



REVIEW ARTICLE

BEYOND ACCESS: TECHNOLOGICAL FACTORS SHAPING STUDENTS' ADOPTION OF eLEARNING AT THE KENYA MEDICAL TRAINING COLLEGE (KMTC), NAIROBI

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ABSTRACT

The Kenya Medical Training College (KMTC) introduced a Moodle-based eLearning platform in 2014 to support teaching and learning across selected programmes. Despite the availability of the platform, its adoption among students remained uneven across departments, raising concerns about the technological factors influencing its effective use. This study examined the technological factors associated with the adoption of eLearning among students at KMTC Nairobi Campus. Guided by a cross-sectional survey design, the study targeted students drawn from six departments. A stratified random sampling procedure was used to select a sample of 261 students. Data was collected using a semi-structured questionnaire incorporating items measured on a five-point Likert scale. Out of the 261 questionnaires administered, 255 were completed and returned, representing a response rate of 96.55%. The study findings showed that technological factors had a moderate influence on students' adoption of eLearning, with an overall mean rating of 3.24 (SD = 0.89). Regression analysis further revealed that the perceived ease of using the Moodle platform was a statistically significant predictor of eLearning adoption ($p = 0.009$, $p < 0.05$). The findings suggest that although the eLearning platform was accessible within the institution, many students lacked adequate knowledge and skills to use it effectively. The study concludes that access to eLearning technology alone is insufficient to ensure its adoption. Institutions should therefore complement technological infrastructure with user-friendly system design, orientation, and continuous capacity-building programmes to enhance students' competence and sustained engagement with eLearning platforms.

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INTRODUCTION

Globally, formal education systems have increasingly adopted various digital technologies to facilitate digital pedagogy beyond the traditional classroom. These technologies enable educators and learners to communicate, access learning materials, and participate in educational activities remotely (Mhlongo et al., 2023). eLearning refers to the use of electronic devices and digital technologies to support the acquisition of knowledge through internet-based learning, which may occur synchronously or asynchronously (Dhawan, 2020). The use of technology in both developed and developing countries depends on the ICT infrastructure level and a conducive environment for teaching and learning. According to Ansong, et al., (2016), countries that have yet to adopt technology (developing) have lagged behind developed countries in the adoption of eLearning. According to Dhawan (2020), the UN (2020), WHO (2020), and Zalat et al. (2020), eLearning is economical for students, teachers, and training institutions. The achievement in eLearning depends on the

prior capacity building of learners' abilities to use the online Learning Management System (LMS). A study conducted by Maphosa (2021) established that the behavioural intention of students to utilize eLearning is positively influenced by effort expectancy, facilitating conditions for students such as helpdesk, and performance expectancy. Elthahir's (2019) study on eLearning in Sudan, identified poor internet service provider network infrastructure, low ICT literacy, weakness in content development and a lack of proficiency in a second language as central challenges of implementing the eLearning system. The students' intention to use the eLearning system is influenced when all instructors need to use the ICT application to teach their course (Yakubu & Dasuki, 2018). According to a study by Tarus, Gichoya, and Muumbo (2015), ICT infrastructure was critical to the implementation of eLearning, as the Faculty and learners experienced difficulties with internet connectivity and computer networks, including a lack of technical support. A study by Mutisya and Makokha (2016) found that the adoption of eLearning in public universities in Kenya faced hurdles due to the lack of sufficient internet connectivity, limited ICT skills among students and faculty, limited computers/ laptops and inadequate time for online

interaction. Tarus et al. (2015) found in a study that most universities in Kenya not only required affordable internet but also adequate internet bandwidth to encourage learners' adoption of eLearning. The COVID-19 pandemic exposed a lack of resilience in higher education in Kenya and other developing countries (OECD, 2020). This is despite the efforts of higher education institutions to develop new ideas and translate these ideas into content for teaching and delivering student assignments. Examinations were also interrupted, especially in developing countries, disrupting students' learning and progression. In a study conducted at Kenya Medical Training College, many students were unable to undertake an online research course due to the low adoption of e-learning (Gachanja et al., 2021).

Age is a hindrance to the adoption of eLearning in the study, as older lecturers prefer to teach using traditional learning methods (Mutisya & Makokha, 2016). According to Gachanja et al. (2021), only 60% of the students enrolled in KMTC nationwide were able to complete the learning simultaneously with the asynchronous activities taught through the Learning Management System. This study acknowledged the existing challenge in the adoption of eLearning at KMTC Nairobi and the gap in research on the factors affecting the adoption of eLearning at the institution. Thus, this study aimed to establish the technological factors that influence the adoption of eLearning by learners in KMTC Nairobi.

METHODOLOGY

Study Area: The study was carried out at the Kenya Medical Training College Nairobi campus, which is one of the 92 KMTCs in Kenya. The campus is located along Ngong Road opposite the Kenyatta National Hospital. KMTC Nairobi campus was a suitable case study for this research because it is the main campus of KMTC and eLearning adoption is significant at the campus that would augment the quality of data gathered for the study.

Collection of data: The study adopted purposive sampling to select six departments from the eighteen departments at KMTC Nairobi. The following are the departments at KMTC Nairobi that were considered for data collection: Medical Education, Health Records and Information Technology, Pharmacy Department, Nursing Department, Clinical Medicine and Surgery, and Orthopedic and Trauma Medicine. The target population in the six departments was 750 learners. The selection of learners involved stratified sampling, where learners were stratified according to year of study and gender (male or female), these clearly defined divisions were used to prevent overlapping issues. The sample size for the study was 261 participants. A semi-structured questionnaire with a 5-point Likert scale was used as the data collection instrument. Data on technological factors gathered from the participants included; the ability to download files from the Moodle eLearning system, the ability to navigate the Moodle eLearning system, training on the Moodle eLearning tools before beginning eLearning, easy access to the Moodle help desk when there are issues, adequacy of internet connectivity within KMTC - Nairobi, the ability to log in to the Moodle eLearning system and ownership of laptops/computers to facilitate eLearning.

This sample size was determined using a statistical formula (when the population size N is known) at a 95% confidence level, assuming $p = 0.5$.

$$N = \frac{N}{1 + N(e)^2}$$

(Yamane, 1967)

Where n is the sample size.

N is the population size

e is the level of precision (acceptance sampling error)

Therefore, the sample size will be

$$n = \frac{750}{1 + 750(0.05)^2} = 261 \text{ learners.}$$

The target population and sample size distribution of the students across the six departments are presented in Table 1.

Table 1. Distribution of the study's sample size

Respondents	Target Population	Sample size	Per cent
Nursing department	170	59	22.7
Clinical Medicine	110	38	14.6
Medical Education	120	42	16.0
Health Records and Information Technology	120	42	16.0
Pharmacy Department	140	49	18.7
Orthopedic & Trauma Medicine	90	31	12.0
Total	750	261	100.0

Analysis of collected data: The gathered data from the participants was cleaned, coded, and analyzed using Statistical Package for Social Sciences (SPSS). Data on technological factors was subjected to descriptive statistical analysis to establish the extent of influence of technological factors on the adoption of eLearning at KMTC Nairobi. Inferential regression analysis was done to determine the influence of technological factors on the adoption of eLearning at KMTC Nairobi and test for significance level at $p < 0.05$.

RESULTS

The response rate for the study's sample size was 96.55%. Table 2 depicts the response rate for the six departments selected for this study.

Table 2. Response Rate Based on the Six Departments

Department	Sample target	respondents	Response rate
Nursing department	59	56	94.92%
Clinical Medicine	38	36	94.74%
Medical Education	42	41	97.62%
Health Records and Information Technology	42	40	95.24%
Pharmacy Department	49	48	97.96%
Orthopedic & Trauma Medicine	31	31	100.00%
Total	261	252	96.55%

Demographics of the study's participants: The demographics for the study's participants are presented in Figure 1. The majority of the participants in the study were male, third-year students, aged 18-25 years, and from the Nursing department.

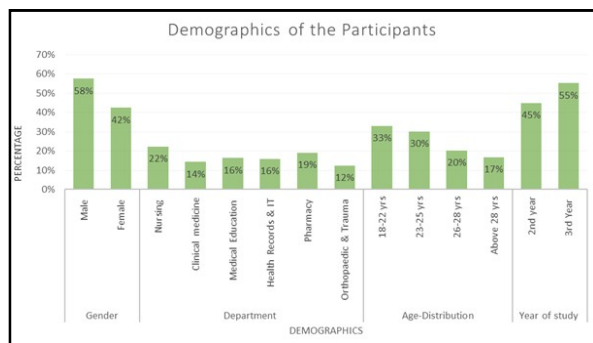


Figure 1. Demographics of the participants

Extent of technological factors in influencing eLearning adoption at KMTC Nairobi:

Descriptive statistical analysis was conducted on the data of technological factors, and the results are presented in Table 3. The overall average rating of the technology factors was 3.239 ± 0.89 , indicating a neutral rating. Technological factors have a moderate influence on the adoption of eLearning at KMTC Nairobi. Table 4 presents the results of the inferential regression analysis on technological factors, indicating that the ease of use of Moodle by learners is a statistically significant factor ($p = 0.009$, $p < 0.05$) in influencing the adoption of e-learning at KMTC Nairobi. Thematic analysis was used to analyse the Technological challenges faced while using the Moodle eLearning system in KMTC, Nairobi. The emerging themes from the qualitative question were internet connectivity issues, login and navigation of the Moodle system, and training and support follows;

Internet connectivity issues: There were challenges with internet connectivity reported by 171 respondents, or 77% of the total respondents. Students felt that the institution's internet connectivity was inadequate even though they were paying for it. As a result, they resorted to using mobile data bundles, which were more expensive and put a strain on their finances. Here are some of the responses;

"Inadequate internet connectivity throughout the institution, forcing us learners to use alternative measures which are expensive to a student"

"Lack of internet access for learners....we pay for wifi which we can't access"

"Student has to cater for the internet charges. Poor students will find it challenging and extra cost from the basic school fees"

The students claim that the institution has few WI-FI routers, which contributes to the poor internet connectivity. Due to traffic from many students using the internet at once, the speed is also slow. Here are some of the responses;

"Internet connectivity to be improved hence installation of wifi routers"

"The internet connectivity is low due to the large number of students"

The students experience system issues as a result of the internet connectivity. The system frequently hangs, according to the students, especially during exams. Some of the responses from the students were as follows;

"Hanging of the system while doing online exam leading to wastage of allocated time" "System failure especially during Exams" ... "System hangs mostly during online examination"

Log in and navigate the Moodle system: Thirty-six per cent of respondents indicated that the major technological problem faced by the institution in adopting eLearning was logging in and navigating within the Moodle system.

The students indicated that there are certain units which are restricted to a certain number of students, and whenever there is more than the set number, the other ones are logged out. Students also indicated that there is a challenge in password recovery. Some of the respondents said that;

"It is a challenge when it comes to harmonized units that have a certain number of participants to log in, and some are unable to join the lesson"

"Sometimes the system is down, but it is easy to access and in case of password loss, retrieving the account takes some time"

Logging in and navigating in the system is also affected by internet connectivity. The respondents indicated that whenever there is a huge influx of students accessing the system simultaneously, logging in may take quite some time, and navigating the system also becomes slow. Some of the respondents said;

"Logging in issues and while using it with so many other students it gets very slow"

"The Moodle eLearning system is a little bit difficult to navigate, and the internet connectivity is not that strong"

A few students also indicated that the navigation process is too cumbersome, and there was less support for them. Some of the respondents said;

"Long navigation process"... "You have to navigate the system on your own most times"

Training and support: About 3% of the students have technological challenges since they were never trained and they lack support, especially from their lecturers. Some students believe that the lecturers have never used the Moodle system. One of the respondents said;

"Since I joined eLearning system, I have seen challenges in terms of accessing. It is not easy to use it because none of our teachers has tried to use it"

Some of the students believe that the training on the eLearning system is inadequate. When asked about the technological challenge faced, one of the students said;

"Inadequate training on the Moodle eLearning system"

The support to students was also a challenge since they indicated that they had to navigate the system on their own and

locate the files they needed. Some students felt that there was not enough support from their lecturers. Some of the respondents said;

Table 1. Results of the Technological Factors based on a 5-point Likert Scale

Technology factors items	strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	mean $\pm$ SD
I can comfortably use the Moodle eLearning application software	22(8.7%)	27(10.7%)	57(22.6%)	92(36.5%)	54(21.4%)	3.51 $\pm$ 1.19
I find it easy to log in to the Moodle eLearning system	20(7.9%)	42(16.7%)	43(17.1%)	87(34.5%)	60(23.8%)	3.5 $\pm$ 1.24
I can download files from the Moodle eLearning system	42(16.7%)	42(16.7%)	62(24.6%)	65(25.8%)	41(16.3%)	3.08 $\pm$ 1.32
I find it easy to navigate through the Moodle eLearning system	19(7.5%)	33(13.1%)	67(26.6%)	87(34.5%)	46(18.3%)	3.43 $\pm$ 1.15
I was trained on Moodle eLearning tools before commencing the use of eLearning.	49(19.4%)	65(25.8%)	49(19.4%)	59(23.4%)	30(11.9%)	2.83 $\pm$ 1.31
I can access the Moodle help desk easily when I encounter challenges.	34(13.5%)	50(19.8%)	64(25.4%)	67(26.6%)	37(14.7%)	3.09 $\pm$ 1.26
I own a laptop /Computer/Mobile Phone to facilitate eLearning.	27(10.7%)	25(9.9%)	30(11.9%)	64(25.4%)	106(42.1%)	3.78 $\pm$ 1.36
Internet connectivity is adequate within KMTC- Nairobi.	67(26.6%)	55(21.8%)	53(21.0%)	43(17.1%)	34(13.5%)	2.69 $\pm$ 1.38

Table 2. Regression analysis output on the technological factors

Model Coefficients - EA adoption					
Predictor	Estimate	SE	t	p	
Intercept	4.4463	0.3022	14.713	< .001	
Usage of Moodle	-0.2114	0.0796	-2.657	0.009	
Easy login to Moodle	-0.1101	0.0795	-1.385	0.169	
Downloading files	0.0352	0.0592	0.595	0.553	
Navigating the Moodle system	-0.0257	0.0855	-0.300	0.765	
Training before using Moodle	-0.0325	0.0663	-0.490	0.625	
Accessing Moodle help desk	-0.0698	0.0614	-1.136	0.258	
Owning a Laptop/smartphone/or computer	0.0375	0.0607	0.618	0.538	
Adequacy of internet connectivity	-0.0680	0.0539	-1.262	0.209	

“The internet is not adequate to download the information so you are forced to use bundles. We lack attention from our lecturers and yet we are available for 1 week”

“No prior training of learners on how to use the moodle. Files cannot be downloaded from the module, and finding help is hectic.”

DISCUSSION

The adoption of eLearning is hindered by technological issues, including a lack of software familiarity, difficulty logging into the Moodle eLearning system, and limited access to computers for eLearning. The students' low familiarity with the software suggests a lack of system orientation among the students. Early student awareness-raising by the school administration is crucial for the adoption of e-learning systems (Houcine & Slim, 2021). The eLearning Moodle system is introduced to the students when they enroll at KMTC, so a thorough orientation is required. Houcine & Slim (2021) demonstrated that research on the adoption of e-learning technology by Students during the COVID-19 quarantine period showed that the willingness to adopt e-learning systems is significantly influenced by the availability of technical assistance, as alluded to by the tutors interviewed at the KMTC Nairobi campus. One of the technological factors influencing the adoption of eLearning is logging into the Moodle eLearning system. Due to slow internet connectivity and the large number of students attempting to access the eLearning Moodle system concurrently, this led to problems logging into the system. Poor internet connectivity at Jomo Kenyatta University of Agriculture and Technology (JKUAT) also had an impact on e-learning adoption, according to Kingori (2018). This suggests that the issue with internet connectivity affects not only the KMTC Nairobi campus but also other Kenyan institutions and developing nations.

A report by the World Bank (2020) indicated that, due to connectivity constraints, approximately 35% of the population in developing nations can access the internet, which is significantly lower than the 80% of the population in developed nations that have access to the internet. To achieve full eLearning adoption, higher education institutions in developing nations must invest in internet connectivity. The other technological factor that hinders the adoption of eLearning is the lack of computers. The tutors, however, indicated that the students can access eLearning through their mobile phones. According to Paul and Thuthukile (2020), lack of ICT resources denies school students learning opportunities. Computers improve young minds' education in a variety of ways. This includes helping them with their schoolwork and other assignments; as a result, their availability is a requirement, not a luxury.

Both students and tutors mentioned the need to provide computers to students; in fact, students suggested that the institution create a computer lab. Technological factors negatively impact the adoption of eLearning. According to the results of the bivariate regression, a 1% increase in eLearning adoption is associated with a 0.077% decrease in technological factors. Further analysis reveals that the learner's department and academic year are the moderating factors that influence the relationship between technological factors and eLearning adoption. Technological factors have a lesser impact on students in their third year than on those in their second year.

CONCLUSION

The KMTC Nairobi campus has a low adoption rate for eLearning due to insufficient internet connectivity both within the institution and in other areas outside, where poor internet connectivity makes it difficult for students to access the online platform, both at school and at home.

Despite the Moodle system being accessible within the organisation, the results indicated that most students are not knowledgeable about how to use it effectively. As a result, it demands that the institution take additional steps to orient learners to the system better. Additionally, there are not enough computers or reliable internet for the students to use the Moodle system.

RECOMMENDATIONS

Further study is needed to examine the technological factors influencing eLearning adoption among learners on other campuses outside Nairobi city.

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