The adoption of e-learning as a remote teaching and learning methodology in Tanzanian higher education institutions: Academic staff attitudes and main challenges

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ABSTRACT

This paper examines the implementation of e-learning as a remote pedagogical approach in Tanzanian higher education institutions and evaluates their readiness to adopt it as a comprehensive educational strategy. Various academic institutions are implementing a comprehensive e-learning system for instruction and education. The survey aimed to assess academics' willingness to embrace e-learning. The investigation assessed readiness by examining the study's objectives, which focused on academic staff's satisfaction with the shift and the challenges they faced during the adoption process. The Technology Acceptable Model guided the research. The research employed a mixed-methods case study, integrating qualitative and quantitative methods. While the research used purposive sampling, 260 respondents participated. Quantitative and qualitative data were collected concurrently, processed in SPSS and Excel independently, and the results were integrated into the study's summary and discussion. The study revealed that the academic staff at Tanzanian universities were prepared to adopt e-learning as a pedagogical approach. The study identified infrastructure limitations, such as network service providers and ongoing outages, that hinder access to electricity. Full-scale E-learning was once deemed to be unsuitable for teaching and learning. This study shows TU can overcome e-learning's barriers to adoption and implementation. Research showed the school is ready for e-learning. Though unrelated to the study, this technology's infrastructure worried me. The report suggests that TU accelerate the adoption of e-learning as a full teaching and learning approach. All colleges can roll out. The study's findings affect the institution's strategic teams, requiring improved controls for remote student evaluation during e-learning exams. Finally, university administration may use this study to inspire academics and improve technology-enhanced teaching and learning.

Keywords: E-Learning, E-Learning Challenges, Technology Acceptance Model, Teaching and Learning

I. INTRODUCTION

Technology and digital resources have transformed life. Technology has improved teaching and learning. Online or virtual learning allows students to learn at home using the internet and other technology. E-learning allows for personalized study at your own pace and in your preferred learning style (Mikić et al., 2025). After COVID-19, E-learning is used to describe the complete teaching and learning process. E-learning has made education more flexible and personalized. E-learning encompasses online communication, not just teaching and learning. E-learning is important in other fields besides academia. E-learning teaches personnel in Healthcare, Banking, Business, Corporate, etc., through Learning Management Systems (LMS) and exercises. E-learning enables peer participation and greater control over content reception and response (Chen et al., 2020; Elavarasan & Pugazhendhi, 2020; García et al., 2019).

Tanzanians and others were unprepared for the 2019 Coronavirus pandemic (Mhlanga & Moloi, 2020). Government agencies, policymakers, corporate leaders, and religious leaders were surprised. The epidemic struck suddenly, thus most institutions implemented interim measures to mitigate its health hazards (Chen et al., 2020). Most higher education institutions have begun reshaping their teaching and learning techniques to include technology-based E-learning, while the new methods were mostly classroom-based (Sugand et al., 2021). Given the compliance requirement to halt classroom operations, these institutions had to accelerate the development of a full-fledged E-learning system for teaching and learning.

Like many countries, Tanzania's risk-aversion strategies were improvised and affected by alert levels (Kollamparambil & Oyenubi, 2021). Alert levels determined national disaster intervention restrictions (Kollamparambil & Oyenubi, 2021). The alarm levels are 1-5. Tanzania quickly implemented "E-learning as a contingency measure" (Cidral et al., 2018). A contingency plan is a course of action, program, or strategy created by policymakers to help an organization or institution address a major issue. Tanzania Universities (TU) had to move quickly to maintain learning and teaching during the COVID-19 pandemic, like most universities worldwide. The most robust educational system for distance learning is e-learning. Most institutions were locked down due to COVID-19 (Alsoud & Harasis, 2021).

In poor nations such as Indonesia, Lesotho, and Jordan, e-learning has replaced traditional educational methods (Abdullah et al., 2017). Since the TU has adopted E-learning as an alternative to traditional ways, this study was inspired. Whether TU professors would support this project was the question. Computer technology skills and user attitudes are the two main factors affecting an institution's E-learning preparedness (Cidral et al., 2018). Effective training helps identify hazards associated with such actions. If so, the institution can create risk-aversion techniques.

Sugand et al., (2021) recommends respecting intrinsic and extrinsic educational principles in teaching and learning. Easily understand lecturers' or academics' approach to delivering the subject matter; pose minimal challenges to academics; positively impact career advancement and, to some extent, economic status; and include teaching and learning strategies with clear plans to tackle and deal with introductory phase hiccups. Most writers recommend e-learning for remote learning during the COVID-19 pandemic. The COVID-19 lockdown made Tanzania Universities (TU) prefer E-learning for remote study.

Due to technological issues, several academics were hesitant to completely utilize online E-learning. A lack of passion for this initiative harmed the University and hindered student progress. This study investigates why TU professors dislike E-learning. Thus, the study answered:

1.1 Statement of the Problem

The deployment of E-learning at TU revealed several university and national difficulties. Lack of technology skills, conventional learning culture, and a serious lack of technological infrastructure in most of the country stood out. E-learning resources and infrastructure are still scarce in Tanzania, a developing nation. Tanzanians are slow to adopt E-learning (Mhlanga & Moloi, 2020). E-learning at TU used little technology. The teaching strategy comprised traditional classroom contact between academic staff and students, along with some technology. Due to technological issues, several academics were hesitant to completely utilize online E-learning. A lack of passion for this initiative harmed the University and hindered student progress. This study investigates why TU professors dislike E-learning.

1.2 Research Questions

i. What is the level of satisfaction among TU academic staff concerning E-learning?
ii. What were the primary problems faced by TU academic staff in E-learning?

II. LITERATURE REVIEW

2.1 Theoretical Review

Grant and Osanloo (2016) state that every study is based on a Theoretical Framework. The study's premise, problem statement, significance, and objectives/questions are linked. Most importantly, material examination, research procedures, and analysis require a proper Theoretical Framework (Heding et al., 2020). To make a significant, well-reasoned contribution to the discipline, Heding et al. (2020) say research must be based on scientific principles. A scientific notion can guide the investigation and assess the evidence for the dependent and independent variables. Human cognitive restrictions make it hard to see the thread that connects theory and practice (Ullah et al., 2020). This framework is suitable for integration. This study comprises four pillars based on its goals and questions:

First, to evaluate TU academic staff attitudes on the Covid-19 transition from blended to full-fledged E-learning; Second, to identify the barriers to adopting E-learning as a full teaching and learning technique; Third, to examine how E-learning influences professors' topic delivery to students; and fourth, to offer solutions to expedite remote learning adoption during the COVID-19 pandemic. E-learning has changed education, and the reviewed material identifies it as a valuable tool for tertiary institutions to achieve their strategic goals of teaching, research, and service. E-learning has helped academics and professors grow at the institutional and personal levels (Terras & Ramsey, 2015). Advances in information technology have made this educational delivery method suitable for remote and E-learning. This has made online teaching require pedagogical and technical skills, which many teachers and students are learning (Mohammed & Kassem, 2020). Whether individual or collective, E-learning presents issues for academics throughout colleges and universities. Sugand et al., (2021) divides these issues into three categories:

Personal challenges, which reflect an individual's internal traits, character, and habits; attitudinal inhibitors, which are mostly driven by internal character variables, such as people's attitudes and perspectives on technology and E-learning. For instance, Tanzanians burned 5G towers due to their views. Contextual inhibitors include external factors such as a lack of ICT support, organizational structures that are difficult to change, and infrastructural enablers such as internet availability and speed.

According to Cerezo et al. (2017), research questions and objectives provide a theoretical framework for scientifically evaluating, conducting, and reporting the study. The optimum research methodology is determined by the same theoretical framework, according to Cerezo et al. (2017). Thus, the Technology Acceptance Model (Greyling, 2018) and two principles of the Diffusion of Innovation Theory were examined. Section 2.1 discusses The Theory of Reasoned Action (Alryalat et al., 2020) and The Theory of Planned Behaviour (Alhumaid, 2020).

2.1.1 Technology Acceptance Model

The Technology Acceptance Model (Greyling, 2018) is recommended for studying people's attitudes toward change, especially in technology-related processes. Regarding this study's research questions or objectives: Academic staff happiness: New technology affects academic staff happiness. Most of this is driven by perceived intrinsic and extrinsic benefits. Problems with E-learning: Technology-based optimists and pessimists' innovative attitudes affect the obstacles. Pessimism and optimism affect how people weigh difficulties and triumphs (Yadav et al., 2021). Learning's impact on academic staff: Perceived utility and experiences with new technology affect feelings and predicted outcomes. People expect change after deep experiences. E-learning benefits academics who use technology to create and deliver lectures and assign online tasks to students (Errida & Lotfi, 2021). E-learning adoption: Motivation theories drive the acceptance of new techniques. It suggests low academic motivation and satisfaction (Ismowati et al., 2021). Academic attitudes regarding E-learning are derived from this theory.

2.1.2 The Theory of Reasoned Action

Levels of satisfaction are determined by people's attitudes towards the kind of change that is being introduced into the work environment. This means that institutions undergoing technological improvements or in the process of migrating to technology-based methods must ensure that their Human Resource Management practices have been elevated to enhance people's readiness to accept the change (Errida & Lotfi, 2021); Challenges with the E-learning methodology, since these are the reciprocals of people's attitudes, the enhancement of people's capabilities will result in less challenges (Errida & Lotfi, 2021). Impact of E-learning on academic staff, Antecedents such as previous exposure determines the severity of impact on individuals. Institutions that have a poor record in handling technological changes will experience a negative impact with regard to every change instigated (Alryalat et al. 2020); and Adoption of E-learning: Behavioral controls determine the speed of adoption. This normally takes up a lot of time as every time a change is introduced, institutions must be engaged in restructuring processes (Errida & Lotfi, 2021). Academic attitudes regarding E-learning are derived from this theory.

2.1.3 Theory of Planned Behavior

Beliefs about the likely consequences influence satisfaction levels. Leaving people's perceptions to dominate the environment is likely to dampen the good results intended by certain actions. Employees' level of satisfaction will be hampered severely by such unwarranted behavior (Errida & Lotfi, 2021). Challenges with an E-learning methodology, this is a normative behavior towards the outcomes as expected by the pioneers of the change; Impact of E-learning on academic staff, perceptions about the factors that may facilitate or impede performance of the new process or change. Resistance or flexibility to change determines the impact of change on the people's way of doing their jobs. Adoption of E-learning can be achieved if people are given sufficient control on the change, which is time-consuming. This suggests that for every process or methodology change, the institution must engage all their staff members in the change management process. However, this not always practical (Huang et al., 2022). Academic attitudes regarding E-learning are derived from this notion.

2.1.4 Model Comparisons

As shown in Table 1 below, this section compares the theories discussed above to shed more light on the issue at hand.

Table 1

Model Comparisons

Research Question	TRA	TAM	TPB
Academic staff level Of satisfaction of satisfaction	This is more determined by people's attitudes	People's attitudes towards the new technology determine their level of satisfaction	Beliefs about the likely consequences influence satisfaction levels
Challenges with the E-learning methodology	These are reciprocals of people's attitudes	Technology-based orientation and how people feel About innovation (optimists and pessimists) plays an important role in the prevalence of challenges	Normative behaviour towards the outcomes as expectations of the change instigators
Impact of E-learning on Academic Staffs	Antecedents such as previous exposure determine the severity of impact on individuals	Experiences and perceived usefulness of the change brought about by the new technology influences both feelings about the change	Perceptions of the factors that may facilitate or impede performance of the new process or change
Adoption of E-learning	Behavioural controls determine the speed of adoption	Motivation theories help speed up people's willingness to accept modern methods of doing things	Can be achieved if people are given sufficient control of the change, which is time-consuming

2.1.5 Relevance of these Theories to the Study

Comparatively profiling the three theories shows that they apply to this study for the following reasons: *They all address the study's problem statement; They all share the study's objectives' variances; and finally, they all focus on technology, the study's sticking point.* TAM provides a solid blueprint for the study. In line with the rationale, aim, and problem statement, the framework can guide the study to ensure that both the concept and purpose are not botched (Varpio et al., 2020).

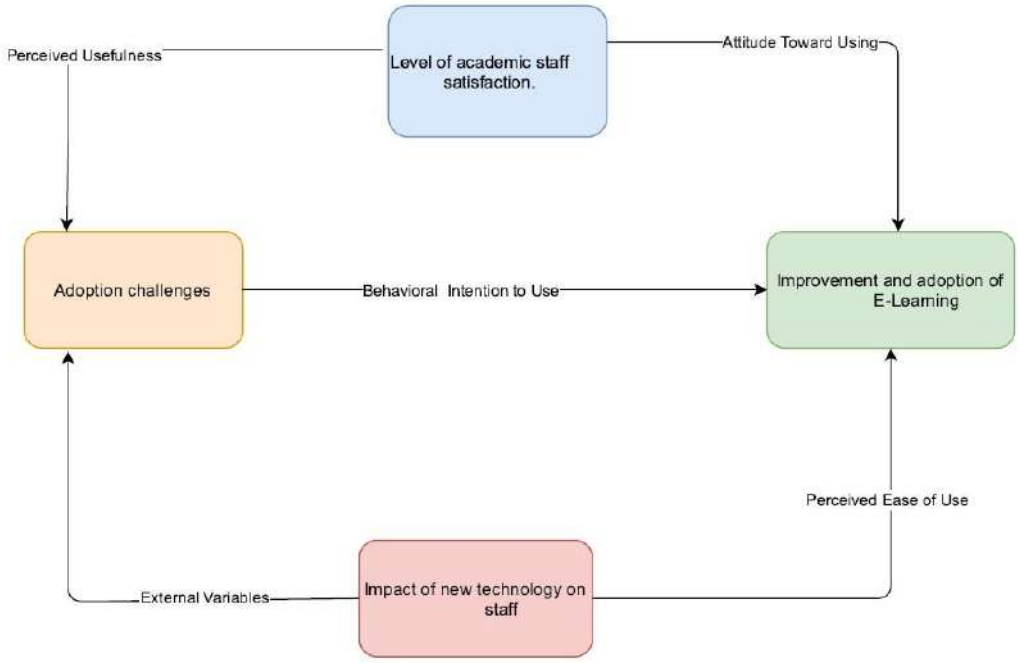

Figure 1

Structured Equation Model

2.2 Empirical Review

E-learning involves online classes. This encompasses all online tech-based education. Technology moves quickly, so children and adults must adapt. E-learning—web-based, online, and virtual classroom. E-learning imparts teaching through ICT (Krouska et al., 2024; Mikić et al., 2025).

2.2.1 How Does E-Learning Work?

E-learning is a broad term that encompasses any electronic medium used to learn. E-learning works by providing educational content over electronic media or digital platforms, as detailed in Table 2 below.

Table 2

How E-learning Works?

How E-learning Works	Details	Citation(s)
Online Database	Online learning platforms store student data in databases. This trains students to gain knowledge systematically. Basic e-learning uses knowledge databases to explain and guide every aspect.	Al-Fraihat, et al. (2017) Alam, & Parvin (2021) Jeyaraj (2020)
Asynchronous Learning	E-learning provides productive study sessions using asynchronous learning.	Ali & Arshad (2018). Arrosagaray, et al.(2019) Cerezo, et al. (2017)
Synchronous Learning	Students participate in live, synchronous e-learning classes with real-time teachers. This strategy emphasizes real-time learning.	Chen, et al. (2021) García-Peñalvo (2020) Jeyaraj (2020)
Online Support and Feedback	Online support is essential for e-learning success. Students learn technology and its technical elements with proper support.	Chen, et al. (2020) Elavarasan& Pugazhendhi (2020). García, et al. (2019). García-Peñalvo (2020)

2.2.2 Types of E-learning

E-learning involves online classes. This encompasses all online tech-based education. Technology moves quickly, so children and adults must adapt. E-learning—web-based, online, and virtual classroom. E-learning imparts teaching through ICT (Krouska et al., 2024; Mikić et al., 2025).

Table 3

Types of E-Learning

E-learning Type	Details	Citation
Adapted Learning	Data-driven adaptive learning employs technology to customize material. Digital resources keep children's class data and enable flexible, tailored teaching in adapted learning.	Gnaur, et al. (2020) Hair, et al (2019)
Mobile Learning	Mobile learning, which lets students study on their phones, is popular. Mobile learning (m-learning) is easier because most software and learning resources are mobile-friendly.	Hill, et al. (2020) Hossain (2021) Hsiao, et al. (2016)
Gamification	Gamification teaching pupils using games is fun. Interactive e-learning using gamification offers students digital badges or certificates for academic performance.	Huang & Chueh (2022) Jeyaraj (2020) Huang(2024)
Microlearning	E-learning methods like microlearning break complex concepts into smaller, more manageable chunks. This strategy helps pupils understand complex ideas in smaller bits. Microlearning helps kids absorb complex ideas in small parts.	Ivanović, et al (2018) Jeyaraj (2020) Karkar et al. (2020)
Blended Learning	Blended e-learning combines online and offline learning. Blended learning is sometimes called hybrid or mixed. This strategy uses in-person and online classes.	Jeyaraj (2020) Núñez-Canal, et al. (2022)
Synchronous E-learning	Synchronous e-learning involves real-time education. Students use e-learning platforms to communicate with teachers and peers in synchronous learning.	Li, et al (2021) Lockee (2021) Mustafa, et al. (2020)
Asynchronous E-learning	Asynchronous e-learning lets students study at their own pace. Asynchronous learning lacks live interaction. Asynchronous learners can use CD-ROMs, video networks, intranets, and Internet resources.	Loeb (2020) Amiti (2020) Milićević, et al. (2021) Zakir & Hidayat, 2018)
Web-based Learning	Web-based learning uses the internet and software to deliver educational content. This lets students learn any idea using web-based virtual learning platforms.	Li & Liang (2020) Zakir & Hidayat, 2018) McAllister, et al. (2022).

2.2.3 Benefits of E-Learning

Online education fosters creativity and socialization more than traditional learning. E-learning improves teaching and assessment for students and teachers. Table 4 summarizes e-learning benefits.

Table 4

Benefits of E-Learning

Benefit	Details	Citation(s)
Provides Flexibility	Students study at their own pace and in their own way. Educational flexibility lets people study and learns at their own pace and in their own comfort, and promotes inclusive education where all students may learn.	Turan et al. (2022) Dev et al. (2024)
Personalised Education	e-learning is tailored learning. Because students have diverse learning styles and capacities, it provides tailored content, allows students to study independently while interacting one-on-one.	Shieh and Hsieh (2021
Promotes Global Collaboration	Enables students communicate remotely. Collaboration helps students connect through online group projects, discussion boards, exercises, experiments, and projects.	Rasheed et al. (2020).
Reduce Cost	cheaper than traditional schooling; reduces transportation, hotel, library, and other costs. Enables students to study at home without having to travel.	Pakdaman et al (2019)
Equal Accessibility	All can easily obtain a high-quality education online. Students can learn from home on digital platforms regardless of problems or location.	Šorgo, Ploj Virtič & Dolenc (2023)
Real Time Feedback	Students receive rapid performance feedback. Formative evaluation technology helps teachers measure their skills and provide immediate feedback.	Terras & Ramsay (2015) Whitaker et al. (2016)
Enhance Students Engagement	Students are engaged in dynamic, entertaining e-learning through videos, games, animations, music, and simulations.	Staneviciene & Žekienė (2025 Šorgo, Ploj Virtič & Dolenc (2023)

2.2.4 E-Learning Challenges Facing Academics

E-learning may help both institutions and students, but some claim that neither will (Lizcano & Arroyave, 2020). Ivanović et al (2018)) listed disturbing challenges as: poor internet connectivity, connectivity problems; Lack of remote academic access for students; Poor residential conditions (e.g., restrictive workspace); Few online teaching and learning materials; Lack of video conferencing, editing, and online assessment ICT skills; and low confidence in IT helpdesk professionals' support skills.

2.2.5 Attitude toward E-Learning

Attitude guides people's thoughts, feelings, and actions toward a psychological object (Girish et al., 2022) and explains behavior (Baber, 2021). Being positive or negative toward a person, object, condition, or program is termed attitude. Technology use is also attitude-based. User technology acceptance depends on e-learning attitudes. The technology acceptance model considers a user's attitude toward using a system and the perceived utility of the system (Girish et al., 2022).

Tech usage intention, affected by tech attitude, best predicts system use. Punnoose (2012) discovered that tech-savvy teachers liked e-learning. Punnoose (2012) found that gender, computer experience, self-efficacy, and drive influenced the favorable e-learning attitudes of female university students. They discovered that computer experience predicted self-efficacy and e-learning motivation. Baber (2021) studied university students' expectations regarding the efficacy and acceptability of e-learning. Students enjoyed using technology for teaching, studying, and research. Whitaker et al. (2016) discovered that university students preferred e-learning since it was easy to use and useful for academic work. Multimedia-based education improved secondary school students' learning attitudes, according to Zakir and Hidayat (2018). They found that multimedia-based training changed students' learning styles and attitudes. Universities globally use student-centered teaching to foster lifelong learning, innovation, and adaptation in their graduates (Zakir & Hidayat, 2018).

Individual traits affect education and training (Zakir & Hidayat, 2018). Attitude and learning style determine e-learning success (Zakir & Hidayat, 2018). Understanding students' learning styles helps teachers adapt lessons. Knowing students' attributes helps instructors construct effective lessons and activities. The COVID-19 epidemic has improved e-learning and online education. Preservice teachers will face these circumstances. They must integrate and adapt to technology. Preservice teachers' learning styles and attitudes about various technologies must be presented and studied to determine if they are connected. This research will aid e-learning course designers, practitioners, and researchers. There is limited research on preservice teachers' learning styles and e-learning attitudes. Academic studies should focus

on e-learning characteristics as remote or blended education may continue due to COVID-19. Thus, this study studied preservice learning styles.

III. METHODOLOGY

3.1 Research Design

A qualitative-quantitative case study was provided. The quantitative and qualitative data were gathered simultaneously and evaluated individually in SPSS and NVivo (Harrison et al., 2020). Some mixed-methods studies combined qualitative and quantitative data (Collis & Hussey, 2013). Mixed-methods research simplifies problem-solving with qualitative and quantitative methods. Mixed-methods was chosen for these reasons. The study challenges the idea that colleges can boost E-learning during COVID-19. Case study goals shaped its description and interpretation. In addition to biographical information, the questionnaire measures satisfaction and impact. These goals need quantitative and qualitative data. The other two goals evaluate TU academics' biggest challenges. We want to lessen academics' E-learning discontent. Qualitatively study academic opinions. Academic satisfaction trumps E-learning in the descriptive study. Quantitative data helps. Academic perspectives and experiences will be assessed using qualitative data (Sutton & Austin, 2015).

3.2 The Study Population

The study examined all academics at the institution involved in teaching and learning at all levels in Tanzania. Divided the study into Agriculture, Engineering and Science, Health Sciences, Humanities, and Law and Management Studies colleges. The study targeted all four colleges' Lecturers, Senior Lecturers, and Professors. Study participants numbered 1,221. Refer to Table 5.

Table 5

Number of Academic Staff by College

College	Prof	Senior	Lecturer	Total
Agriculture, Engineering & Science	125	101	124	350
Health Sciences	70	45	167	282
Humanities	99	69	220	388
Law & Management Studies	42	56	103	201
Total	**336**	**271**	**614.00**	**1221**

Involving all 1221 academics would provide unnecessary data, making the project excessively difficult. It was easier to work with fewer professors to ensure population representation. Duquia et al. (2017) suggest that the research sample must keep all target population characteristics to be representative. Thus, retaining such traits greatly improves the dependability of outcomes (Rose & Johnson, 2020). Zhao and Grafström (2020) suggest that considering all qualities of auxiliary variables is another significant factor in sample representativeness.

3.3 The Sampling Method

Superfluous data from all 1221 academics would make the study too difficult. Working with a smaller number of academics was more practicable to achieve population representation. Duquia et al. (2017) suggest that the research sample must exhibit all target population characteristics to be representative. Therefore, retaining such traits greatly improves the reliability of findings. Zhao and Grafström (2020) suggest that accounting for all qualities of auxiliary variables is another key requirement for sample representativeness. Auxiliary variables improve the estimation of sample formation (Grafström & Schelin, 2014).

3.4 The Size of the Sample

As detailed below, this study used the National Education Association (Neagu) formula, the most efficient method for determining sample size to achieve fair population representation (Toyon, 2021).

$S=X^2NP\ (1-P) \div d^2(N-1)+X^2P(1-P)$, *where: S= Required sample*

X^2*=Table value of chi-square for 1 degree of freedom at the desired confidence level*

N= Population size

P=Population portion (assumed to be 0.50, since this would provide the maximum sample size

D=Degree of accuracy as a proportion (0.05).

When calculating NEA, consider the sample size relative to the population size. As the population grows, the sample size decreases and remains above 380. The population size of this study was 1221, and the table and formula calculated 280 as the sample size. Following stratified random sampling:

Table 6

Population and Sample Size by College

STRATA	Population	Sample
Agriculture, Engineering & Science	350	80
Health Sciences	282	65
Humanities	201	46
Law & Management Studies	388	89
TOTAL	**1221**	**280**

3.5 Data Collection

This study used a closed- and open-ended questionnaire. The interviews also included biographical and open-ended inquiries.

3.6 Data Analysis

The qualitative and quantitative data were analyzed individually in NVivo and SPSS. The results were discussed after merging. A protected file stores respondent surveys for easy access. Online data were easily imported into Microsoft SQL and coded according to the study instrument objectives. The following shows data analysis.

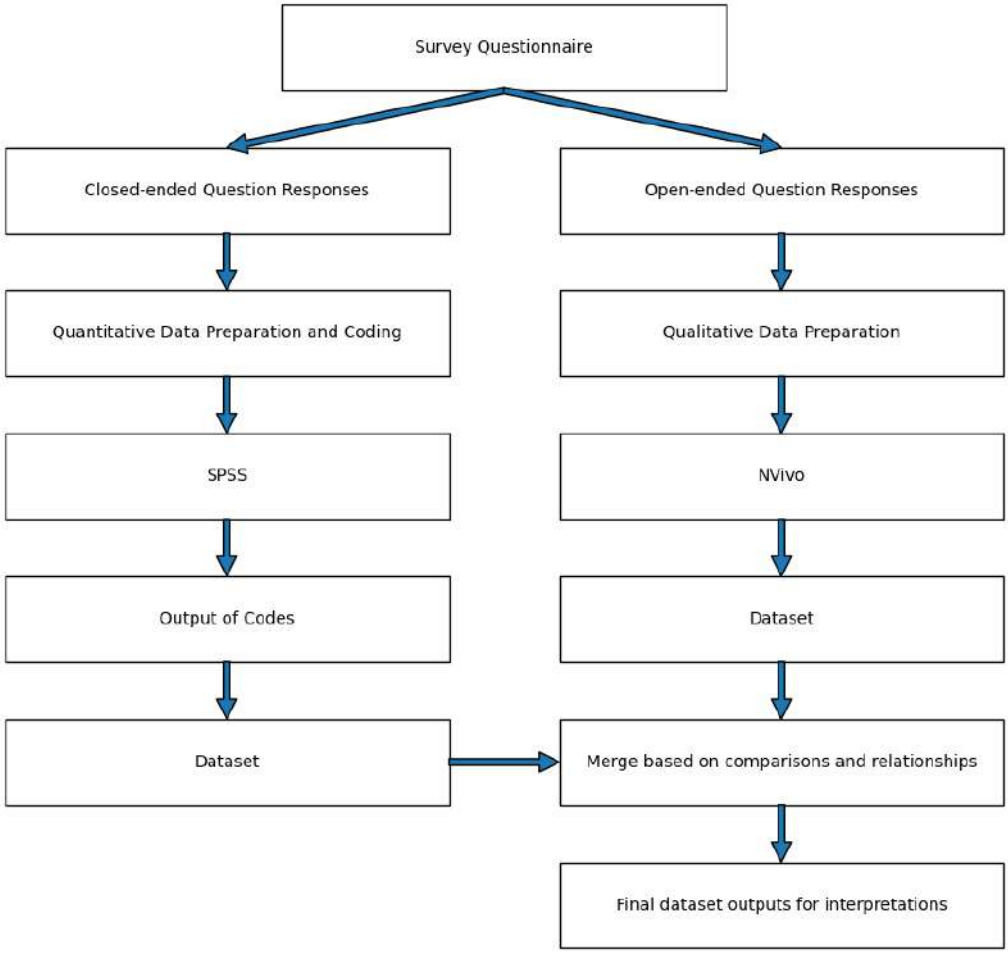

Figure 1

Data Analysis Process

SPSS analyzed coded data. Data was presented in tables and graphs. These participant data graphs were ready for discussion. Further validity results will be investigated in the next section. Analyzing qualitative data with NVivo Word clouds and Clusters. Respondents' common answers generate word clouds and clusters. Larger words are more important in responses, while smaller words are less relevant in results. Words are ranked from most to least important.

IV. FINDING & DISCUSSION

4.1 Research Questions versus Themes

For Section B (quantitative research), each theme consisted of four statements coded "SQ001 to SQ004", which made up a total of eight statements.

Table 6

Research Questions Versus Themes

RESEARCH QUESTION	THEME
1. What are the levels of satisfaction of Academic staff regarding E-learning during covid 19?	Attitudes of academic staff towards E- learning
2. What were the main challenges in E- learning experienced by academic staff during Covid-19?	E-learning technology challenges faced by academics during the adoption of E-learning

4.2 Sample Characteristics

This section summarizes respondents' bios and jobs. The overall distribution by gender, age, qualifications, race, residence, campus, and home language is below.

4.2.1 Gender

Figure 2 shows that 48% of the answers were male and 52% female. This means more women than men participated.

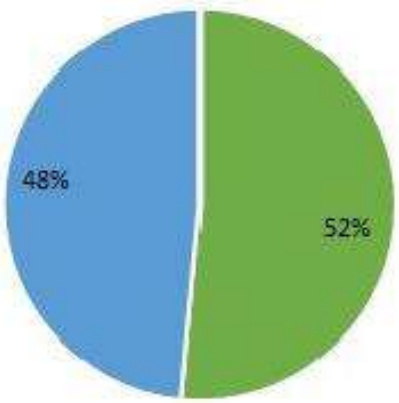

Figure 2

Sample Characteristics by Gender

4.2.2 Age

Figure 3 shows that 7.89% of the 266 participants were 21–30 years old, 28.95% were 31–40, 54.51% were 41–69, and 8.65% were 41–60.

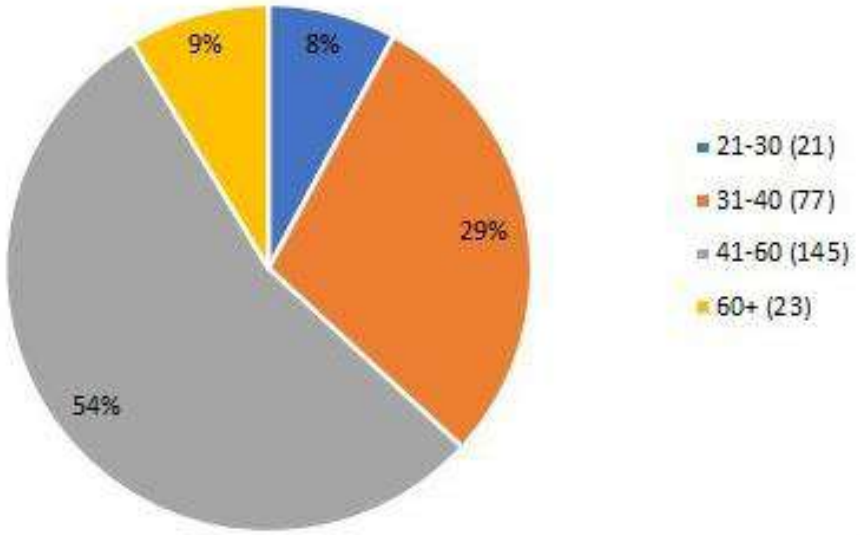

Figure 3
Sample Characteristics by Age

4.2.3 Qualifications

Figure 4 shows that 266 participants had 2.63% junior degrees, 2.26% honours degrees, 29.70% Master's degrees, 63.91% PhDs, and 1.50% post-graduate diplomas. Results show that the school is flooded with doctoral-holding scholars.

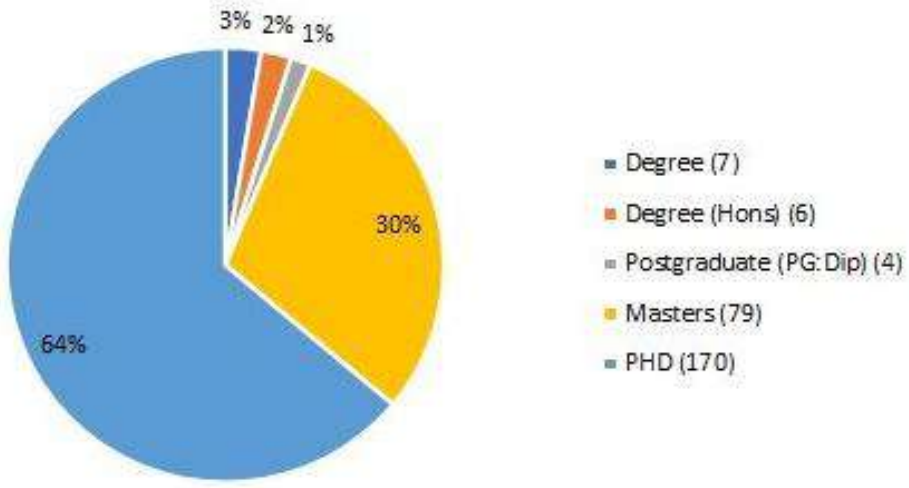

Figure 4
Sample Characteristics by Qualifications

4.2.4 Race

The sample comprised four major racial groupings, as shown in Figure 5. Foreign scholars who did not fit into African, Coloured, Indian, or White were placed in the fifth group, “other”. Africans made up 40.23 percent, Coloureds 4.89 percent, Indians 21.80 %, Whites 29.70 %, and ‘other’ 3.38 %. The data show that African-born academics dominate this institution.

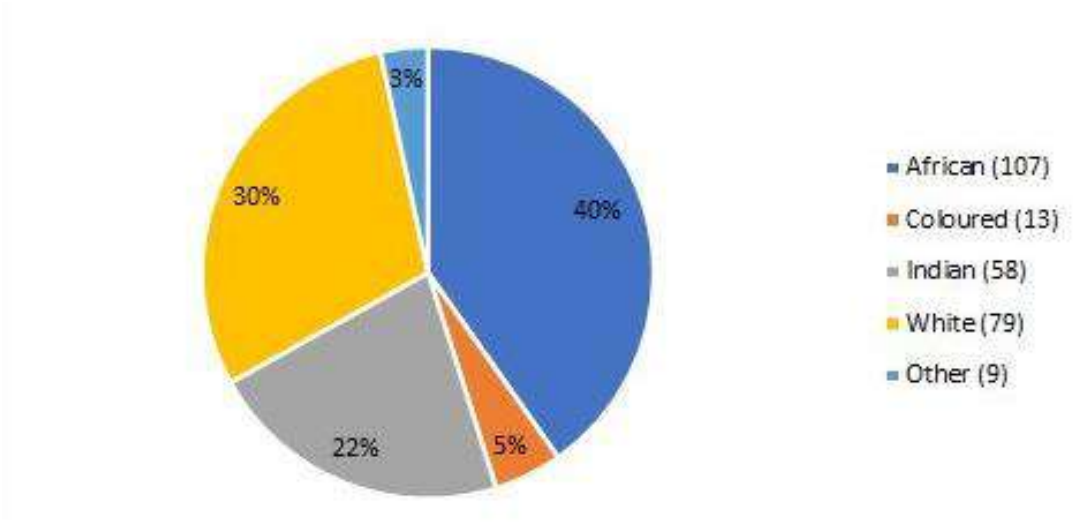

Figure 5
Sample Characteristics by Race

4.2.5 Academics' Positions

Figure 6 shows that respondents were lecturers, senior lecturers, and professors, with "other" representing all other categories. Lecturers made up 54.89%, Senior lecturers 22.56%, Professors 18.05%, and 'other' 4.51%. In this institution, lecturers make up the majority of the academic staff.

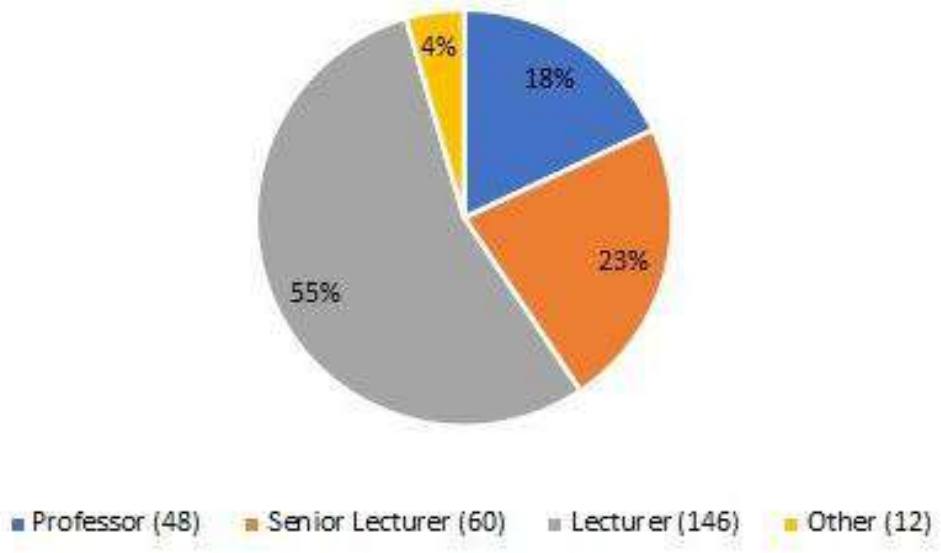

Figure 6
Sample Characteristics by Academics' Positions

4.2.6 Class Taught

The results showed that 27.82% of respondents were first-year undergraduate lecturers, 19.17% post-first-year undergraduates, 23.68% honours degree lecturers, 12.03% Masters' degree/supervisors' lecturers, 1,13% PhD supervisors, and 16,17% 'other'.

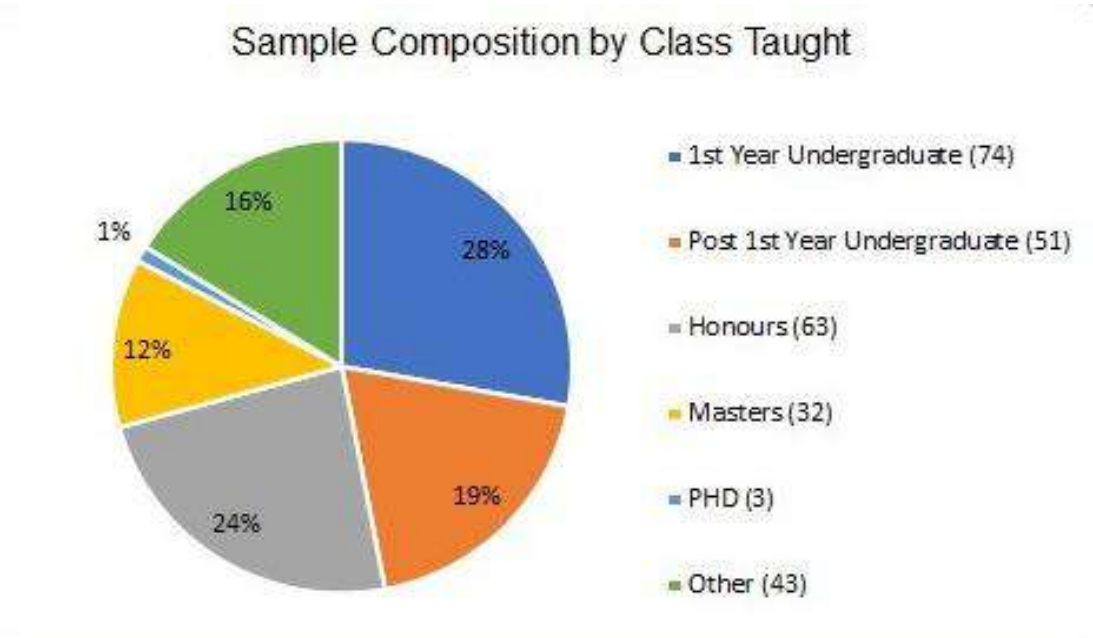

Figure 7
Sample Characteristics by Class Taught

4.2.7 E-Learning Experience

Figure 8 shows that 52.26% of lecturers had 1 to 5 years of experience, 35.34% had 6 to 10 years, 8.65% had 11 to 15 years, 2.26% had 16 to 20 years, and 1.50% had 20 years or more. This question examined academic instructors' experiences with electronic teaching. The data show the majority have 5 years or less experience.

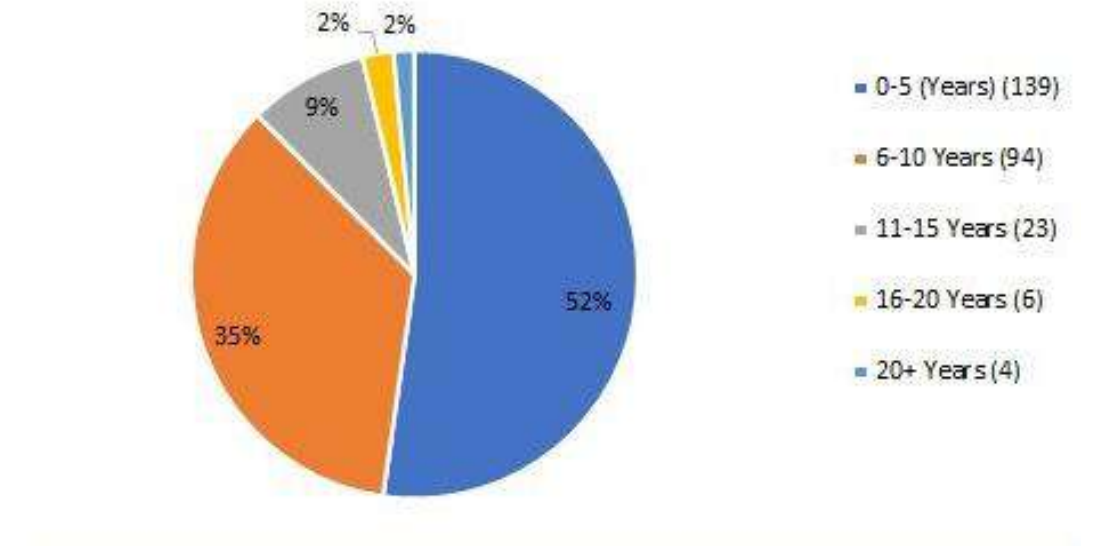

Figure 8
Sample Characteristics by E-Learning Experience

4.3 Attitudes Towards E-learning (SQ001 to SQ004)

Regarding the theme assessing academic staff attitudes regarding E-learning, the following was observed:

SQ001: *I have applied E-learning in my teaching method*

Response analysis: 46% agreed, 36% strongly agreed, 9% disagreed, 5% were unsure, 3% strongly disagreed, and 1% had no response. The sample characteristics in Figure 9 show that 48% of academics had more than 5 years of E-learning experience. E-learning technology experience ranges from 1 to 5 years for 52% of academics. With brief instruction, academics may master E-learning technology, according to García-Peñalvo (2020). The sample characteristics "E-learning Experience" and "attitude" are correlated.

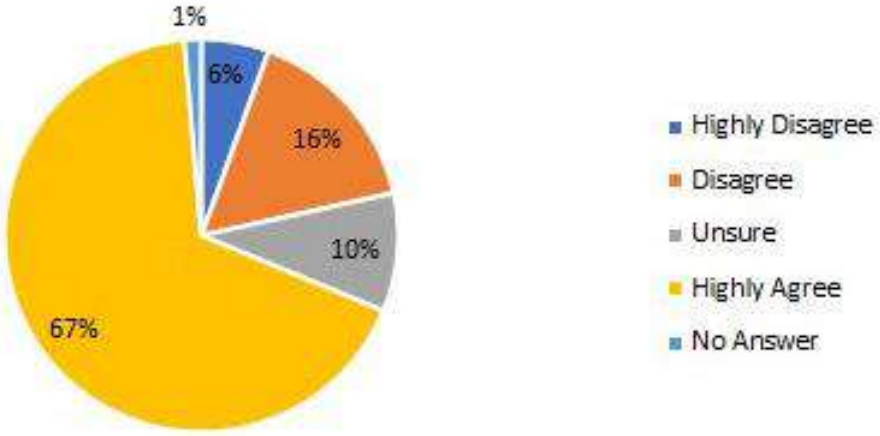

Figure 9
Attitudes towards E-Learning: Q1

SQ002: I have sufficient skills as required by E-learning technology

Response analysis: 56% agreed, 15% strongly agreed, 14% disagreed, 10% were undecided, 4% strongly disagreed, and 1% had no response. The response pattern shows a link between the sample feature "E-learning experience" and the theme "attitude."

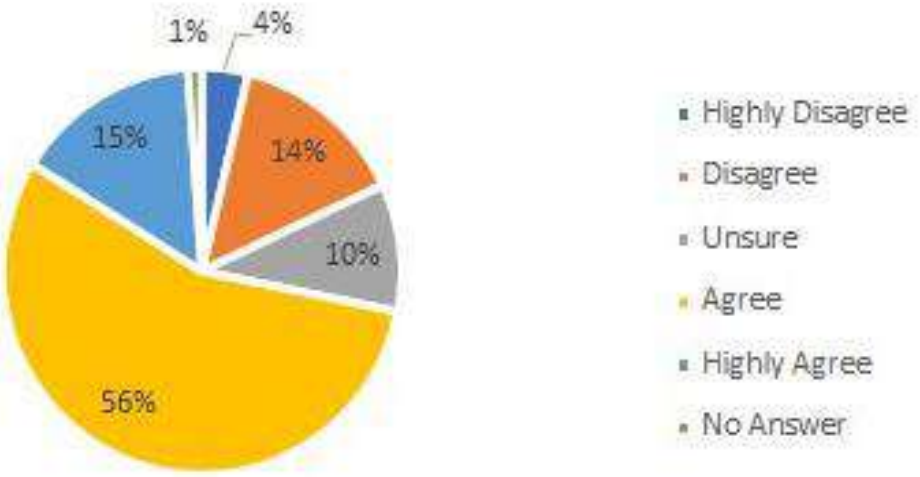

Figure 10
Attitudes towards E-Learning: Q2

SQ003: *I am confident that E-learning will work with minimum glitches*

Response analysis: 53% agreed, 17% were unsure, 15% agreed, 10% strongly agreed, 5% strongly disagreed, and 1% offered no answer. The responses show that academics like E-learning. Academic attitudes are strongly correlated with the sample attribute "E-learning experience".

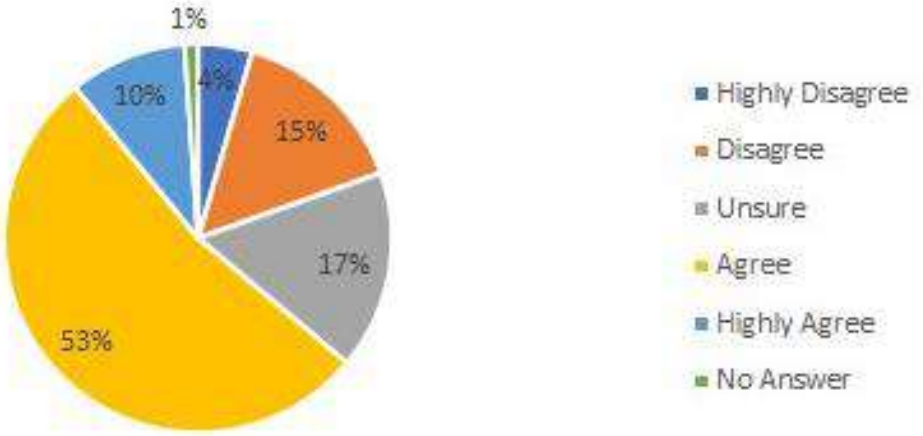

Figure 11: *Attitudes toward E-learning: Q3*

SQ004: *E-learning is a long-overdue system of teaching and learning at TU*

Response analysis: 48% agreed, 30% strongly agreed, 11% disagreed, 7% were unsure, 3% strongly disagreed, and 1% did not respond. The replies suggest a link between "E-learning experience" and "attitude". Academic experience is strongly correlated with E-learning attitude. TU academics have a favorable attitude toward E-learning due to their positive experience.

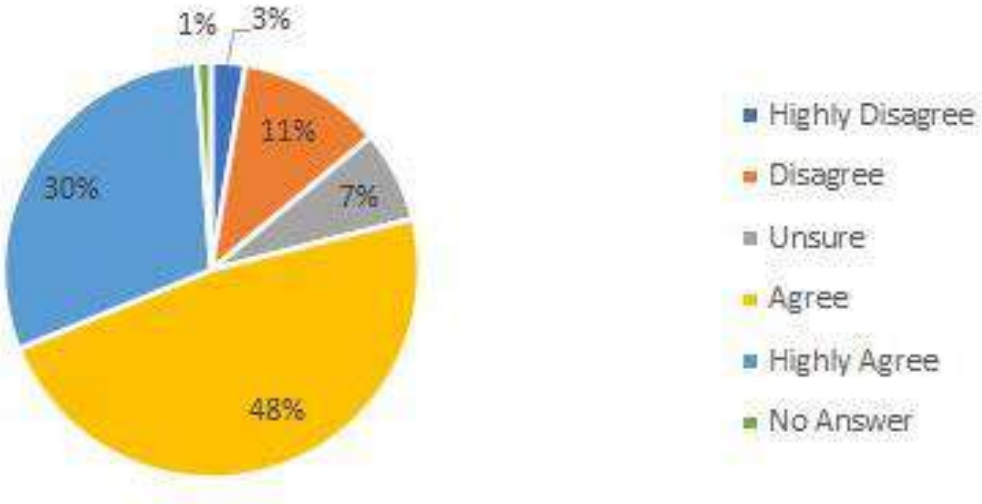

Figure 12
Attitudes towards E-Learning: Q4

4.4 E-Learning Technology Challenges Faced by Academic Staff (SQ005 to SQ008)

There were four statements probing this theme, and the following was observed:

SQ005: *TU IT system is user-friendly*

Response analysis: 50% agreed, 20% disagreed, 14% were unsure, 10% highly agreed, 6% highly disagreed, and 1% did not respond. College characteristics show that 54% of academics are from Law, Management Studies, Agriculture, Engineering, and Science. These two colleges employ ICT extensively since they provide computer-based courses. Thus, responses show computer proficiency and little IT issues with TU.

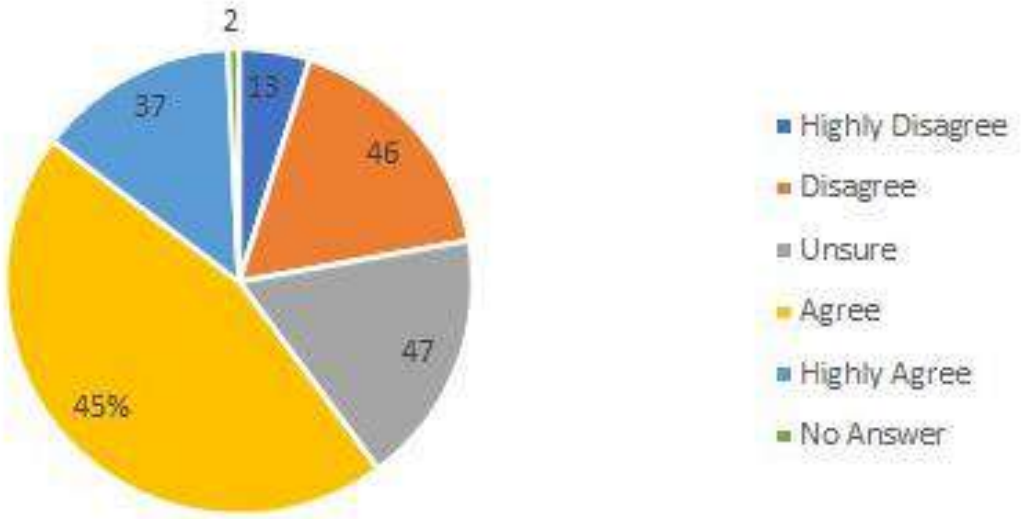

Figure 13
E-Learning Technology Challenges: Q1

SQ006: *TU IT help desk is always available in case of technological glitches*

Response analysis: 45% agreed, 18% was undecided, 17% disagreed, 14% highly agreed, 5% highly disagreed, and 1% did not respond. Most responses concurred. Most academic personnel (87%) live in urban regions, which have higher network connections than rural places. Thus, academics may easily communicate with helpdesk staff. Thus, the academic location affects the availability of technological help desks. Urbanites have fewer ICT issues than ruralites.

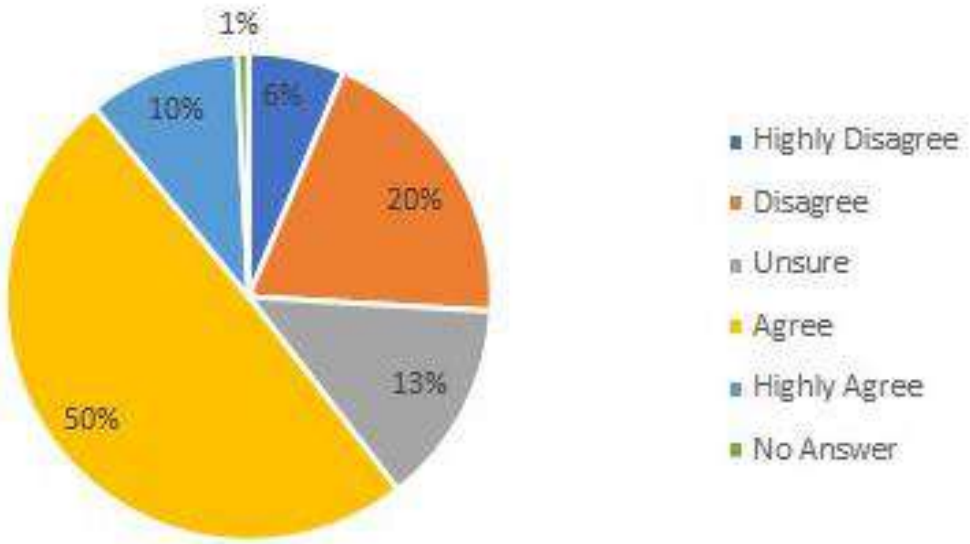

Figure 14
E-Learning Technology Challenges: Q2

SQ007: *Tanzania Universities' IT software supports the E-learning technology requirements*

Response analysis: 52% agreed, 18% disagreed, 14% were unsure, 12% strongly agreed, and 1% did not respond. Most academics think that TU IT software helps E-learning due to its easy helpdesk access and E-learning experience.

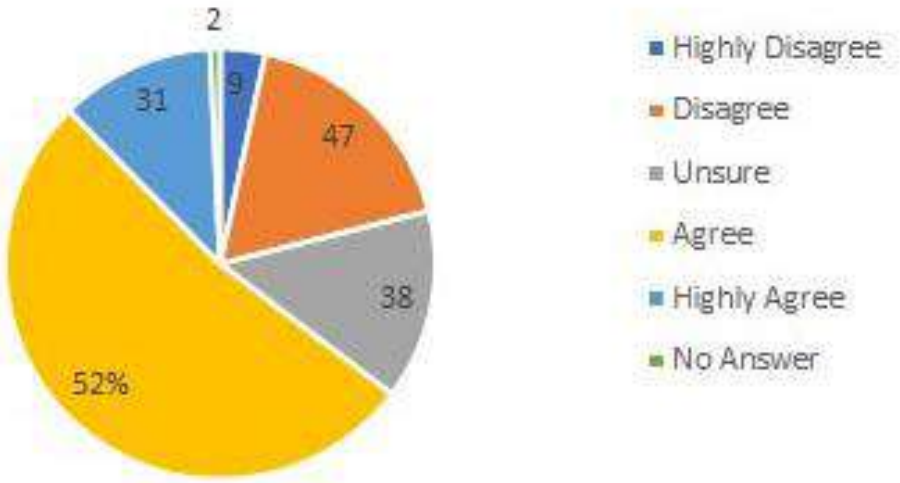

Figure 15
E-Learning Technology Challenges: Q3

SQ008: *TU offers sufficient data bundles for the smooth running of the remote classes*

Response analysis: 43% agreed, 20% disagreed, 16% were unsure, 10% strongly agreed, 10% strongly disagreed, and 1% did not respond. Results show 53% of academics are satisfied with TU data packages. The responses to the technological challenges statement imply that TU's E-learning deployment is unlikely to be difficult.

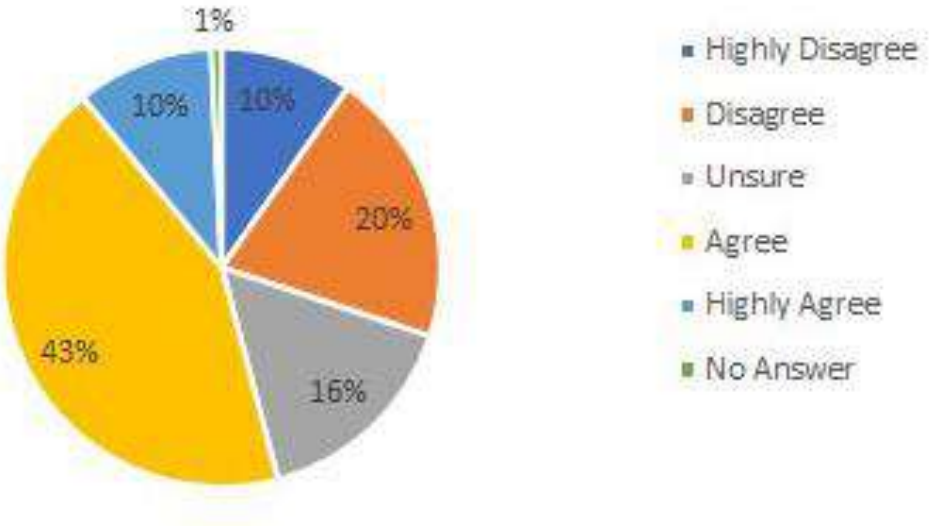

Figure 16
E-Learning Technology Challenges: Q8

4.5 Qualitative Data

This segment collected qualitative data using eight open-ended questions. The format was the same as closed-ended questions. Four topics were used with two questions each. Questions were coded Q1–Q8:

Table 7

Themes and Coding of Open-ended Questions

THEMES	QUESTIONS
	Q1: Explain your personal experiences with E- learning?
	Q2: What can you do to motivate other academics to adopt E-learning?
E-learning technology challenges	Q3: What are your IT systems challenges that make you think E-learning will be hard to adopt? Q4: How can the TU IT systems be improved to be more efficient and user-friendly?

Scientific data analysis was done using NVivo software to produce a "Word-cloud" showcasing respondents' most frequently used terms. The boldest word is the most common, and as the word size increases, its importance decreases. As an example:

Theme 1: Attitudes towards E-learning – in Q1, the "Word-cloud" depicts the significance of the words as below:

These most important terms are then compared to the responses to determine their perspectives and sentiments. Only the top four terms were analyzed. The number of times respondents used these terms is shown in Table 8.

Table 8

Word Count in Each Open-Ended Question

WORD-COUNT ANALYSIS							
Q1		**Q2**		**Q3**		**Q4**	
WORD	**RATE**	**WORD**	**RATE**	**WORD**	**RATE**	**WORD**	**RATE**
Learning	159	Learning	130	learning	124	System	94
Experience	107	Academics	96	students	70	User	85
Time	64	Encourage	56	connectivity	50	friendly	50
Teaching	56	Colleagues	52	support	42	teaching	21
Q5		**Q6**		**Q7**		**Q8**	
WORD	**RATE**	**WORD**	**RATE**	**WORD**	**RATE**	**WORD**	**RATE**
learning	139	Group	124	Learning	46	Gain	111
Quality	94	Work	124	knowledge	42	Financial	102
students	66	Students	111	Academics	33	Saving	60
Improve	56	impact	63	research	32	work	46

Q1: Explain your personal experiences with E-learning – The most used word was "learning", followed by "experience", then "time", and fourthly "teaching".

From the data, these words were extracted as responses:

Learning: "Learning" was the most used word in Q1. Below is an extract of responses from the relevant data collected

Table 9

Word "Learning" Extract fron Qn1

Learning **Resp. #** **Full response Quoted**
17 I've practiced versions of e-teaching and learning for almost a decade. The transition from the blended approach to the virtual approach was reasonably straightforward
100 Personally, I have a lot of E-learning experience, but I must say that COVID-19 has reintroduced E-learning, and the uptake now is much better than it was years ago. I think E-learning is finally going to take over in the education sector
175 E-learning is great, and I like the blended learning approach, but it requires me to be very organised and to have the entire semester's plan laid out. There is also a drastic increase in the time spent on administration with E-learning.
204 I have good experience with e-learning, and enjoying it

E-learning can enrich their teaching and learning, according to responses. The strategy boosts academics' concentration on organizing and delivering daily lectures while demanding students to learn equally. Experience: experience was the second most used word in Q1, and responses have been extracted as follows:

Table 10
Word "Experience" Extract fron Qn1

Resp. #	Full response Quoted
4	I have good experience with e-learning. I have about 7 years' worth of experience.
117	I have extensive E-learning experience, and I am very excited about the adoption of E-learning at TU. This would certainly improve the quality of content delivery and management
205	I have good experience with e-learning. It has taught me a lot, and I can conduct my lectures with ease and confidence.
257	I have extensive experience in e-learning. I believe it's a technology that has been ignored in Tanzania for far too long, until recently, when COVID-19 hit us.

Most respondents report a mixed experience of teaching and learning in E-learning within academia. TU has used a hybrid approach for some time. Academics have prepared for the long-awaited rollout; thus, responses are telling. *Time* was the third-most-used word in Q1. Responses extracted from the data collected are as follows:

Table 11
Word "Time" Extract from Qn1

Resp. #	TIME Full response Quoted
57	It took a bit of time to learn the best practices for teaching certain sections, but I am now confident in adopting e-learning.
77	It was challenging at first, but with time and support, I got more and more confident
89	I'm happy with how it's been going since the initial lockdown. I'm comfortable with this medium, and I haven't had to adapt to it. It is less stressful than conventional methods and saves time and money on a daily basis.
134	I enjoy teaching tremendously both in the classroom and online. E-learning offers a number of ways to engage students individually, which is not always easy in large classrooms of 200+. This does require a lot of time, planning, skills, and engagement

Time is vital in E-learning, according to responses. Allow for the learning curve. Time saved applying E-learning is better than time wasted on the learning curve. Additionally, respondents save more time on travel, which helps them with personal problems. Teaching was the fourth-most-used word in Q1. Responses extracted from the data collected are as follows:

Table 12
Word "Teaching" Extract from Qn1

Teaching	
Resp. #	**Full response Quoted**
3	It was challenging at first as I was familiar with traditional methods. I see it as an absolute necessity now. It has proved to make teaching and learning more accessible, even during pandemics
79	I don't have much experience, but I have been exposed to E-learning and have used it in my teaching. It is a wonderful technology
126	As an IT professional, I was motivated to find ways to incorporate E-learning into teaching the curriculum content.
224	I enjoy teaching tremendously both in the classroom and online. E-learning offers a number of ways to engage students individually, which is not always easy in large classrooms of 200+.

E-learning has benefited education in various ways, according to responses. With E-learning, lecturers have many options for attaining good results. As **"Theme 1"** consisted of two questions, the second question was treated the same as the first one.

Q2: What can you do to motivate other academics to adopt E-learning?
The most used words in the responses to this question were:

Table 13

Word "Academics" Extract from Qn2

Resp. #	Full response Quoted
20	I would really encourage my colleagues to embrace change and use e-learning, as it is definitely a modern way of teaching and learning. I would encourage more forums and workshops to improve awareness of academics about this tool
87	I would really love to see other academics adopt e-learning, and I would engage with them in one-on-one discussions and arrange workshops and webinars to engage and have discussions on the pros and cons of E-learning and how we as academics would benefit from adopting e-learning
105	One of the best ways to motivate them is to have a platform for a group of academics to share our daily challenges and new tools that seem viable for teaching and learning.
265	All academics should reflect on their pedagogy and consider effective ways to reach their students. What we need to encourage pedagogical innovation.

The comments imply that academics are prepared to let perceptions of technology issues not influence them, but to focus on what is more important in the field of pedagogy. This suggests that respondents think technology is less difficult than E-learning. *Encourage:* the full responses are below; the explanations are subsequently in line with the theme.

Table 14

Word "Encourage" Extract fron Qn2

Encourage	
Resp. #	**Full response Quoted**
4	I would strongly encourage my colleagues to adopt E-learning for remote teaching and learning. I would motivate them by increasing their awareness of e-learning and discussing this topic in a knowledge session with them.
127	I would really encourage my colleagues to embrace change and use e-learning, as it is definitely a modern way of teaching and learning.
144	We share our experiences and try to assist and encourage each other
226	I would really encourage my colleagues to play their part and embrace this wonderful tool, meant to assist us. I would encourage various forms of platforms where this topic can be discussed, and information and experience sharing

Most responses reflect a high level of motivation, with academics predominantly indicating a strong desire to implement E-learning as a teaching and learning methodology. This encouragement shows the hope that even tech-illiterate academics can be co-opted into technology-based learning platforms and methods. *Colleagues:* The entire responses and theme-aligned explanations are below. The left column shows respondents' placement of their data collection sheets, and the right column shows their responses.

Table 15

Word "Colleagues" Extract fron Qn2

Resp. #	Colleaques Full response Quoted
11	Engage with my colleagues; you know, some people are scared of change and growth, which is why you find negative perceptions. I would like to see more webinars and workshops addressing this particular matter
100	I would really implore my fellow colleagues to get involved and play their part in speeding up the adoption of E-learning at TU. It is long overdue.
146	word-of-mouth engagements with fellow colleagues
226	I would really encourage my colleagues to play their part and embrace this wonderful tool, meant to assist us. I would encourage various forms of platforms where this topic can be discussed, and information and experience sharing

Most responses indicate that academics are willing to support, hope for, and believe that technology-based techniques can simplify and improve their everyday work and help them succeed in their careers. This again shows TU faculty motivation.

Theme 2: E-learning technology challenges

Table 16
Word "Teaching" Extract from Qn3

Learning	
Resp. #	**Full response Quoted**
16	*A teaching and learning system that is not highly user-friendly. *Load shedding. *Network problems. *The fact that E-learning can be impersonal. *Lack of IT support after hours for evening classes.
76	Mathematics is an interactive subject. Currently, I am struggling to be hands-on when using eLearning. Secondly, the university-provided laptop is not making it easy to teach mathematics via E-learning. Touch screen laptop might help
158	Working from home is highly difficult to adopt E-learning because of other people/pets in the home that make a noise and cause distractions.
214	Streamlined processes automation in line with teaching and learning at TU

Three technological issues hinder E-learning uptake, according to responses. Access to networks, electricity, and power in remote areas was the first difficulty. Second was the university-supplied laptop specification for engineering students who need lots of processing power. Academics and students struggle when such technology takes a long time to reply. Third was university-provided student equipment. Touchscreens, microphones, trackballs, light pens, and other input choices are needed for interactive subjects like math. *Students:* was the second most used word in responses to this question. Responses containing the word were extracted as indicated below

Table 17
Word "Students" Extract from Qn3

Resp. #	**Full response Quoted**
46	Connectivity issues in Tanzania, coupled with unstable Eskom electricity provision. Unresponsiveness among the students.
163	The only drawback I experienced was the practical/clinical aspect: I find that students need hands-on practice with clinical skills.
189	Sufficient and reliable data and internet connectivity for students. This has been a major challenge for us and has prevented live-streamed lectures to large classes (300 - 1000 students).
246	E Learning is hugely problematic to those students who do not have data and/or connectivity and a quiet place to study via E-learning resources

According to the comments, which focused on "student," academics worry that E-learning may harm students. In addition to data and network connectivity shortages, practical courses may be hampered. Most students say movies do not help them with clinical experiments. This requires greater hands-on student participation. **Connectivity:** is the third most used word, and the extracts from the data collected are presented below

Table 18
Word "Students" Extract from Qn3

Resp. #	**Full response Quoted**
41	The lack of resources for students who are not physically on campus, and the poor connectivity in rural areas.
73	Unreliable electrical supplies, unreliable internet connectivity. I even resorted to going on campus to address connectivity problems. On campus
180	Unreliable electrical supplies, unreliable internet connectivity. I even resorted to going on campus to address connectivity problems.
266	Network connectivity is the main challenge. When you have a Zoom lecture, you wait 30 minutes before you can have half the class.

Again, academics emphasize the significance of stable, persistent connectivity, supported by a power supply, network service provider, etc. *Support* is the fourth-most-common word in responses to this question. Below are some responses extracted from the collected data.

Table 19

Word "Support" Extract from Qn3

Resp. #	Full response Quoted
12	Extremely slow and very unreliable on-campus Wi-Fi. No immediate IT support when problems arise during lectures. Lack of customisability of our LMS, Moodle.
136	Our IT E-learning staff are not true experts in the field.
215	lack of real-time support
256	Our systems are not fully up to standard to support the full implementation of e- learning

Most respondents mention TU's IT staff's proficiency. Technicians may fail to solve academic issues. Even if they can answer, the system is often too slow or lacks the software to support the query. Although most respondents did not directly address technology issues, their comments show an instinctive grasp of the factors that are more significant in encouraging each other to adopt technology-based techniques than in focusing on the downsides.

4.6 Summary of the key findings

Table 20

Summary of Key Findings

Objectives	Key Findings
1. To determine the levels of Academic staff satisfaction with blended and E-learning adoption during Covid-19	Academics are highly satisfied with the adoption policy and are ready for any challenges it may pose to the sphere of teaching and learning.
2. To determine the challenges experienced by academics during the adoption of E-learning during Covid-19	The academics seem to have already gained a fair amount of training. Findings indicate that any challenges encountered during E-learning adoption can be easily mitigated.

4.7 Discussion

TU's academic staff feel pretty confident and satisfied about jumping into e-learning. Their positive attitudes and solid knowledge base play a big role here. This aligns with the Technology Acceptance Model, which posits that people are more likely to adopt new technology when they perceive it as useful and have a positive attitude toward it (Greyling, 2018; Yadav et al., 2021). Academic Staff reports applying e-learning in their teaching methods (about 82% of respondents). As Al-Fraihat et al. (2017), Alam & Parvin (2021), and Jeyaraj (2020) highlighted, most university academic staff use e-learning in their teaching, including sharing reading materials, collaborating with other academic staff, and engaging in other activities.

Proportionately, more academics have had fair exposure to E-learning as a learning and teaching methodology (Chen et al., 2020). While most Academoc staff use e-learning, they also have sufficient skills (71% of respondents) to use e-learning technology. Chen et al. (2020) noted that in the 21st century, most academic staff have sufficient skills to adopt e-learning. Most staff already have the skills they need, but some real issues still get in the way—such as spotty internet, insufficient institutional support, and challenges with hands-on components. Mohammed & Kassem (2020) raise the same concerns. According to García-Peñalvo (2020) and Krouska et al. (2024), e-learning works best when staff have reliable tech support, and teaching is tailored to their needs.

Most academic Staff have agreed that e-learning is a long-overdue system for teaching and learning in Tanzania (about 78% of respondents). As argued by Chen et al. (2020), Elavarasan & Pugazhendhi (2020), García et al. (2019), and García-Peñalvo (2020), e-learning is one of the overdue systems for teaching and learning at TU. To improve academic performance and the quality of education, it is recommended that TU adopt e-learning and address all challenges raised (García-Peñalvo, 2020). In addressing such challenges, it is recommended that TU consider local factors in their context (Gnaur et al., 2020; Hair et al., 2019). Local factors matter a lot too—stuff like infrastructure and access to resources can make or break e-learning (Lizcano & Arroyave, 2020). If TU wants its e-learning projects to really work and last, it needs to tackle these ongoing problems head-on.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Fully-fledged E-learning was long thought to be unable to match conventional teaching and learning methods. Despite E-learning's detractors, this study showed that TU can overcome its uptake and implementation issues. The research showed that the school is ready to use E-learning. Although not a focus of the study, this technology's infrastructure was a concern.

5.2 Recommendations

A literature review in this study helped answer the problem statement's query. This study collected and analyzed data and found results comparable to those of the pioneers of institutional theory. The study objectives informed the research procedure, so this study's recommendations are based on them. The main suggestion is below. The report recommends that TU hasten the introduction of E-learning as a full teaching and learning mode. Rollout can occur in all colleges

Declaration of Interest

The author declares that he does not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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