Technology Enhanced Learning and Teaching in Higher Education Institutions in the 21 Century: Benefits and Challenges

Audrey Matere[1] & Josephine Oranga[2]

[1]*Department of Curriculum Instruction and Media, Kisii University, Kenya*

[2]*Department of Psychology, Kisii University, Kenya*

**Corresponding author: audreymatere@kisiiuniversity.ac.ke*

https://doi.org/10.62049/jkncu.v5i2.310

Abstract

Modern higher education faces challenges for both learners and lecturers. While digital resources, Web 2.0 technologies, and online connectivity offer significant learning opportunities, many Virtual Learning Environments (VLEs) remain basic and fragmented. This study investigated technology-enhanced learning and teaching in Kenyan higher education institutions. Utilizing a descriptive survey design, the study involved 15 ICT staff and 1467 students from various institutions, employing stratified and purposive sampling methods. Data was collected through questionnaires and interview schedules, with quantitative analysis conducted using SPSS and qualitative data analyzed thematically. The findings reveal that technology enhances learning by providing access to information, promoting interactive and immersive experiences, fostering collaboration, and offering cost-effective resources. It also supports adaptive learning, critical thinking, and skills development. However, challenges such as limited access to technology, digital literacy gaps, high costs, data privacy concerns, and resistance to technology adoption were identified. Despite these obstacles, universities are successfully using technology to promote active learning, collaboration, and academic support, contributing to improved teaching and learning outcomes in higher education.

Keywords: Technology Enhanced, Learning and Teaching, Higher Institutions, Benefits and Challenges

Introduction

Higher education has been in a period of considerable change since the early 1990's. There has been a transformation in the way universities are financed, and organizational objectives have shifted to focus on the generation of new income streams and increasing accessibility and participation (Khlaisang, & Songkram, 2019). The resulting growth in Education and international markets has generated the need to review the infrastructures and methods that support teaching and learning. Modern day Education presents challenges for both learners and teachers. "The coming of mass higher education has brought larger classes, more diverse students and leaner unit costs, but keener interest in teaching quality and graduate attributes (Shen & Ho, 2020). In parallel to such changes there has been unprecedented growth in information technologies and the development of a whole new communication media and culture. Web 2.0 technologies have impacted fundamentally on the way we communicate and are changing the expectations of learners. Whilst universities have invested heavily in technology, there remains the need to adapt pedagogical approaches to make the best use of this new infrastructure (Adorno & Horkheimer, 2019). Despite the opportunities and expectations, it can remain difficult to change well established traditional methods. Traditions, values, and infrastructure all create the conditions for natural inertia. The recent Benchmarking and Pathfinder Programme has provided a valuable opportunity for institutions to take stock of their own e-learning provisions and practices. However, it is necessary that they now translate this into further action for self-improvement and evaluation (Quinnett, 2022).

In its drive towards becoming an advanced (developed) nation by 2020, Malaysia recognized the critical role of education as the driving force of its transformation process into becoming a knowledge-based society as a necessary requirement of becoming a developed nation in the information age. Thus, the education industry is expected to train young learners into becoming competent citizens capable of making useful contribution in their respective capabilities towards the attainment of this national goal (Singh & Chudasama, 2020). To prepare the education sector for this task, policymakers considered the full integration of information technology in the education system at all levels of learning as necessary. In achieving this, the government has over the years introduced new policies backed up with the allocation and use of huge resources to provide the infrastructure and facilities needed for ICT integration in the education sector. This is aimed at creating 21st century learning environment in Malaysian schools and institutions of higher learning to facilitate the development of information and technological competence of learners alongside their professional development. Thus, producing the desired citizens needed in the 21st century for sustainable development in Malaysia as member of the global community in the information age (Pedro, Subosa, Rivas & Valverde, 2019).

Literature Review

Mzumbe University for instance, started using Moodle system in 2014 to offer its programs in blended distance programs via learning centers in Mwanza and Mbeya regions. Likewise, the Open University of Tanzania which initially used to run pure distance learning has now stated blending delivery of its programs with various educational technologies (Mtebe, 2020). The university is complementing its programs using Moodle system where materials are made available electronically for all students to access. Other institutions reported to use various educational technologies to complement face-to-face delivery in Tanzania include Muhimbili University of Health and Allied Science (MUHAS), Sokoine University of Agriculture, Kilimanjaro Christian Medical University College (KCMUCo) According to Kibuku, Ochieng

and Wausi (2020) indicates that a good number of higher education institution in Kenya have also adopted various technology enhanced learning in their Institutions. These institutions include the University of Nairobi (UoN), Moi University (MU), Egerton University (EU), Kenyatta University (KU), Jomo Kenyatta University of Agriculture and Technology (JKUAT), Maseno University (MAU), Masinde Muliro University of Science and Technology (MMUST) and Kisii University (Muuro et al., 2014). Majority of these institutions have adopted Moodle as the technology that facilitates the delivery of blended learning with instructors actively interacting with students via Moodle systems.

The concept of Technology Enhanced Learning Environments (TELE‟s) focuses on learning that amplifies education environments to real –life applicability. Njai, and Nyabuto (2021), in their analysis of learning in virtual worlds states that a technologically enhanced learning environment is any learning space, physical location, context, and learning culture that uses technology to optimize the ability of students to learn. In this regard, learners are not only equipped with the knowledge and skill to as a form of personal development but also as future contributors to the current and future society. Lin and Hwang (2019) expound on the need for such environments stating that Technology Enhanced Learning Environments encourage students to explore their own interests and capabilities using modern equipment. This equipment includes but are not limited to open online courses, learning management systems, social networks, game-based learning, augmented reality, and virtual world environments among other specific outcome-specific resources. Brown (2020) found there were issues in the level of engagement among the students. They also identified differences between teaching and learning environments across the first and final years of study. Final year modules tended to offer more student choice and have more varied approaches to teaching and assessment. There are also smaller class sizes and ‘better’ resources. Perhaps this is not altogether surprising given the extra demands put on first year modules in terms of scale, student diversity and unit costs. Deep and surface learning approaches are often seen as ways of measuring student engagement and the quality of learning. The ETL Project identified ‘organized effort’, how students organize their study and whether they use their time effectively, as important in enabling students to achieve deeper learning. Scores for deep approach and organized effort were higher, and scores for surface approach lower, in final year courses. Another factor influencing this was the compulsory nature of core modules and the diversity of the student body. Issues such as perceived subject relevance and prior knowledge can affect student motivation and engagement.

Research Hypothesis

H_{01}: Technology enhanced learning has no significant influence on teaching in higher education institutions in the 21st century

Research Methodology

This study employed a descriptive survey research design to examine technology-enhanced learning and teaching in Kenyan higher education institutions. The target population consisted of 15 ICT staff and 1467 students across various institutions. A sample size was determined using Yamane's formula (1967), with stratified sampling applied to ensure fair representation from different higher education institutions, while purposive sampling was used to select ICT staff. Data were collected through questionnaires for quantitative insights on technology use, benefits, challenges, and related factors, and interview schedules for qualitative data from ICT staff. The quantitative data were analyzed using SPSS Version 25, employing descriptive

statistics to characterize the population. The qualitative data were transcribed and analyzed thematically to identify recurring themes. Triangulation of both quantitative and qualitative findings was used to provide a comprehensive understanding of the research topic. Ethical considerations, including informed consent, anonymity, and confidentiality, were prioritized throughout the study.

Results

Descriptive Statistics on the Benefits of Technology to Enhanced Learning and Teaching in Higher Education

Table 1: Benefits of Technology to Enhanced Learning and Teaching in Higher Education

Statements		SA	A	N	D	SD	Mean	Std. Dev
Technology provides access to more information and learning materials than traditional methods	F	101	117	13	29	19	3.90	1.20
	%	36.2	41.9	4.7	10.4	6.8		
Technology offers interactive and immersive learning experiences that can be more engaging than traditional lectures	F	85	123	9	39	23	3.75	1.26
	%	30.5	44.1	3.2	14.0	8.2		
Technology facilitates communication and collaboration between students and faculty both inside and outside the classroom	F	88	133	11	30	17	3.88	1.15
	%	31.5	47.7	3.9	10.8	6.1		
Technology allows for adaptive learning platforms and individualized instruction tailored to each student's needs	F	98	111	11	29	20	3.82	1.25
	%	35.1	39.8	3.9	14.0	7.2		
Technology integrates critical thinking, problem-solving, and digital literacy skills into the learning process.	F	87	124	9	31	28	3.76	1.28
	%	31.1	44.4	3.2	11.1	10.0		
Technology allows for more frequent and varied assessment methods, providing immediate feedback to students.	F	98	109	10	45	17	3.81	1.25
	%	35.1	39.1	3.6	16.1	6.1		
Technology can offer cost-effective alternatives to traditional textbooks and other learning materials.	F	95	132	13	26	13	3.98	1.09
	%	34.1	47.3	4.7	9.3	4.7		
Technology can provide tools and resources to support students with disabilities and create a more inclusive learning environment	F	93	107	12	42	25	3.72	1.31
	%	33.3	38.4	4.3	15.1	9.0		
Technology facilitates connections with experts and resources from around the world, fostering global collaboration	F	84	114	16	40	25	3.69	1.28
	%	30.1	40.9	5.7	14.3	9.0		

According to the results in Table 1, the descriptive statistics findings showed that 101(36.2%) of the respondents strongly agreed that a technology provides access to more information and learning materials than traditional methods while 117(41.9%) representing majority of the respondents agreed that a technology provides access to more information and learning materials than traditional methods. A small

proportion 29(10.4%) of the respondents disagreed, and 19(6.8) of the respondents strongly disagreed that technology provides access to more information and learning materials than traditional methods. The study findings father revealed that a technology provides access to more information and learning materials than traditional methods with mean rating of 3.90 and standard deviation of 1.20 and these reveals that they agree that a technology provides access to more information and learning materials than traditional methods.

ICT (3) interviewed share thoughts regarding technology

" Technology offers a wealth of benefits in education compared to traditional methods. Digital learning methods, including interactive technology, have been shown to keep children engaged, improve attention, and enhance learning quality. Digital technologies in education provide students with instant access to vast information resources, foster creativity, and offer dynamic learning environments that transcend traditional techniques "

Furthermore, 208(74.6%) of the respondents agreed and 52(22.2%) of the respondents disagreed that technology offers interactive and immersive learning experiences that can be more engaging than traditional lectures. However, respondents agreed that they technology offers interactive and immersive learning experiences that can be more engaging than traditional lectures with mean rating of 3.75 and Standard deviation of 1.26. This suggests that respondents generally believe technology offers interactive and immersive learning experiences that can be more engaging than traditional lectures. Further, 221(79.2%) of the respondents agreed that technology facilitates communication and collaboration between students and faculty both inside and outside the classroom and those who disagreed that technology facilitates communication and collaboration between students and faculty both inside and outside the classroom are 47(16.9%). The study findings revealed that participants agreed with the statement that technology facilitates communication and collaboration between students and faculty both inside and outside the classroom with mean rating of 3.88 and the Standard deviation of 1.15.

Similarly, 209(74.9%) of the participants agreed that technology allows for adaptive learning platforms and individualized instruction tailored to each student's needs. However, 59(21.2%) of the respondents disagreed that technology allows for adaptive learning platforms and individualized instruction tailored to each student's needs. Further, the study findings revealed that participants agreed towards the statement that technology allows for adaptive learning platforms and individualized instruction tailored to each student's needs with mean rating of 3.82 and the standard deviation of 1.25. Moreover, the statement on the development of the 21st century 211(75.6%) of the respondents agreed that technology integrates critical thinking, problem-solving, and digital literacy skills into the learning process and on the other hand 59(21.1%) of the respondents disagreed that technology integrates critical thinking, problem-solving, and digital literacy skills into the learning process. Additionally, the study results revealed that the respondents agree that technology integrates critical thinking, problem-solving, and digital literacy skills into the learning process with mean rating of 3.76 and a standard deviation of 1.28.

However, 207(74.2%) of the participants agreed that technology allows for more frequent and varied assessment methods, providing immediate feedback to students. On contrary, 62(22.2%) of the participants disagreed that technology allows for more frequent and varied assessment methods, providing immediate feedback to students. Further, the study results also showed that the respondents agreed that technology allows for more frequent and varied assessment methods, providing immediate feedback to students with mean rating of 3.81 and the standard deviation of 1.25. Also, on cost-effective learning, vast majority of

the respondents 227(81.4%) of the respondents agreed that technology can offer cost-effective alternatives to traditional textbooks and other learning materials. However, 39(14.0%) of the respondents disagreed that technology could offer cost-effective alternatives to traditional textbooks and other learning materials. Analysis on mean and standard deviation of 3.97 and 1.09 respectively revealed the respondents agreed with the statement that technology can offer cost-effective alternatives to traditional textbooks and other learning materials. Similarly, 200(71.9%) of the participants agreed that technology can provide tools and resources to support students with disabilities and create a more inclusive learning environment. However, 67(24.1%) of the respondents disagreed that technology could provide tools and resources to support students with disabilities and create a more inclusive learning environment. Further, the study findings revealed that participants agreed towards the statement technology can provide tools and resources to support students with disabilities and create a more inclusive learning environment with mean rating of 3.72 and the standard deviation of 1.31.

Interviewed ICT staff (9) noted that:

"Assistive technology has been successful in increasing the inclusion and accessibility of students with disabilities, providing benefits such as improved academic performance, language development, and enhanced skills development "

Finally, it was noted that 198(71.0%) of the participants agreed that technology facilitates connections with experts and resources from around the world, fostering global collaboration. Conversely to that, it was noted that 65(23.3%) of the respondents disagreed that technology facilitates connections with experts and resources from around the world, fostering global collaboration. The study results revealed that the respondents agree with the statement that technology facilitates connections with experts and resources from around the world, fostering global collaboration with mean rating of 3.69 and a standard deviation of 1.28.

Descriptive Statistics on the Challenges of Technology in Enhancing Learning and Teaching in Higher Education Institutions (21st Century).

A total of 9 statements were used to determine the challenges of technology in enhancing learning and teaching in higher education institutions (21st Century). Results are shown in Table 2.

Table 2: Challenges of Technology in Enhancing Learning and Teaching in Higher Education Institutions (21st Century).

Statements		SA	A	N	D	SD	Mean	Std. Dev
Students and faculty do not have sufficient access to devices, software, and reliable internet connectivity	F	99	133	8	24	15	3.99	1.10
	%	35.5	47.7	2.9	8.6	5.4		
Students and faculty lack essential skills for using technology effectively for learning and teaching	F	100	113	13	40	13	3.89	1.18
	%	35.8	40.5	4.7	14.3	4.7		
The cost of technology, software, and training is prohibitive for some institutions and individuals	F	100	112	4	39	24	3.81	1.29
	%	35.8	40.1	1.4	14.0	8.6		

Frequent technical problems and difficulty troubleshooting hinder the effective use of technology.	F %	80 31.5	117 41.9	7 2.5	40 14.3	27 9.7	3.71	1.31
Data privacy and security risks associated with technology use raise concerns for institutions and individuals.	F %	90 32.3	131 47.0	3 1.1	32 11.5	23 8.2	3.84	1.23
Some faculty and students are resistant to adopting new technologies for learning and teaching.	F %	98 35.1	128 45.9	5 1.8	27 7.7	21 7.5	3.91	1.19
Faculty lack adequate training and support for integrating technology into their teaching practices.	F %	108 38.7	115 41.2	4 1.4	36 12.9	16 5.7	3.94	1.20
Effectively assessing student learning outcomes in technology-supported environments is difficult.	F %	83 29.7	122 43.7	5 1.8	44 15.8	25 9.0	3.70	1.29
Access to and opportunities for using technology vary significantly based on socioeconomic background	F %	87 31.2	118 42.3	7 2.5	36 16.1	22 7.9	3.73	1.27
Overreliance on technology can negatively impact face-to-face interaction and student engagement	F %	98 35.1	120 43.0	6 2.2	37 13.3	18 6.5	3.87	1.21

According to Table 2, on the statement on inadequate access to technology 99(35.5%) of the respondents strongly agreed that students and faculty do not have sufficient access to devices, software, and reliable internet connectivity while 133(47.7%) of the respondents agreed that students and faculty do not have sufficient access to devices, software, and reliable internet connectivity. A small proportion 24(8.6%) of the respondents disagreed, and 15(5.4) of the respondents strongly disagreed that students and faculty do not have sufficient access to devices, software, and reliable internet connectivity. Moreover, the study findings revealed that the respondents agreed with the statement that students and faculty do not have sufficient access to devices, software, and reliable internet connectivity with mean rating of 3.99 and a standard deviation of 1.10.

ICT (1) interviewed indicated

"*Insufficient access to devices, software, and reliable internet connectivity among students and faculty can indeed hinder effective teaching and learning. The integration of technology in the classroom environment offers numerous benefits, including providing students with instant access to a vast amount of information and resources, connecting the classroom experience to the real world, and preparing students for the modern workplace*"

Furthermore, on the lack of digital literacy, 213(76.3%) of respondents agreed and 53(19.0%) of the respondents disagreed that students and faculty lack essential skills for using technology effectively for learning and teaching. However, the respondents agreed that students and faculty lack essential skills for using technology effectively for learning and teaching with mean rating of 3.89 and standard deviation of 1.18. Further, 212(75.9%) of the respondents agreed that the cost of technology, software, and training is prohibitive for some institutions and individuals and 63(22.6%) of the respondents disagreed that the cost

of technology, software, and training is prohibitive for some institutions and individuals. Furthermore, the study's findings revealed that the respondents agreed with the statement that the cost of technology, software, and training is prohibitive for some institutions and individuals with mean rating of 3.81 and a standard deviation of 1.29.

ICT (11) urged that:

"The cost of technology can indeed act as a barrier for some institutions and individuals, underscoring the need for more affordable options and support in accessing necessary technology. The affordability of mobile devices is a significant concern for billions of people globally, with disparities in device costs relative to average monthly incomes posing challenges to access and connectivity"

Similarly, 205(73.4%) of the participants agreed that frequent technical problems and difficulty troubleshooting hinder the effective use of technology. However, 67(23.0%) of the respondents disagreed that frequent technical problems and difficulty troubleshooting hinder the effective use of technology. Further, the study findings also indicated the respondents agreed that frequent technical problems and difficulty troubleshooting hinder the effective use of technology with mean rating of 3.71 and a standard deviation of 1.31. Further, 221(79.3%) of the respondents agreed that data privacy and security risks associated with technology use raise concerns for institutions and individuals. On contrary 59(19.7%) of the respondents disagreed that data privacy and security risks associated with technology use raise concerns for institutions and individuals. Further, the mean rating of 3.84 and standard deviation of 1.23 indicates that the respondents agreed that that Data privacy and security risks associated with technology use raise concerns for institutions and individuals. The study nonetheless showed that 226(70.0%) of the participants agreed that some faculty and students are resistant to adopting new technologies for learning and teaching and 48(17.2%) disagreed with the statement that some faculty and students are resistant to adopting new technologies for learning and teaching. Further, the study results also revealed that the mean rating of 3.91 and a standard deviation of 1.20 indicate that the participants agreed with the statement that some faculty and students are resistant to adopting new technologies for learning and teaching. Additionally, majority 223(79.9%) of the respondents agreed that faculty lack adequate training and support for integrating technology into their teaching practices. On contrary to that, 52(18.6%) of the respondents disagreed that faculty lack adequate training and support for integrating technology into their teaching practices. Further, the study results also indicated that the respondents agreed that faculty lack adequate training and support for integrating technology into their teaching practices with mean rating of 3.94 and standard deviation of 1.20.

ICT (5) revealed that:

"Technology integration in the classroom offers benefits such as increased access to information resources, enhanced engagement, and dynamic learning environments that transcend traditional techniques. Moreover, incorporating technology into education facilitates meaningful learning experiences, greater use of prior knowledge, student-centered environments, and opportunities for higher-order thinking and innovative practice. To address the challenges associated with assessing student learning outcomes in technology-supported environments, it is crucial to develop assessment strategies that consider the unique aspects of digital learning while ensuring that didactic considerations remain a focus in education"

Further 205(73.4%) of the respondents agreed that effectively assessing student learning outcomes in technology-supported environments is difficult. However, 69(24.8%) of the respondents disagreed that effectively assessing student learning outcomes in technology-supported environments is difficult. Additionally, the study results on mean and standard deviation revealed that the respondents agreed with the statement that effectively assessing student learning outcomes in technology-supported environments is difficult with mean rating of 3.70 and a standard deviation of 1.29. Last but not least, 205(73.5%) of the respondents agreed that access to and opportunities for using technology vary significantly based on socioeconomic background. However, 67(24.0%) of the respondents disagreed that access to and opportunities for using technology vary significantly based on socioeconomic background. Analysis on mean and standard deviation of 3.73 and 1.27 respectively revealed that the respondents agreed with the statement that the access to and opportunities for using technology vary significantly based on socioeconomic background. Finally, it was noted that 218(78.1%) of the participants agreed that overreliance on technology can negatively impact face-to-face interaction and student engagement. Conversely to that, it was noted that 55(19.8%) of the respondents disagreed that overreliance on technology can negatively impact face-to-face interaction and student engagement. Further, the mean rating of 3.87 and a standard deviation of 1.21 revealed that the respondents agreed that overreliance on technology can negatively impact face-to-face interaction and student engagement.

Descriptive Statistics on the Learning and Teaching in Higher Education Institutions (21st Century).

Factors to be considered under learning and teaching in higher education institutions (21st Century) are learning environment, teaching practice and student support. Results are shown in Table 3, 4 and 5.

Learning Environment

The following statement sought to determine the learning environment on learning and teaching in higher education institutions (21st Century). Table 3 presents the results.

Table 3: Learning Environment

Statements		SA	A	N	D	SD	Mean	Std. Dev
My university utilizes technology effectively to enhance my learning experience.	F	102	119	10	27	21	3.91	1.21
	%	36.6	42.7	3.6	9.7	7.5		
My lecturers encourage active learning and participation in class discussions.	F	91	114	7	44	23	3.74	1.29
	%	32.6	40.9	2.5	15.8	8.2		
Collaborative learning activities are frequently used in my courses	F	82	131	9	29	28	3.75	1.26
	%	29.4	47.0	3.2	10.4	10.0		
I have access to online learning resources and tools outside of the classroom	F %	96 34.4	117 41.9	5 1.8	32 11.5	29 10.4	3.78	1.31
The learning environment at my university promotes critical thinking and problem-solving skills	F %	99 35.5	118 42.3	4 1.4	33 11.8	25 9.0	3.84	1.28

According to Table 3, 102(36.6%) of the respondents strongly agreed that our university utilizes technology effectively to enhance our learning experience while 119(42.7%) of the respondents agreed that our university utilizes technology effectively to enhance our learning experience. A small proportion 27(9.7) of the respondents disagreed, and 21(7.5) of the respondents strongly disagreed that our university utilizes technology effectively to enhance our learning experience. Moreover, the study findings revealed that the respondents agreed with the statement that that our university utilizes technology effectively to enhance our learning experience with mean rating of 3.91 and a standard deviation of 1.21. Moreover, 205(73.5%) of the respondents agreed that our lecturers encourage active learning and participation in class discussions and on the other hand 67(24.0%) of the respondents disagreed that our lecturers encourage active learning and participation in class discussions. Additionally, the study results revealed that the respondents agreed that our lecturers encourage active learning and participation in class discussions with mean rating of 3.74 and a standard deviation of 1.29. Also, 213(76.4%) of the respondents agreed that collaborative learning activities are frequently used in our courses. However, 57(20.4%) of the respondents disagreed that collaborative learning activities are frequently used in our courses. Analysis on mean and standard deviation of 3.75 and 1.26 respectively revealed the respondents agreed with the statement that collaborative learning activities are frequently used in our courses.

However, 213(76.3%) of the participants agreed that they have access to online learning resources and tools outside of the classroom. On contrary, 61(21.9%) of the participants disagreed that they have access to online learning resources and tools outside of the classroom. Further, the study results also showed that the respondents agreed that they have access to online learning resources and tools outside of the classroom with mean rating of 3.78 and the standard deviation of 1.31. Finally, it was noted that 217(77.8%) of the participants agreed that the learning environment at our university promotes critical thinking and problem-solving skills. Conversely to that, it was noted that 58(20.8%) of the respondents disagreed that the learning environment at our university promotes critical thinking and problem-solving skills. The study results father revealed that the respondents agree with the statement that the learning environment at our university promotes critical thinking and problem-solving skills with a mean rating of 3.84 and a standard deviation of 1.28.

ICT (6) interviewed indicated that

"*There are barriers to the effective use of digital technologies by university teachers. These barriers include personal, professional, institutional, and contextual factors that hinder the integration of technology into teaching practices"*

However, ICT (4) revealed that

"*While there are challenges in effectively utilizing technology in universities, the benefits of incorporating digital tools for enhancing learning experiences are significant."*

Teaching Practices

Further, the following statement sought to determine the teaching practice on learning and teaching in higher education institutions (21st Century). Table 4 presents the results.

Table 4: Teaching Practices

Statements		SA	A	N	D	SD	Mean	Std. Dev
My lecturers effectively communicate complex information in a clear and engaging manner	F	76	132	4	42	25	3.69	1.27
	%	27.2	47.3	1.4	15.1	9.0		
My lecturers encourage me to apply knowledge learned in class to real-world situations	F	84	142	7	30	16	3.89	1.12
	%	30.1	50.9	2.5	10.8	5.7		
My lecturers are approachable and available to answer questions outside of class time.	F	82	127	13	43	14	3.79	1.17
	%	29.4	45.5	4.7	15.4	5.0		
My lecturers provide timely and constructive feedback on my assignments and assessments	F	71	125	18	48	17	3.66	1.20
	%	25.4	44.8	6.5	17.2	6.1		
My lecturers are open to new teaching methods and technologies	F	102	106	13	39	19	3.84	1.25
	%	36.6	38.0	4.7	14.0	6.8		

The study results in Table 4 showed that the majority 208(74.5%) of the respondents agreed that our lecturers effectively communicate complex information in a clear and engaging manner. On contrary, 67(24.1%) of the respondents disagreed that our lecturers effectively communicate complex information in a clear and engaging manner. Further, the study results indicate that the mean and the standard deviation of 3.69 and 1.27 respectively clearly show that the respondents agreed with the statement that our lecturers effectively communicate complex information in a clear and engaging manner. Similarly, 226(81.0%) of the respondents agreed that our lecturers encourage us to apply knowledge learned in class to real-world situations while on the other hand 46(16.5%) disagreed that our lecturers encourage us to apply knowledge learned in class to real-world situations. The study results also showed that the respondents agreed with the statement that our lecturers encourage us to apply knowledge learned in class to real-world situations with mean rating of 3.89 and standard deviation of 1.12. The study further revealed that, 209(74.9%) of the participants agreed that our lecturers are approachable and available to answer questions outside of class time.

On contrary to that 57(20.4%) of the respondents disagreed that our lecturers are approachable and available to answer questions outside of class time. Further, the study results indicate that the respondents agreed that our lecturers are approachable and available to answer questions outside of class time with mean rating of 3.79 and standard deviation of 1.17. However, 196(70.2%) of the participants agreed that our lecturers provide timely and constructive feedback on our assignments and assessments. On contrary to those findings 65(23.3%) of the respondents disagreed that our lecturers provide timely and constructive feedback on our assignments and assessments. Further, the study results indicate that the respondents agreed with the statement that our lecturers provide timely and constructive feedback on our assignments and assessments with mean of 3.66 and a standard deviation of 1.20. Finally, the findings revealed that 208(74.8%) of the respondents agreed that our lecturers are open to new teaching methods and technologies. However, 58(20.8%) of the respondents disagreed that that our lecturers are open to new teaching methods and

technologies. Similarly, the respondents agreed that our lecturers are open to new teaching methods and technologies with mean rating of 3.84 and a standard deviation of 1.25.

Students Support

However, the following statement sought to determine the students' support on learning and teaching in higher education institutions (21st Century). Table 5 presents the results.

Table 5: Students' Support

Statements		SA	A	N	D	SD	Mean	Std. Dev
My university provides adequate academic support services, such as tutoring and writing centers	F	85	127	7	41	19	3.78	1.22
	%	30.5	45.5	2.5	14.7	6.8		
I feel comfortable seeking help from academic advisors and career counselors.	F	97	114	11	35	22	3.82	1.25
	%	34.8	40.9	3.9	12.5	7.9		
My university promotes mental health and well-being resources for students.	F	90	109	12	46	22	3.71	1.29
	%	32.3	39.1	4.3	16.5	7.9		
I feel a sense of belonging and community within my university	F	87	122	13	36	21	3.78	1.23
	%	31.2	43.7	4.7	12.9	7.5		
My university prepares me for the challenges of the 21st century workforce.	F	80	127	12	35	25	3.72	1.25
	%	28.7	45.5	4.3	12.5	9.0		

The study results in Table 5 indicate vast majority, 212(71.0%) of the participants agreed that their university provides adequate academic support services, such as tutoring and writing centers. However, 60(21.5%) of the participants disagreed that their university provides adequate academic support services, such as tutoring and writing centers. Further, the study findings indicated that the respondents agreed with the statement that their university provides adequate academic support services, such as tutoring and writing centers with mean rating of 3.78 and standard deviation of 1.22. Secondly, 211(75.7%) of the participants agreed that they feel comfortable seeking help from academic advisors and career counselors. Conversely, 57(20.4%) disagreed that they feel comfortable seeking help from academic advisors and career counselors.

On contrary, the findings revealed that the respondents agreed to the statement that they feel comfortable seeking help from academic advisors and career counselors with mean rating of 3.82 and standard deviation of 1.25. In addition, majority 199(71.4%) of respondents agreed that their university promotes mental health and well-being resources for students. However, 68(24.4%) of the respondents disagreed that their university promotes mental health and well-being resources for students. However, the study results also showed that the mean rating of 3.71 and a standard deviation of 1.29 indicates that the respondents strongly agreed with the statement that that their university promotes mental health and well-being resources for students. Similarly, 209 (74.9%) of the participants agreed that they feel a sense of belonging and community within their university and 57(20.4%) disagreed that they feel a sense of belonging and community within their university. Further, the study results also indicate that the respondents agreed that they feel a sense of belonging and community within their university with mean rating of 3.78 and standard

deviation of 1.23. Finally, majority of the respondents 207(74.2%) agreed that our university prepares them for the challenges of the 21st century workforce. However, 50(20.5%) of the respondents disagreed that our university prepares them for the challenges of the 21st century workforce. Further, the study results also indicate that the mean rating of 3.72 and a standard deviation of 1.25 the respondents agreed with the statement that our university prepares them for the challenges of the 21st century workforce.

Discussion

The study reveals that technology plays a crucial role in enhancing learning and teaching in higher education by offering several benefits. A majority of respondents agreed that technology facilitates access to vast amounts of information and learning materials, provides immersive and interactive learning experiences, and supports communication and collaboration between students and faculty. It also offers adaptive learning platforms, encourages critical thinking, and enables frequent, varied assessments with real-time feedback. Additionally, technology can reduce the cost of traditional learning materials, promote inclusivity for students with disabilities, and foster global collaboration. These findings are consistent with previous studies highlighting the positive impact of technology on educational outcomes. However, the study also identifies several challenges associated with technology in education. These include limited access to devices, software, and reliable internet connectivity, high costs of technology and training, and data privacy concerns. There is also resistance to adopting new technologies among some students and faculty, as well as a lack of digital literacy.

Moreover, technical problems and difficulties in assessing student learning outcomes further complicate the integration of technology in educational settings. These issues are consistent with previous research that underscores the barriers to effective technology use in higher education. In terms of learning and teaching strategies, the study highlights that universities are effectively utilizing technology to enhance student experiences. The majority of respondents agreed that active learning, collaborative learning activities, and access to online resources are frequently incorporated into courses. Additionally, respondents indicated that lecturers foster critical thinking, engage students in real-world applications, and provide timely feedback. Academic support services, such as tutoring, career counseling, and mental health resources, are also seen as valuable. These findings align with previous research suggesting the importance of supportive teaching environments in promoting student success and well-being, as well as preparing students for the workforce.

Conclusions

In conclusion, technology plays a significant role in enhancing education by providing access to more information and learning materials, offering interactive and immersive learning experiences, facilitating communication and collaboration, enabling adaptive learning platforms, integrating critical thinking and problem-solving skills, providing varied assessment methods, offering cost-effective alternatives to traditional materials, supporting students with disabilities, and fostering global collaboration. There are several key challenges related to technological access and utilization in education. These challenges include issues such as lack of access to devices and reliable internet connectivity, insufficient digital literacy among students and faculty, prohibitive costs of technology and training, data privacy concerns, resistance to adopting new technologies, and disparities in technology access based on socioeconomic background. The findings suggest that addressing these challenges is crucial for enhancing educational experience, improving teaching and learning outcomes, and ensuring equitable access to technology resources. The

university effectively utilizes technology, encourages active learning, and promotes collaborative learning. Strategies to reduce student resistance to active learning were discussed, and effective elements of collaborative learning were outlined. Participants also have access to online resources and tools, and the learning environment promotes critical thinking and problem-solving skills. Lecturers are perceived to effectively communicate complex information, provide timely feedback, and are open to new teaching methods. The university provides adequate academic support services, and participants feel comfortable seeking help from advisors and counselors. The university also promotes mental health and well-being resources, fosters a sense of belonging, and prepares students for the challenges of the workforce.

References

Adnan, A. H. M. (2020). From interactive teaching to immersive learning: Higher Education 4.0 via 360-degree videos and virtual reality in Malaysia. *IOP Conference Series: Materials Science and Engineering, 917*(1), 012023. IOP Publishing.

Adorno, T. W., & Horkheimer, M. (2019). The culture industry: Enlightenment as mass deception. In *Philosophers on Film from Bergson to Badiou: A Critical Reader* (pp. 80-96). Columbia University Press.

Ahmed, A. (2018). Perceptions of using assistive technology for students with disabilities in the classroom. *International Journal of Special Education, 33*(1), 129-139.

Ahn, M. Y., & Davis, H. H. (2020). Four domains of students' sense of belonging to university. *Studies in Higher Education, 45*(3), 622-634.

Akçayır, M., & Akçayır, G. (2017). Advantages and challenges associated with augmented reality for education: A systematic review of literature. *Educational Research Review, 20*, 1-11.

Almajed, A., Skinner, V., Peterson, R., & Winning, T. (2016). Collaborative learning: Students' perspectives on how learning happens. *Interdisciplinary Journal of Problem-Based Learning, 10*(2), 9.

Almulla, M. A., & Al-Rahmi, W. M. (2023). Integrated social cognitive theory with learning input factors: The effects of problem-solving skills and critical thinking skills on learning performance sustainability. *Sustainability, 15*(5), 3978.

Bradberry, L. A., & De Maio, J. (2019). Learning by doing: The long-term impact of experiential learning programs on student success. *Journal of Political Science Education, 15*(1), 94-111.

Bree, R. T., & Gallagher, G. (2016). Using Microsoft Excel to code and thematically analyse qualitative data: A simple, cost-effective approach. *All Ireland Journal of Higher Education, 8*(2).

Brown, S. (2020). *Learning, teaching and assessment in higher education* (pp. 1-232). Learning, Teaching and Assessment in Higher Education.

Cakrawati, L. M. (2017). Students' perception on the use of online learning platforms in EFL classrooms. *ELT Tech: Journal of English Language Teaching and Technology, 1*(1), 22-30.

Chang, H. Y., Wang, C. Y., Lee, M. H., Wu, H. K., Liang, J. C., Lee, S. W. Y., ... & Tsai, C. C. (2015). A review of features of technology-supported learning environments based on participants' perceptions. *Computers in Human Behavior, 53*, 223-237.

Donaldson, P., McKinney, L., Lee, M., & Pino, D. (2016). First-year community college students' perceptions of and attitudes toward intrusive academic advising. *NACADA Journal, 36*(1), 30-42.

Ghafar, A. (2020). Convergence between 21st century skills and entrepreneurship education in higher education institutes. *International Journal of Higher Education, 9*(1), 218-229.

Ghavifekr, S., & Rosdy, W. A. W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science, 1*(2), 175-191.

Ghavifekr, S., Kunjappan, T., Ramasamy, L., & Anthony, A. (2016). Teaching and learning with ICT tools: Issues and challenges from teachers' perceptions. *Malaysian Online Journal of Educational Technology, 4*(2), 38-57.

González-Gómez, D., Jeong, J. S., Airado Rodríguez, D., & Cañada-Cañada, F. (2016). Performance and perception in the flipped learning model: An initial approach to evaluate the effectiveness of a new teaching methodology in a general science classroom. *Journal of Science Education and Technology, 25*, 450-459.

Hargittai, E., Piper, A. M., & Morris, M. R. (2019). From internet access to internet skills: Digital inequality among older adults. *Universal Access in the Information Society, 18*, 881-890.

Hernández-Torrano, D., Ibrayeva, L., Sparks, J., Lim, N., Clementi, A., Almukhambetova, A., ... & Muratkyzy, A. (2020). Mental health and well-being of university students: A bibliometric mapping of the literature. *Frontiers in Psychology, 11*, 1226.

Huang, R., Tlili, A., Chang, T. W., Zhang, X., Nascimbeni, F., & Burgos, D. (2020). Disrupted classes, undisrupted learning during COVID-19 outbreak in China: Application of open educational practices and resources. *Smart Learning Environments, 7*, 1-15.

Khlaisang, J., & Songkram, N. (2019). Designing a virtual learning environment system for teaching twenty-first century skills to higher education students in ASEAN. *Technology, Knowledge and Learning, 24*, 41-63.

Kibuku, R. N., Ochieng, D. O., & Wausi, A. N. (2020). E-learning challenges faced by universities in Kenya: A literature review. *Electronic Journal of e-Learning, 18*(2), 150-161.

Lai, C. (2015). Modeling teachers' influence on learners' self-directed use of technology for language learning outside the classroom. *Computers & Education, 82*, 74-83.

Lapitan Jr, L. D., Tiangco, C. E., Sumalinog, D. A. G., Sabarillo, N. S., & Diaz, J. M. (2021). An effective blended online teaching and learning strategy during the COVID-19 pandemic. *Education for Chemical Engineers, 35*, 116-131.

Mtebe, J. S. (2020). Examining user experience of eLearning systems implemented in two universities in Tanzania. *Interactive Technology and Smart Education, 17*(1), 39-55.

Mulliner, E., & Tucker, M. (2017). Feedback on feedback practice: Perceptions of students and academics. *Assessment & Evaluation in Higher Education, 42*(2), 266-288.

Muñoz, J. L. R., Ojeda, F. M., Jurado, D. L. A., Peña, P. F. P., Carranza, C. P. M., Berríos, H. Q., ... & Vasquez-Pauca, M. J. (2022). Systematic review of adaptive learning technology for learning in higher education. *Eurasian Journal of Educational Research, 98*(98), 221-233.

Nabaho, L., Oonyu, J., & Aguti, J. N. (2017). Good teaching: Aligning student and administrator perceptions and expectations.

Nami, F., & Vaezi, S. (2018). How ready are our students for technology-enhanced learning? Students at a university of technology respond. *Journal of Computing in Higher Education, 30*(3), 510-529.

Okuda, T., & Anderson, T. (2018). Second language graduate students' experiences at the writing center: A language socialization perspective. *TESOL Quarterly, 52*(2), 391-413.

Pandey, N., & Pal, A. (2020). Impact of digital surge during Covid-19 pandemic: A viewpoint on research and practice. *International Journal of Information Management, 55*, 102171.

Pedro, F., Subosa, M., Rivas, A., & Valverde, P. (2019). Artificial intelligence in education: Challenges and opportunities for sustainable development.

Plump, C. M., & LaRosa, J. (2017). Using Kahoot! in the classroom to create engagement and active learning: A game-based technology solution for eLearning novices. *Management Teaching Review, 2*(2), 151-158.

Quinnett, P. (2022). The Certified QPR+ Pathfinder Training Program: Need, concept, framework, & curriculum for a global approach to the prevention and mitigation of suicidal ideation and deaths by suicide. QPR Institute.

Rafi, M., JianMing, Z., & Ahmad, K. (2019). Technology integration for students' information and digital literacy education in academic libraries. *Information Discovery and Delivery, 47*(4), 203-217.

Saleh, A., & Bista, K. (2017). Examining factors impacting online survey response rates in educational research: Perceptions of graduate students. *Online Submission, 13*(2), 63-74.

Shen, C. W., & Ho, J. T. (2020). Technology-enhanced learning in higher education: A bibliometric analysis with latent semantic approach. *Computers in Human Behavior, 104*, 106177.

Singh, P. K., & Chudasama, H. (2020). Evaluating poverty alleviation strategies in a developing country. *PLOS ONE, 15*(1), e0227176.

Tharayil, S., Borrego, M., Prince, M., Nguyen, K. A., Shekhar, P., Finelli, C. J., & Waters, C. (2018). Strategies to mitigate student resistance to active learning. *International Journal of STEM Education, 5*, 1-16.

Thomas, G., & Thorpe, S. (2019). Enhancing the facilitation of online groups in higher education: A review of the literature on face-to-face and online group-facilitation. *Interactive Learning Environments, 27*(1), 62-71.

Wagner, K. M. (2019). Faculty and students' perceptions of open educational resources vs. traditional textbooks. *Wilmington University (Delaware)*.

Watty, K., McKay, J., & Ngo, L. (2016). Innovators or inhibitors? Accounting faculty resistance to new educational technologies in higher education. *Journal of Accounting Education, 36*, 1-15.

Zalat, M. M., Hamed, M. S., & Bolbol, S. A. (2021). The experiences, challenges, and acceptance of e-learning as a tool for teaching during the COVID-19 pandemic among university medical staff. *PLOS ONE, 16*(3), e0248758.