning process contribute to an increase in academic engagement (Liu et al., 2020; Haleem et al., 2022). Consequently, teachers' sharing of information and collective reflection are essential in educational innovations (Liu et al., 2020).

2.3 Teaching and learning approaches in higher education

Pedagogy is relational, and both teachers and learners are transformed through it as they learn from one another. It is argued that: *"The art, science and craft of teaching is wielded effectively by teachers who give students opportunities to explore, create and interact with the knowledge and the unknown, nurturing curiosity and interest"* (UNESCO, 2021, p. 51).

Teaching and learning approaches are emphasised for effective facilitation and the fostering of creativity and critical thinking. In this study, the teaching and learning approaches include face-to-face learning, blended learning, and online learning. Each of these approaches is explained in the subsequent sections.

2.3.1 Face-to-face learning

Face-to-face learning occurs in a classroom environment and enhances learners' presence and interaction with teachers according to the allocated timetable. It fosters social presence, interaction, and satisfaction (Bali & Liu, 2018; TCU, 2022). This mode of learning enables direct contact, immediate feedback, in-person interaction between teachers and students, and collaborative learning, which encourages cooperation and knowledge exchange among students. Furthermore, face-to-face learning provides hands-on opportunities in practical activities and physical education. It allows for direct interactions in teaching and learning and offers immediate feedback and support from teachers regarding students' academic and emotional needs. Face-to-face learning is often regarded as superior to online learning because it facilitates interaction, leading to greater learner satisfaction (Bali & Liu, 2018).

2.3.2 Blended learning

Blended learning combines face-to-face traditional classroom instruction with online learning. Some activities within a course are conducted in person, while others take place online. This approach enables students to learn through both online media and traditional face-to-face teaching (TCU, 2021). It also facilitates ideal and adaptable educational experiences by integrating conventional

education with online learning components (Su et al., 2024; Sareen & Mandal, 2025). Blended learning offers various benefits in the classroom, including improved learning outcomes, increased student commitment, and enhanced satisfaction. Additionally, it supports time management and self-regulated learning. This approach is easily adaptable for different situations and types of learning, providing flexibility. Furthermore, blended learning allows for the redesign of how courses are prepared, scheduled, and delivered in higher education through both physical and virtual instruction (Nikolopoulou & Zacharis, 2023).

2.3.3 Online learning

Online learning involves self-directed education through internet tools. This learning approach has continued to change and develop through four phases. For example, internet-driven education was in use in the 1990s. The second phase was the usage of Learning Management Systems (LMS) from 2000 to 2007. This was followed by Massive Open Online Courses (MOOCs) between 2008 and 2012. Currently, there are online programmes designed to engage students who need to develop their knowledge and skills but cannot enrol in full-time, on-campus courses. The online instruction methods have been acknowledged as effective tools for learning due to their various multimedia teaching materials, accessibility, and adaptability. They allow access to instruction and content from any location and at any time (Khanal, 2021). These methods also provide opportunities for students and facilitate knowledge dissemination. However, online learning is considered ineffective due to a lack of self-discipline, poor time management, and low motivation and anxiety among learners, which negatively affects students' academic performance (Adarkwah, 2021; Larson & Sung, 2019).

2.4 The usage of new digital technology devices in teaching and learning

Digital technologies have been used in educational activities at various levels for several decades. Technology is a key driver of innovation in higher education institutions and has transformed the teaching and learning process worldwide (OECD, 2021). For example, the use of computers, projectors, and mobile phones is becoming increasingly popular in different educational settings (UNESCO, 2021; Frei-Landau et al., 2022). Advances in Information Communication Technology continue to reshape teaching and learning. Digital technologies encourage interactive learning experiences as well as creativity among students. For instance, the use of animation and simulation in learning fosters student engagement in the teaching and learning process. It enhances learning experiences by providing sounds and visuals that capture students' attention, stimulating cognitive function and representations of learned concepts. Consequently, it helps students to understand complex ideas more easily and aids their memory as they read text and watch animations. Likewise, it improves students' concentration during the teaching and learning process (Desai, 2018). Furthermore, it allows students and teachers to collaborate with others around the world (Miller, 2017). However, it requires significant time and effort from both students and teachers in learning activities, as well as skills to create or acquire software (Miller, 2017). Thus, the digitalisation of education enables the use of various teaching strategies, techniques, and approaches to facilitate effective teaching and learning. A balance between electronic and traditional forms of education has emerged as a universal approach in modern education (Frei-Landau et al., 2022; Desai, 2018).

Therefore, exposure to and utilisation of digital innovation in higher learning institutions is emphasised to ensure effective education. Technological know-how and skills are also crucial in enhancing digital innovation. However, a lack of digital literacy, accessibility, and limited resources continues to impede the effective use of technology in teaching and learning activities (Bogers et al., 2022).

The literature review highlights the importance of educational innovation in teaching and learning processes. Various scholars demonstrate the contributions and significance of educational innovation in different teaching and learning contexts. Despite efforts and emphasis on the adoption of

educational innovation, its application in higher education institutions remains inadequate. This research aims to contribute to both theoretical and practical knowledge regarding the adoption of educational innovation in higher education institutions.

3. Methodology

This section presents the methodology that guided the study. It outlines the study area, study design, target population, sample size, sampling procedures, and data analysis. The study was conducted in two higher education institutions in the Dar es Salaam region. Dar es Salaam is one of the regions that possesses the preferred characteristics for this study, as it has a high number of higher education institutions (TCU, 2023; NACTE, 2023). A quantitative cross-sectional survey was employed, allowing for the simultaneous collection of data. The target population for this research consisted of lecturers and bachelor's degree students in Social Sciences programmes. The participation of both male and female respondents was observed. Heads of Departments and Deans were included in the study due to their key roles in supervising the implementation of teaching and learning in higher education institutions. The study aimed to recruit 385 participants, with the sample selected from the population of students and lecturers in the two higher education institutions in the Dar es Salaam region. A representative sample was calculated using Cochran's formula (Cochran, 1977).

$$no = \frac{Z^2 p(1-p)}{e^2}$$

Where:

z- Confidence level-1.96

p-Estimated proportion of the population 0.5

e- margin error ± 5

$$no = \frac{1.96^2 \cdot 0.5(1-0.5)}{0.05^2} = 384.16 \approx 385$$

The study used stratified sampling to select groups of students and teachers. Probability sampling techniques were then employed, specifically using systematic random sampling to select second and third-year bachelor's degree students in Social Sciences programmes. Additionally, random sampling was used to select lecturers from the two higher education institutions. Students and lecturers were chosen based on the considerable time they had engaged in teaching and learning activities within higher education institutions. The selection ensured equal representation by sex. The probability sampling technique reduces bias, allowing every participant an equal chance of being included in the sample (Creswell, 2018). A questionnaire survey was used to collect data on educational innovation in teaching and learning within higher education institutions. It was also utilised to gather socio-demographic data such as age, sex, and education level.

3.4 Validity and reliability checks of instruments

A pilot study was conducted prior to data collection to ensure the reliability and validity of the study. For this reason, questionnaires were pre-tested with respondents who had the same socio-demographic characteristics as the target study population. All identified problems were addressed to ensure that the tool was not ambiguous and could effectively capture the intended information from the respondents. The researchers also identified difficulties encountered by the respondents; thus, questions were edited and adjusted according to their level of understanding. The study used seven items to examine the use of technological tools in teaching and learning within higher education institutions. A five-point Likert scale was employed to assess the use of educational innovations in teaching and learning. The scale ranged from 1 (very low) to 5 (very high). Additionally, ten items were used to capture responses on learning approaches employed in teaching and learning activities. The reliability of the items was assessed using Cronbach's alpha, which was 0.81 and 0.79 for the items. A higher Cronbach's alpha is relevant as it provides a basis for making inferences (Taber, 2018).

3.5 Data analysis and ethical considerations

Quantitative data were coded and entered into a computer. The data were analysed using the Statistical Package for Social Sciences. Comparisons of the mean and standard deviation were conducted, and ANOVA was employed to analyse teaching and learning approaches. The data were interpreted and presented using frequency tables and bar charts. A descriptive summary of the information obtained from the respondents was created to derive the findings and general conclusions of the study. Moreover, the study employed the Diffusion of Innovation theory as an interpretive lens for the quantitative results following the statistical analysis. This study was registered with the Directorate of Research and Publications, and research clearance was sought from the Mwalimu Nyerere Memorial Academy Authority to conduct the study in the Dar es Salaam region. The researchers ensured confidentiality, and consent was obtained from the respondents by explaining the purpose of the study and requesting voluntary participation. The researchers ensured that the entire data collection process was conducted in a conducive environment while maintaining confidentiality.

4. Findings and Discussion

This section presents the study's findings based on the objectives and research questions that guided the investigation. It details the usage of technological tools in teaching and learning activities, followed by the delivery approaches employed in higher education. Similar themes were utilised in the discussion of the findings.

4.1 Study findings

This section presents the characteristics of the respondents, their usage of digital technological tools, and the approaches to teaching and learning delivery.

4.1.1 Characteristics of respondents

Respondents' characteristics were examined in terms of age, sex, and education level from three categories of respondents: lecturers (88), students (262), and heads of department and deans (24). Out of 385 participants, 374 respondents participated in the study, which is equivalent to a high response rate of 97.1 per cent. The findings further revealed that more than half of the respondents were students and held a bachelor's degree. Respondents aged 18–25 years and those aged 26–35 years each represented one-third of the total respondents in their respective age groups. The findings are presented in detail in Figure 1.

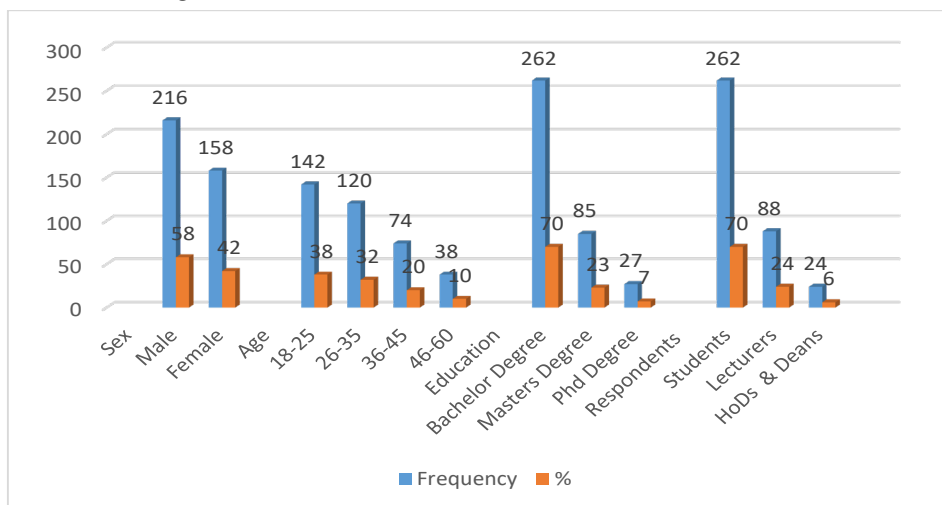


Figure 1: Characteristics of respondents (HoDs - Heads of Departments)

Findings in Figure 1 show a slight difference between the percentages of male and female respondents, with male respondents comprising 58 per cent compared to female respondents, who made up less than half at 42 per cent.

4.1.2 Usage of digital technological tools in teaching and learning in higher education institutions

The first research question aimed to establish the use of digital technological tools in teaching and learning within higher education. The findings indicated that these tools were most commonly reported as being used in teaching and learning activities at higher learning institutions. Table 1 presents the usage of technological tools as reported by lecturers, students, Heads of Department, and Deans (n=374).

Table 1: Technological tools used in teaching and learning activities

	Technological Tools	Mean	Std. Deviation	95% Confidence Interval of the Difference	
				Lower	Upper
1.	Institutions' Academic Management system	4.76	1.85	4.573	4.947
2.	Course management tools	4.52	1.94	4.323	4.717
3.	MS Office and Excel	4.47	1.06	4.363	4.577
4.	Learning management Systems	3.42	1.02	3.317	3.523
5.	Mobile learning tools	2.38	1.35	2.242	2.517
6.	Technological assessment tools	2.31	1.04	2.205	2.415
7.	Animation and simulation tools	2.23	1.72	2.056	2.404

Findings in Table 1 indicate that certain technological tools were most frequently used to manage teaching and learning activities in higher education institutions. These included the institutional academic management system (M=4.76, SD=1.8), course management tools (M=4.52, SD=1.9), and learning management systems (M=3.4, SD=1.0), as well as the use of MS Office and Excel (M=4.4, SD=1.3). Findings further show that technological assessment tools (M=2.3, SD=1.04) and animation and simulation tools (M=2.2, SD=1.7) had low levels of usage.

4.1.3 Teaching and Learning Delivery Approaches in Higher Education Institutions

The second research question required respondents to indicate the teaching and learning approaches used in the delivery of education. The findings show that more than three-quarters of the respondents (80%) reported that the face-to-face learning approach was the main delivery method for teaching and learning. Figure 2 provides details of the findings as reported by students, lecturers, Heads of Departments, and Deans (n=374).

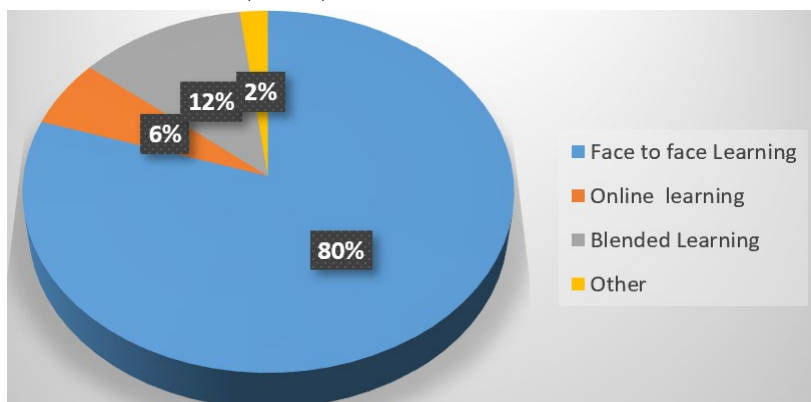


Figure 2: Teaching and learning approaches

Findings further show that the usage of blended learning and online learning was reported to be less than 15 percent each. This suggests that these teaching and learning approaches had low usage compared to the face-to-face learning approach.

4.1.4 The preferred approaches for teaching and learning

The respondents were asked to share their opinions on the most preferred approaches to teaching and learning. Findings indicate that both lecturers and students preferred a face-to-face approach combined with a digitalised learning environment. Additionally, the results revealed that students favoured online learning and blended learning approaches over traditional face-to-face methods. Table 2 provides a detailed overview of the results.

Table 2: Preferred approaches for teaching and learning

S/N	Preference of Learning Approaches	Students			Lecturers		
		Mean	SD	SEM	Mean	SD	SEM
1.	Face to Face Digital	4.2	1.2	.12	4.1	1.2	.12
2.	Blended Learning	3.7	1.3	.12	3.2	1.4	.13
3.	Online Learning	3.6	1.6	.16	3.1	1.3	.14
4.	Face to Face Traditional	3.1	1.4	.14	3.6	1.3	.12

Moreover, the findings in Table 2 indicated that some respondents preferred the traditional face-to-face approach for teaching and learning delivery, as reported by students ($M=3.1$, $SD=1.4$) and lecturers ($M=3.6$, $SD=1.3$) respectively. However, these reported levels were low compared to other teaching and learning approaches.

Furthermore, the one-way ANOVA results showed significant differences in preferences for teaching and learning approaches among lecturers and students. Table 3 presents the results in detail.

Table 3: One-way ANOVA analysis

Preference for Learning Approaches		Sum of Squares	df	Mean Square	F	Sig.
Face to Face Digital	Between Groups	19.378	1	19.378	11.447	.001
	Within Groups	360.557	372	1.693		
	Total	379.935	373			
Face to Face Traditional	Between Groups	46.624	1	46.624	25.117	.000
	Within Groups	391.667	370	1.856		
	Total	438.291	371			
Blended Learning	Between Groups	17.431	1	17.431	7.513	.007
	Within Groups	484.911	368	2.320		
	Total	502.341	369			
Online learning	Between Groups	4.590	1	4.590	1.972	.162
	Within Groups	493.396	372	2.327		
	Total	497.986	373			

The one-way ANOVA analysis in Table 3 indicates that there is a significant difference in preference between face-to-face and digital learning approaches. The variation across groups was measured by the sum of squares ($SS = 19.378$) and degrees of freedom ($df = 1$), which yields a mean square of 19.378 and an F value of 11.447, with a p value of .001, which is significant at ($p < .001$). Moreover, significant differences in preference for the face-to-face traditional approach were reported. The variation across groups was measured by the sum of squares ($SS = 46.624$) and degrees of freedom ($df = 1$), which yields a mean square of 46.624 and an F value of 25.117, with a p value of .000, which

is significant at ($p < .001$). The findings further indicate that the variation across groups for the measurement of the online learning approach was not significant ($p > 0.05$), as detailed in Table 3.

4.2 Discussion

This section presents the discussion of findings in the following subsequent sections.

4.2.1 Usage of digital technological tools in teaching and learning in higher education institutions

The findings showed adequate usage of the institution's academic management system, course management tools, and learning management systems, as well as MS Office and Excel. It can be argued that the adoption of new technologies in teaching and learning is related to and determined by education, digital skills, and readiness to embrace new changes (Feng et al., 2025). However, the findings indicate that technological assessment tools, as well as animation and simulation tools, were not used frequently. Guided by the Diffusion of Innovation Theory, the results suggest that the complexity and compatibility of technological tools affect their usage and integration in teaching and learning activities. Other studies also show that animation and simulation tools require skills to create or purchase software (Miller, 2017). This suggests that such tools require more preparation and resources, which can limit their effective usage despite their usefulness in teaching and learning.

The findings further suggest that teaching and learning activities have been integrated with digital technological tools such as computers, smart boards, projectors, MS Office, and the internet. These facilities enhance the teaching and learning process. Findings from this study call for the promotion and usage of various technological tools that can contribute to efficiency in teaching, learning, and the assessment of teaching and learning. Other scholars have shown that traditional approaches are predominantly used in higher education institutions, but these have been integrated with technological tools that help to increase efficiency in the preparation and delivery of teaching and learning approaches in the classroom environment (Barakina et al., 2021).

4.2.2 Teaching and learning delivery approaches in higher education institutions

The study provided insights into the usage of teaching and learning approaches. The findings reported a high usage of face-to-face methods for the delivery of teaching and learning in higher education institutions. Moreover, blended learning and online learning were found to have minimal usage. The findings showed that students preferred various learning approaches, including face-to-face teaching and learning methods. These approaches were mostly used, albeit with modifications through the integration of different technologies and innovations (Faud et al., 2020). Additionally, the respondents' preference for a face-to-face approach within a digitalised learning environment was reported in this study. The findings also indicated a preference for transformed face-to-face learning. These results encourage the utilisation of various digital learning environments, such as the use of computer applications and the internet (Barakina et al., 2021; Hilton et al., 2020). These findings reflect Rogers's theory, which highlights the adoption of innovations in different categories. Students in this study appeared to be ready for adoption despite shortcomings in the adoption process, as revealed by their preferences for various approaches to teaching and learning. Hence, the findings of this study demonstrated that the adoption of ideas and behaviours differs within the population (Miller, 2015).

Thus, the same applies to the adoption and usage of technologies in the teaching and learning environment, where there were late adopters of the technologies used in teaching and learning approaches. These findings, therefore, call for the provision of knowledge and skills through seminars and training on the application and usage of different technologies in teaching and learning in higher education institutions. This will encourage innovation and the use of technologies for an effective teaching and learning environment.

4.2.3 Implications for policy and practice

This study provides practical insights into the adoption of educational innovations and the use of digital technology in teaching and learning activities within higher education institutions. Based on Diffusion of Innovations Theory (DIT), the study highlights the application of educational innovations in these institutions. It raises concerns about the training needs of instructors in delivery techniques that encourage innovativeness. The findings can inform and influence policy related to education and innovation, offering valuable information to policymakers in the education sector on promoting and fostering innovation and creativity in higher education. Therefore, this study aims to contribute to both theoretical and practical knowledge regarding the adoption of educational innovations in higher education institutions. Future research should focus on addressing the inadequate use of educational innovations to optimise technology adoption and improve teaching and learning outcomes.

4.2.4 Study limitations

This study had several limitations, including its geographical scope and research design. The research was conducted exclusively in two higher learning institutions, meaning the findings may not fully represent the experiences of higher education institutions in other regions. Moreover, the study employed a cross-sectional research design, which allowed for data collection at a single point in time; therefore, it does not establish causality. Future studies should include diverse geographical locations to ensure broader applicability.

5. Conclusion and Recommendations

This study investigated the usage of educational innovation in teaching and learning activities in higher learning institutions. The findings reported high levels of usage of educational innovation to manage teaching and learning activities in these institutions. The study further revealed a persistent disconnection between technology availability and pedagogical transformation. The traditional face-to-face teaching approach continued to dominate despite significant national and institutional attention to digital learning.

Moreover, the low utilisation of blended learning, online learning, assessment tools, and animation and simulation technologies suggests that higher learning institutions have yet to fully realise the potential of digital pedagogies for enhancing student engagement. Thus, this study provides context-specific evidence to inform policy on digital transformation and practice in Tanzanian higher education institutions by identifying significant gaps in the implementation of innovative teaching and learning approaches.

Therefore, the study contributes to educational innovation in teaching and learning by providing empirical evidence on the adoption of innovative pedagogies in higher education institutions. Hence, the findings call for supportive institutional policies and a culture that encourages pedagogical innovation. Future research could explore the technological, institutional, and individual factors influencing the adoption of educational innovations and evaluate interventions designed to enhance their integration into teaching and learning.

Based on the study findings and the theory that guided the study, the following recommendations are suggested for strengthening the usage and utilisation of educational innovations and new technologies in teaching and learning in higher education institutions:

- **Monitoring and evaluation of technology integration:** The Ministry of Education, Science and Technology, through the regulatory bodies and higher education institutions, should promote the integration of innovative technologies in teaching and learning activities to ensure connectivity between technology availability and its usage in pedagogical transformation.

- Promote blended and online learning: Higher learning institutions should encourage the use of blended and online learning approaches through institutional policies and the provision of appropriate digital learning platforms to ensure adherence to regulatory bodies' requirements.
- Integrate technology usage in curriculum planning: Higher learning institutions should consider including technological tools within course design and ensure their effective usage in teaching and learning to inform continuous improvement in student engagement.

6. Declarations

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References

- Adarkwah, M. A. (2021). "I'm not against online teaching, but what about us?": ICT in Ghana post Covid-19. *Education and Information Technologies*, 26(2), 1665–1685. <https://doi.org/10.1007/s10639-020-10331-z>
- Bali, S., & Liu, M. C. (2018). Students' perceptions toward online learning and face-to-face learning courses. *Journal of Physics Conference Series*, 1108, 012094. <https://doi.org/10.1088/1742-6596/1108/1/012094>
- Barakina, E.Y., Popova, A.N., Gorokhova, S. S., & Voskovkaya, A. S. (2021). Digital technologies and artificial intelligence technologies in education. *European Journal of Contemporary Education*, 10(2), 285–296. <https://doi.org/10.13187/ejced.2021.2.285>
- Baumann, T., Kinsey, M., Swanger, A., Saganski, G., & Stepke, S. (2016). Education and innovation management: A contradiction? How to manage educational projects if innovation is crucial for success and innovation management is mostly unknown. *Procedia – Social and Behavioural Sciences*, 226, 243–251. <https://doi.org/10.1016/j.sbspro.2016.06.185>
- Bogers, M. L. A. M., Garud, R., Thomas, L. D. W., Tuertscher, P., & Yoo, Y. (2022). Digital innovation: Transforming research and practice. *Innovation: Organisation and Management*, 24(1), 4–12. <https://doi.org/10.1080/14479338.2021.2005465>
- Cochran, W.G. (1977). *Sampling techniques* (3rd ed.). John Wiley & Sons.
- Creswell, J.W. (2018). *Qualitative, quantitative, and mixed methods approach* (5th ed.). SAGE.
- Desai, A. (2018). *Animation in education*. CG Pundit. <https://www.cgpundit.com/animation-in-education/>
- Dilobarkokhon, K. (2019). Importance of modern innovation in education. *European Journal of Research and Reflection in Educational Sciences*, 7(12), 659–661. <https://www.idpublication.org>
- Faud, D., Musa, K., & Yusof, H. (2020). Innovation in education. *Journal of Education Research and Indigenous Studies*, 2(1). <http://www.jerisjournal.com>
- Feng, J., Yu, B., Tan, W. H., Dai, Z., & Li, Z. (2025). Key factors influencing educational technology adoption in higher education: A systematic review. *PLOS Digital Health*, 4(4), e0000764. <https://doi.org/10.1371/journal.pdig.0000764>
- Findikoglu, F., & İlhan, D. (2016). Realisation of a desired future: Innovation in education. *Universal Journal of Educational Research*, 4(11), 2574–2580. <http://doi.org/10.13189/ujer.2016.041110>
- Frei-Landau, R., Munich-Rozanov, Y., & Avidov-Ungar, O. (2022). Using Rogers' diffusion of innovation theory to conceptualise the mobile-learning adoption process in teacher education in

- the COVID-19 era. *Education Information Technology*, 27(9), 12811–12838. <https://doi.org/10.1007/s10639-022-11148-8>
- Gaunt, H., & Treacy, D. J. (2020). Ensemble practices in the arts: A reflective matrix to enhance teamwork and collaborative learning in higher education. *Arts and Humanities in Higher Education*, 19(4), 419–444. <https://doi.org/10.1177/1474022219885791>
- Haleem, A., Javaid, M., Qadri, M. S., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3, 275–285.
- Hilton, R., Moos, C., & Barnes, C. (2020). A comparative analysis of students' perceptions of learning in online versus traditional courses. *e-Journal of Business Education and Scholarship of Teaching*, 14(3), 2–11.
- Khahro, S. H., & Javed, Y. (2022). Key challenges in 21st-century learning: A way forward towards sustainable higher educational institutions. *Sustainability*, 14, 16080. <https://doi.org/10.3390/su142316080>
- Khanal, R. (2021). Crisis pedagogy: Student perceptions of pedagogical transition amidst the COVID-19. *Pedagogical Research*, 6(2), em0094. <https://doi.org/10.29333/pr/10826>
- Lancrin, S., Jacotin, J., Urgel, S., Kar, S., & González-Sancho, C. (2017). *Measuring innovation in education: A journey to the future*. OECD Publishing.
- Larson, D. K., & Sung, C.-H. (2019). Comparing student performance: Online versus blended versus face-to-face. *Online Learning*, 13(1), 31–42. <https://doi.org/10.24059/olj.v13i1.1675>
- Liu, H. Y., Wang, I. T., Chen, N. H., & Chao, C. Y. (2020). Effect of creativity training on teaching for creativity for nursing faculty in Taiwan: A quasi-experimental study. *Nurse Education Today*, 85, 1–7. <https://doi.org/10.1016/j.nedt.2019.104231>
- Moreira, C., Abdulzaid, J., Elisando, R., & Melgar, F. (2020). Educational innovation: Perspectives of teachers and students at the Universidad Nacional De Rio Cuarto. <https://doi.org/10.15765/pnrm.v14i26.1480>
- Mtebe, J. S., Dachi, H., & Raphael, C. (2011). Integrating ICT into teaching and learning at the University of Dar es Salaam. *Special Issue: Distance Education for Empowerment and Development in Africa*, 32(2), 289–294. <https://doi.org/10.1080/01587919.2011.584854>
- Mtebe, J. S., & Raisamo, R. (2014). Investigating perceived barriers to the use of open educational resources in higher education in Tanzania. *International Review of Research in Open and Distance Learning*, 15(2), 43–65.
- Mwandosya, G. I., Suero Montero, C., & Mbise, E. R. (2019). Co-designing a mobile education tool for innovative teaching and learning at the College of Business Education in Tanzania. *The Turkish Online Journal of Educational Technology*, 18(3), 10–24.
- Miller, R. L. (2015). Rogers' innovation diffusion theory (1962, 1995). In R. L. Miller (Ed.), *Information seeking behaviour and technology adoption: Theories and trends* (pp. 261–274). IGI Global.
- Miller, K. (2017). The benefits of using animation in the education system. *Life in a House*. <https://www.lifeinahouse.net/the-benefits-of-using-animation-in-the-education-system/>
- Mwandosya, G. I., Suero Montero, C., & Mbise, E. R. (2022). Co-evaluating a mobile education tool artifact in Tanzania higher education institutions: Teachers' and students' perspectives on usability and user experiences. *International Journal of Education and Development Using Information and Communication Technology*, 18(2), 7–27.
- Mykhailyshyn, H., Kondur, O., & Serman, L. (2018). Innovation of education and educational innovations in conditions of modern higher education institutions. *Journal of Vasyl Stefanyk Precarpathian National University*, 5(1), 9–16.
- NACTE. (2023). *Registered and accredited institutions*. <https://www.nactvet.go.tz/registered-institutions>
- Nikolopoulou, K., & Zacharis, G. (2023). Blended learning in a higher education context:

- Exploring university students' learning behaviour. *Education Sciences*, 13(5), 514. <https://doi.org/10.3390/educsci13050514>
- Norman-Acevedo, E. (2019). New languages for virtual learning, tools for learning scenarios. *Revista Panorama*, 13(24), 5-7.
- OECD. (2016). *Innovating education and educating for innovation: The power of digital technologies and skills*. OECD Publishing. <http://dx.doi.org/10.1787/9789264265097-en>
- OECD. (2021). *Measuring innovation in education*. OECD. Rikkerink, M., Verbeeten, N., Somons, R.J., & Ritzen, H. (2016). A new model of education innovation: Exploring the nexus of organisational learning, distributed leadership, and digital technologies. *Journal of Educational Change*, 17(2), 223-249.
- Rubalcaba, L. (2022). Understanding innovation in education: A service co-production perspective. *Economies*, 10(5), 96. <http://doi.org/10.3390/economies10050096>
- Sanchez, J. S., & Vazquez, D. J. (2023). Innovative educational process in higher education: A systematic review. *Resista Innova Education*, 5(1), 23-37.
- Sareen, S., & Mandal, S. (2025). Understanding blended learning at the intersection of policy discourse and academic discussions. *Journal of Further and Higher Education*, 49(1), 72-87. <https://doi.org/10.1080/0309877X.2024.2433569>
- Serdyukov, P. (2017). Innovation in education: What works, what doesn't, and what to do about it? *Journal of Educational Research in Innovative Teaching and Learning*, 10(1), 4-33. <https://doi.org/10.1108/JRIT-10-2016-007>
- Shemahonge, R., & Mtebe, J. S. (2018). Using a mobile application to support students in blended distance courses: A case of Mzumbe University in Tanzania. *International Journal of Education and Development Using Information and Communication Technology*, 14(3), 167-182.
- Su, F., Zou, D., Wang, L., & Kohnke, L. (2024). Student engagement and teaching presence in blended learning and emergency remote teaching. *Journal of Computers in Education*, 11(2), 445-470. <https://doi.org/10.1007/s40692-023-00263-1>
- Taber, K. S. (2018). Research instruments in science education. *Research in Science Education*, 48(6), 1273-1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Tanzania Commission of Universities. (2021). *VITALSTATS on university education in Tanzania 2020*. Dar es Salaam: Ministry of Education, Science and Technology.
- Tanzania Commission of Universities. (2022). *Guidelines for online and blended delivery modes of courses for university institutions in Tanzania*. Dar es Salaam: Ministry of Education, Science and Technology.
- Tanzania Commission of Universities. (2023). *List of university institutions*. TCU.
- Teixeira, A. F., Gonçalves, M. J. A., & Taylor, M. de L. M. (2021). How higher education institutions are driving digital transformation: A case study. *Education Sciences*, 11(10), Article 636. <https://doi.org/10.3390/educsci11100636>
- UNESCO. (2021). *Reimagining our futures together: A new social contract for education*. UNESCO Publishing.
- The United Republic of Tanzania. (2014). *Education and training policy*. URT.
- The United Republic of Tanzania. (2016). *The national ICT policy*. Ministry of Education, Science and Technology.
- The United Republic of Tanzania. (2022). *National innovation framework*. Ministry of Education, Science and Technology.
- The United Republic of Tanzania. (2025a). *Tanzania development vision 2050 (DIRA 2050)*. National Planning Commission.
- The United Republic of Tanzania. (2025b). *National digital education strategy 2024/25-2029/2030*. MOEST.

Tungpantong, C., Nilsook, P., & Wannapiroon, P. (2022). Factors influencing digital transformation adoption among higher education institutions during digital disruption. *Higher Education Studies*, 12(2), 9. <https://doi.org/10.5539/hes.v12n2p9>

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