# Use of EdTech in Support of Remote Learning during COVID-19 Pandemic in Kenya

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## Abstract

*This paper discusses the status and challenges faced by Institutions of Higher Learning (IHL) in Kenya in the implementation of eLearning to support remote learning during the COVID-19 pandemic in Kenya, and suggests possible approaches to its successful implementation. In the last decade, many Kenyan Institutions of Higher Learning have adopted eLearning in their quest for enhanced content delivery for improvement of learning through teaching. However, the effective utilization of eLearning in IHLs continues to be a challenge. The Blooms Taxonomy and Technology Acceptance Model informed this study. The findings from a survey of 211 students and 20 staff eLearning platform users from a Kenyan Institution of Higher Learning are presented in this paper. The aim of this study was to find out the impact of Education technologies (EdTech) technology of ICT enabled ELearning in aiding the learner's improvement of their learning capacity. The effectiveness of the eLearning portal in the facilitation of the learner's academic performance, communication and learning; and the impact of the eLearning platform on the relationship between the learner and the trainer. Data was collected through questionnaires. The findings revealed the awareness of staff and students on the existence of eLearning platforms. 70% of Students showed awareness of eLearning platforms and strongly agreed that it would improve teaching and learning. The benefits and opportunities provided by eLearning overshadows the challenges. This paper concludes by suggesting future work and recommends possible solutions that Stakeholders and Private Institutions of Higher Learning could adopt to successfully implement eLearning.*

***Keywords*: Status, Challenges, Implementation, eLearning**

## I. INTRODUCTION

The Kenyan Government established an open data initiative through its recent initiative to digitize government data provisioned through digital innovation villages and through network connectivity to government ministries departments and agencies, IHLs being one of the beneficiaries. Kenya was ranked first in Africa while it emerged position 42 globally as reported in the global Open data Barometer of year 2016 following its initiatives to ensure data is open freely to the public (Open Data Barometer, 2016). The Kenyan government recognizes the impact Information Communications technology (ICT) plays as a vital enabler in the realization of production, dissemination and assimilation of information and knowledge for productivity and economic prosperity, enhanced human skills, in the realization of an economy driven by innovative use of for innovative industrial development aimed at knowledge creation, adoption, and use for economic growth. In the implementation of its programs, a wide range of challenges have been experienced in the ICT sector including; ICT coordination from a decentralized structures resulting to slow implementation of automated systems, replication of innovations in ICTs; and a widening digital divide between settlements in the rural areas versus urban settlements resulting to less public awareness of the economic opportunities provisioned by adoption of ICTs; less skills in ICTs; resulting to slowed integration and use of ICT services by government Ministries, Departments and Agencies, including Institutions of Higher Learning (IHLs) that motivated the initiation of this research (GOK, 2007) . With the aim of improving service delivery using ICT the Government of Kenya adopted the integration of ICT in Higher Learning to acquaint young Kenyan learners with the relevant knowledge in ICT as an enabler in knowledge acquisition through learning, as envisaged in the rollout of the free laptop project. The Kenyan Second Medium Term Plan 2013-2017, aimed at integrating Science, Technology and Innovation in Education Management through the establishment of a Sector Wide Education and Training Management Information System that links all education related Agencies in the public and private sector. The Kenyan Third Medium Term Plan 2018-2022 (MTP III) (Republic of Kenya, 2018) aimed at initiating and operationalizing a National Education Management Information System (NEMIS) (GoK, 2018) with the objective of establishment of a system for collection, integrating, process, maintain and disseminate data and information for supporting decision making, analysis and formulation of policies for planning monitoring and management. MTP III further aims at integration of ICT into teaching and learning through ICT integration in University Education. Universities and Colleges in Kenya have gradually increased strengthening the Institutions of Higher Learning sector. There exists thirty chartered private universities, thirty public universities and thirty Institutions with letters of interim in the Kenyan IHL sector (Wikipedia, 2020) ; a clear indicator of the increase in student population as a challenge as well as an opportunity in eLearning adoption. Enrolment in public universities increased from 100,649 in 2008/09 to 546,699 students in 2020/21. (Adedoyin & Soykan, 2020; Adnan & Anwar, 2020) indicate that challenges among learners results from cost of acquiring the hardware, and software laptop and desktop computer devices, high cost of network connectivity and lack of coverage in remote places due to the lockdown measures, power outages and less capability of electric power storage in the electronic devices. The huge student population, coupled with the global COVID-

19 pandemic necessitates the need for electronic collaborative learning.

The Kenyan population hugely relies on the IHLs for socio-economic empowerment of learners while ensuring progression of the economy in the attainment of the Big Four Agenda and Sustainable Development Goal Number four on Safe and Quality Education (Mcgreal, 2017). In order to respond to the COVID-19 interruption in the education sector through school closures around the world, drastic measures have to be taken in the adoption of educational technologies in support of remote learning in response to the COVID-19 pandemic ripple effects. The onset of the COVID-19 pandemic in Kenya (Mbogo, 2021)saw several IHLs abruptly react to the effects of the pandemic through the adoption of eLearning platforms. Recently the Kenyan educational sector has seen a surge in digital platforms for learning purposes among IHLs, Tertiary Secondary, Primary and Kindergarten. These platforms help the students, parents, Teachers and Service providers to freely interact remotely. A wide range of technological interventions have been implemented including integration of the eLearning platforms to institutional websites, mobile applications, short message services and USSD. The popular digital learning platforms in Kenya include Usomi, Chuoni, Kusoma, Moringa School, Eneza Education, Boresha Ltd, iMlango, Kytabu, eLimu, Dawati, mElimu and Longhorn eLearning. Popular global platform used in IHLs in Kenya include Moodle, Blackboard, which provide collaborative tools that are both synchronous and asynchronous. These platforms (Paschal & Mkulu, 2020) enable students access learning content through their handheld devices and laptops connected to the internet. The COVID-19 pandemic saw the enhancement of Virtual learning and graduations through the KENET platform, Blue Jeans, Google Meet, Teams, Twitter, GoToWebinar, WebEx, and Zoom, within IHLs. Research is however currently being carried out to gauge the levels of satisfaction among learners to test their perceived usefulness in content delivery and learning while investigating the challenges and benefits. The purpose of this study is to investigate the status (Mbogo, 2021) and challenges in the implementation of electronic learning in Higher Learning Institutions (HLIs) of in Kenya using ICT enabled Educational Technologies in supporting Remote Learning during the global COVID-19 pandemic. This research sought to find the status of learning with the intervention of the ELearning portal in University to promote learning during the COVID-19 pandemic (Ngwacho, 2020). And further find out challenges on its implementation. This research design was guided by the following research questions;

1. Does the technology of ICT enabled ELearning aid the learner's improvement of their learning capacity?
2. What is the effectiveness of the eLearning portal in the facilitation of the learners academic performance, communication and learning?
3. What is the impact of the eLearning platform on the relationship between the learner and the trainer?

## II. LITERATURE REVIEW

The first online lecture was in 1993 recorded by William D. G. in a virtual instruction classroom environment in science (Cross, 2004), where the term 'eLearning' was coined and henceforth the term has been used in different contexts to depict the use of Information Communications Technologies in the learning process. According to (Jantke et al., 2007), eLearning has different meanings to different users, hence resulting to Web 2.0 which describes the interaction between users of the internet for learning purposes through the employment of different learning methods ranging from google documents, blogs and wikis as learning technologies (Jantke et al., 2007). eLearning is therefore computer-based training and course content delivery with the help of electronic gadgets, Interactive Television and Compact Disk Read Only Memory, satellite broadcast, audio and video tapes, extranets, intranets and internet. Computer Based Training relates to the delivery of content in training through the use of computerized networks such as intranet and internet. ELearning is also referred to as online learning

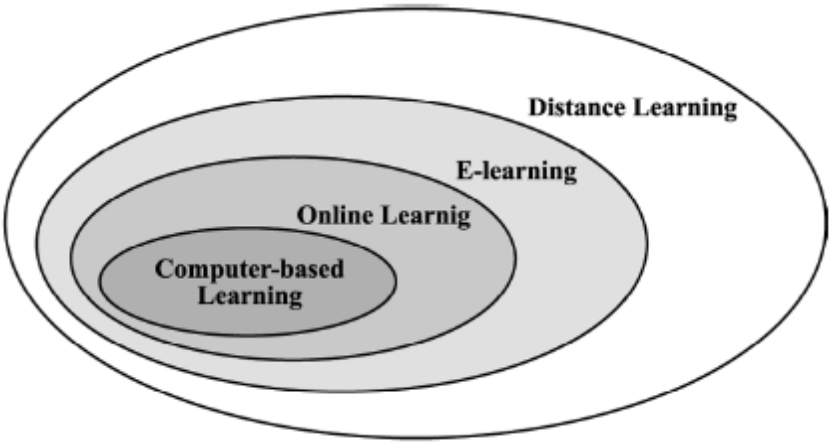


*Figure 1: Relations between learning technologies*

On-going education technology research, coupled by the novel global COVID-19 pandemic provided through empirical evidence insinuate that ICT usage for learning purposes has been catapulted through the spread of 5G network (Salman et al., 2018), affordability of digital devices, affordable internet charges and the digitization of government processes in developing countries (Bundi & Kirongo, 2017) and closure of learning institutions due to lockdowns, versus the need for continuity of learning (Ali, 2020). Innovations towards enablement of remote learning (Garbe et al., 2020) for continuity of education during the pandemic has further seen the adoption of remote learning, examination and meeting platforms and parental control interfaces. This has seen the spread of remote learning (Hash, 2021) to remote places of the world hence enabling access to education to persons that have been socio-economically marginalized, due to race, gender and the physically challenged through ICT enabled Assistive Technologies (Kirongo et al., 2019). The use of education technologies for

enabling remote learning to enable Usability and Interactivity of the eLearning platforms are the two major factors that need to be examined for enhanced learning in response to the COVID-19 pandemic in Kenya, so as to establish the usability of upcoming technologies for Remote Learning. This study is guided by three theoretical models which are the Blooms Taxonomy Theory (BTT)(Abuhassna et al., 2020), Technology Acceptance Model (Alassafi, 2022) and Transaction Distance Theory (TDT) (Abuhassna et al., 2020).

## III. METHODOLOGY

This paper aims at the use of educational technologies in support of remote learning during the COVID 19 pandemic while comparing the benefits that result from proper use of ELearning Portal to the students and staff at a University setup in Kenya. Respondents were drawn from undergraduate and Diploma regular, Distance Learning Mode and part time students from a selected University main campus and town campus and staff from academic and administration sections at the main campus. Demographic profiles of the respondents ranged from gender, age, courses as well as use of ELearning platform data was collected; also questions related to, perception and usefulness of the ELearning Platform was collected.

### Sample and Sampling Procedure

The sampling procedure applied in coming up with the sample was stratified random sampling. It involved dividing the academic staff and student population at the town and main campus to homogenous subgroups of faculties and schools, then taking a random sample of 10% of the population from the strata's in the two campuses. The main campus had a total population of 2110 students, and 200 staff, while town campus had a population of 152 student respondents. The sample used for the research at the main campus was 211 for students, and 20 for staff, whereas the sample from the town campus was 15 for the part time students.

*Table 1: Summary of the Target Population*

| Campus | Staff Population | Student Population |
|---|---|---|
| Main & Town Campuses | 200 | 2110 |
| Sample used | 20 | 211 |

### Research Instruments

Data was collected using questionnaires. The questionnaire contained questions that used interviews as the primary tool for data collection. They were distributed to students in two campuses and staff in one campus. Interviews were done to the respondents with the aim of acquiring data based on the interaction between the target population and the researcher. This was used as a follow-up for questionnaire. Interviews were carried out among staff and students who gave their views with regards to their perception on the eLearning platform. The researcher also observed the state of the eLearning platform on the university website, which further contributed the findings of the research. The instruments were reliable as the responses received from the population interviewed generated consistent information in the findings. A sample of 10% of learners from Postgraduate, Undergraduate and Diploma regular and part time students, was used. The participants were selected from the Universities main campus and from town campus which was selected in a period of three weeks, while teaching and learning was

taking place, among instructors and learners that had an experience with interacting with the ELearning portal to access learning and teaching resources.

## Data Analysis

The questionnaire was made up of two main parts that focused on the demographic and personal background of the respondent's including gender, age, types of courses, year of study, and advantages and usefulness of ELearning Portal. Questions related to awareness of its existence, challenges among lectures and learners, availability of learning material, duration and feedback of learning material, communication relating issues and usefulness of the portal. The data was analyzed by using the Statistical Package for Social Science (SPSS) Version 22.0. The frequency tests were run to determine the distribution of the demographic variables, challenges and status of the implementation of the eLearning portal, and advantages of using ELearning Portal. Further analysis was done using chi square and cross tab, bar graphs and pie charts for a pictorial representation of the finding.

## IV. Results

### Students e-Learning Awareness

The study shows that 70% of the students that were interviewed were aware of the existence of the eLearning platform in The University while 30% were not aware of the existence of the eLearning platform in the University.

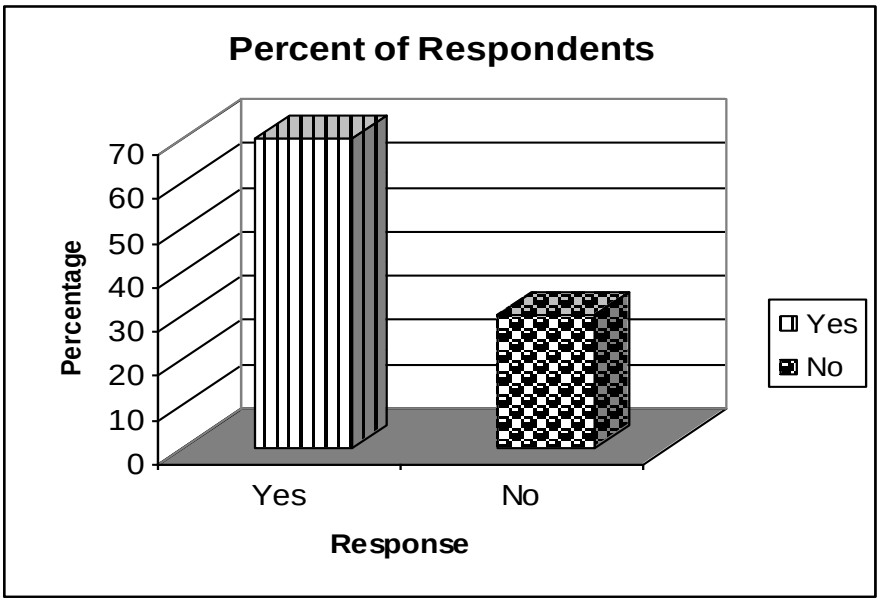


*Figure 2: Students awareness of the E-Learning platform*

## Student Awareness according to Gender

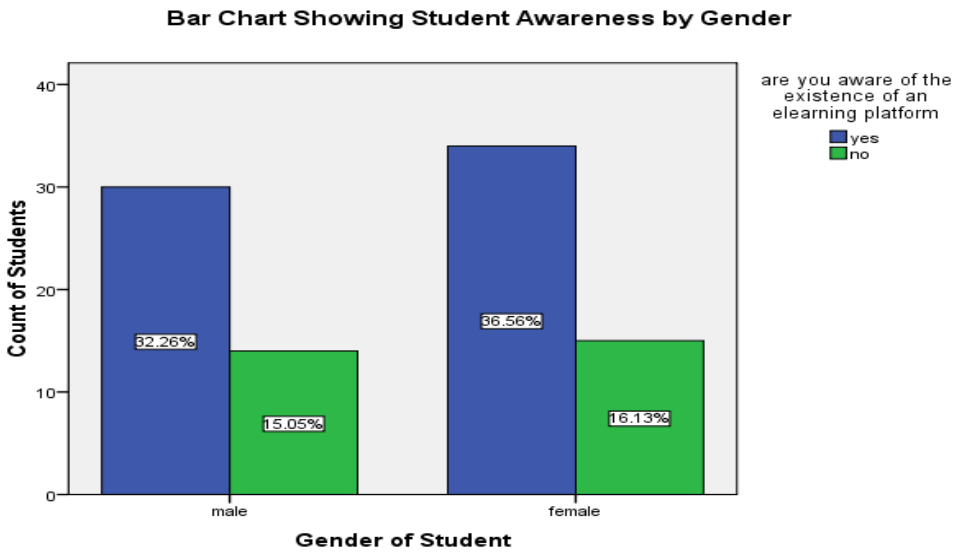


*Figure 3: Awareness according to gender*

Out of 190 students who were interviewed, 133 were aware with them responding Yes and 57 were unaware responding No.54% of the Yes students were female while 46% of the yes students were male students.

*Table 2: Student Awareness according to Field of Study*

| | Are you aware of the existence of an eLearning platform? | | Total |
|---|---|---|---|
| **Field of study** | **Yes** | **no** | |
| Business studies | 37 | 12 | **49** |
| Medical | 29 | 24 | **53** |
| Agriculture | 8 | 0 | **8** |
| Information technology | 36 | 4 | **40** |
| Education | 17 | 10 | **27** |
| Theology | 6 | 7 | **13** |
| **Total** | **133** | **57** | **190** |

The findings from the comparison of the field of study and awareness of the existence of the eLearning platform, show that 45% of the medical students interviewed were not aware of the existence of the eLearning platform, compared to their counterparts in their information technology were who were 1 % unaware. The finding shows that out of the 133 students who are aware, 39 are fourth year students, 35 are first year students, 31 are third year students and 28 are second year students. From the study, 37% of the second

year students seem not to be aware of the existence of the eLearning platform compared to 18% of the fourth year students. The study shows that out of 190 students who were interviewed 75 expressed a positive experience of using the eLearning platform, 46 students were neutral in expressing their experience and 12 students had a negative experience in using the eLearning platform. The study also shows that 30 % of the students were not aware of the existence of the eLearning platform.

## Student barriers in using the eLearning platform

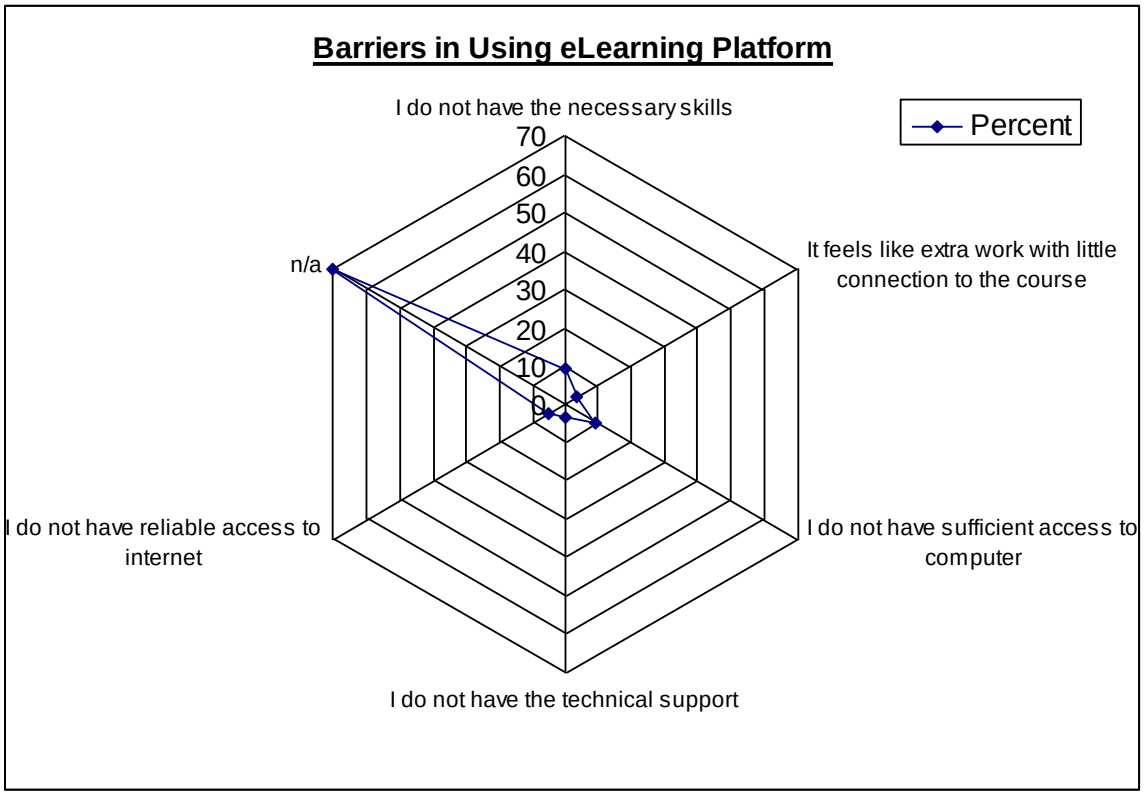


*Figure 4: Barriers in using eLearning Platform*

The finding shows that there are several barriers that are facing students who don't prefer using the eLearning platform for their studies. Out of 57 students who were not aware of the existence of the eLearning platform 18 students did not have the necessary skills and did not have sufficient access to computer. 9 students lacked a reliable connection to the internet while 6 students felt that it was extra work with little connection to the course and did not have the necessary technical support.

*Table 3: The benefits of using eLearning platform*

| | Frequency | Percent |
|---|---|---|
| Improved my learning | 39 | 20.5 |
| Save me time | 22 | 11.6 |
| Convenience | 25 | 13.2 |
| No benefit | 10 | 5.3 |
| Helped me manage my class activities | 13 | 6.8 |
| N/a | 81 | 42.6 |
| **Total** | **190** | **100.0** |

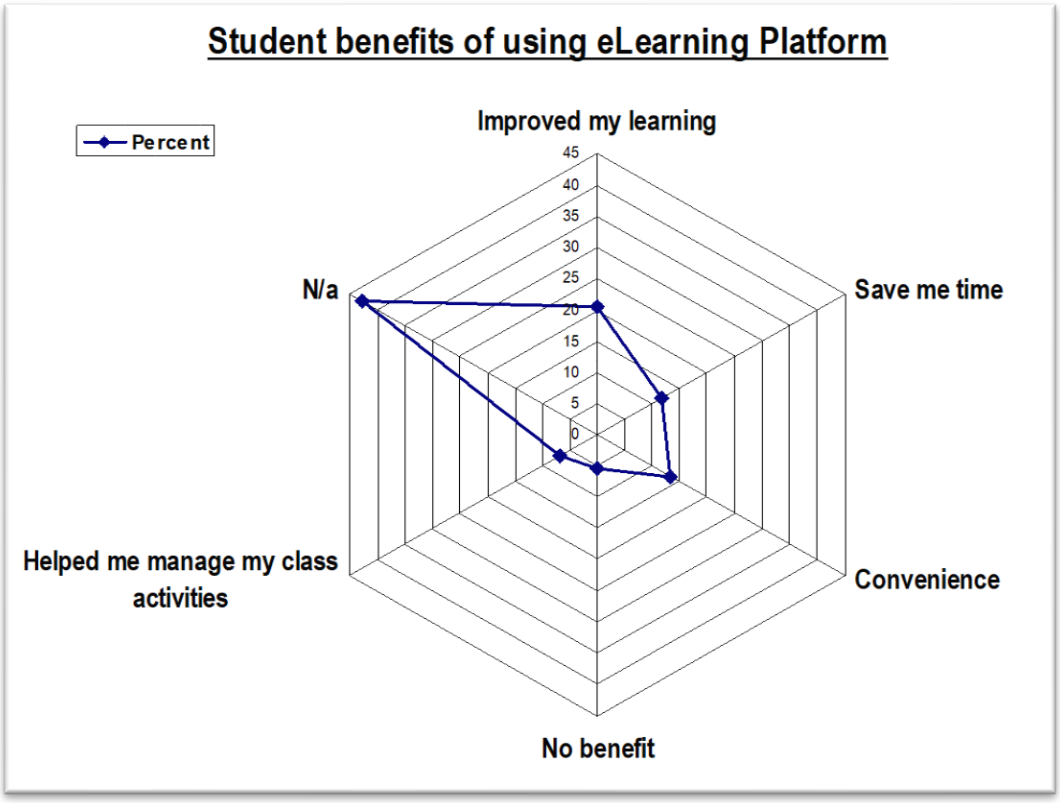


*Figure 5: Benefits of Using eLearning*

The benefits of using eLearning as perceived by students are as follows. It is assumed that advantages of eLearning will lead to positive student perceptions of eLearning implementation. 17% of the candidates agreed that the use of eLearning will improve the learning process, 12% agreed that the use of eLearning makes the learning process convenient and 11% of the student felt that eLearning enabled them to save the students time.

## Students Awareness and usage of the eLearning platform for Learning

The significance value of the test for students who were aware of the existence of an eLearning platform is 0.033. Since this value is less than 0.05, we can conclude that the relationship observed in the crosstabulation is real and not due to chance.

*Table 4: Student Awareness of existence of eLearning*

**Chi-Square Tests**

| are you aware of the existence of an elearning platform | | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|---|
| yes | Pearson Chi-Square | 10.495[a] | 4 | .033 |
| | Likelihood Ratio | 11.639 | 4 | .020 |
| | Linear-by-Linear Association | 1.014 | 1 | .314 |
| | N of Valid Cases | 133 | | |
| no | Pearson Chi-Square | 4.359[b] | 4 | .360 |
| | Likelihood Ratio | 5.522 | 4 | .238 |
| | Linear-by-Linear Association | 1.192 | 1 | .275 |
| | N of Valid Cases | 57 | | |

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is .92.

b. 6 cells (60.0%) have expected count less than 5. The minimum expected count is 1.42.

Students Awareness and usage of the eLearning platform for Learning findings from this study agrees with findings from other studies done. (Al-Mamary, 2022) used the UTUAT model in seeking to understand the use of learning management systems among undergraduate students by developing a predictive model for students' motivation to use LMS through application of existing scientific learning theoretical motivations on technology acceptance. The study concluded that Learning Management Systems (LMSs) have gained popularity among in academic setting in response to the COVID-19 Pandemic and suggests that there is a critical need to advance LMS in Institutions of Higher Learning. (Abuhassna et al., 2020) explored and investigated the potential factors that influence students' academic achievement and satisfaction while using online learning platforms based on the Transaction Distance Theory (TDT) and Blooms Taxonomy Theory (BTT). The findings from the research aligns to the findings of this research by indicating that students' awareness and application of the eLearning platform affected application, remembering, understanding, analyzing, of the students which properly correlated and aligned to the students' academic achievements.

## Has the eLearning helped build a strong relationship with your lecturers towards learning?

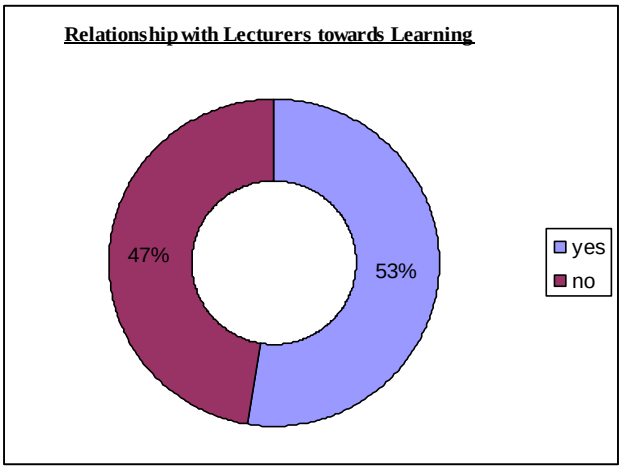


*Figure 6: Relationship with lecturer toward Learning*

The findings show that 53% agreed that eLearning would increase communication and the relationship with lecturers towards while 47% disagreed.

## Staff Awareness by Gender

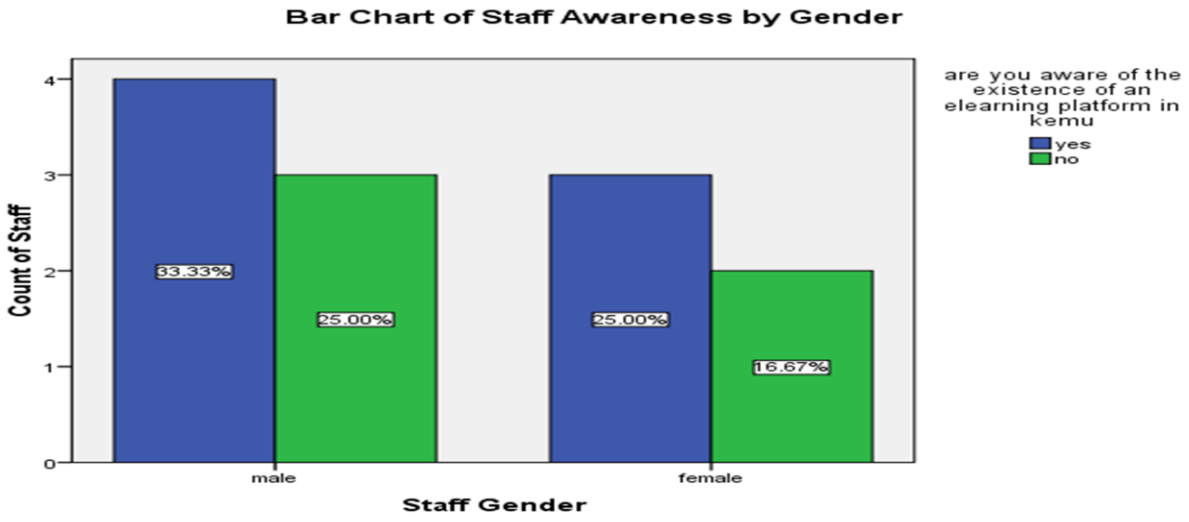


*Figure 7: Staff Awareness by Gender*

## Staff awareness and usage of eLearning platform to deliver coursework

The significance value of the test for staff who used the eLearning platform to deliver coursework is 0.010. Since this value is less than 0.05, we can conclude that the relationship observed in the crosstabulation is real and not due to chance.

*Table 5: Staff Awareness of eLearning platform*

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 9.260[a] | 2 | .010 |
| Likelihood Ratio | 12.352 | 2 | .002 |
| Linear-by-Linear Association | 5.959 | 1 | .015 |
| N of Valid Cases | 15 | | |

a. 6 cells (100.0%) have expected count less than 5. The minimum expected count is .93.

Findings on staff perception of the eLearning platform indicated that 70% Strongly Agree that using the eLearning would improve teaching and learning, 70% Agree that it is expensive to develop and implement an eLearning platform, 58% strongly agree that they would find eLearning platform useful in their job, 58% agreed that eLearning content preparation requires IT skills and 98% eLearning content requires a lot of time to develop. The study shows that there are some factors affecting the students' perception on the implementation of eLearning. Some of these factors why students prefer using the eLearning platform over other modes of learning are described below. 58.9% of the students that were interviewed prefer eLearning over other modes of learning since they find information that is not available on our library and 26.3% can access online class materials. It has been assumed that if a factor can impact a student's use of technology then it also affects their perceptions of implementation and usage of the eLearning platform. This phrasing was done to make the questionnaires more understandable to the students.

## V. Discussion

The enhanced use of eLearning for teaching and learning after the effects of the COVID-19 pandemic as an enabler in Education Technologies for learning in Kenya can be realized through the enablement of IHLs to be ready to use them as a recovery measure from the COVID 19 pandemic. This will necessitate the improvement of the coverage of the network infrastructures and connectivity speeds and user's consistent remote user support in the institutions. However, so as to realize this initiative among Institutions of Higher Learning, appropriate strategies should be put in place to improve learning outcomes. The use of eLearning platform for learning among students and instructors can be enhanced through dynamic eLearning platform that are enabled on multiple devices to offer content in dynamic setups for consumption among learners with diverse learning behavior and attention levels to avoid disrupting students' attention. Students should be provided with the relevant skills to enable them get the best from the use of the eLearning platform. There is need for a change in the curriculum to integrate the use of eLearning in teaching and learning while at the same time enhances policies that recognize and award those who use of eLearning for teaching.

## VI. Conclusion and Future Work

This research study sought to find out whether the technology of ICT enabled ELearning aid the learner's improvement of their learning capacity; the effectiveness of the eLearning portal in the facilitation of the learner's academic performance, communication and learning; and the impact of the eLearning platform on the relationship between the learner and the trainer. Findings from the research proved that ICT EdTech aid learners improve their learning capacity impacting their relationship with the trainers. Future work can be done to test the effectiveness of the use of Virtual Reality and Augmented Reality in the dissemination of practical based training among learners in Institutions of Higher Learning during the recovery phase of the COVID-19 pandemic period. For further future work, this research suggests that more study be carried out to examine the relationship between the infrastructural, cultural, socio-economic and complexity of EdTech use for online learning platforms in Institutions of Higher learning by studying existing Theoretical Models related to use of Technology for learning.

## VII. Recommendations

The findings of this study point out the need for the adoption of eLearning approach in teaching learning and examination, and integration in other University procedure through review of policy and procedures in the set Quality Management System Manuals and Information Security Management Systems. Since most University website have integrated an eLearning portal, interactive content need to be integrated through the adoption of Virtual Reality and Augmented Reality to address the growing need for remote training of practical based skills training. Training Curriculum for teacher trainings Colleges and Schools should review their curriculum to enhance the adoption and approval of virtual based practical learning and training and be adopted as an alternative to physical practical based training through the adoption of the emerging virtual reality and augmented reality learning. Courses that are offered in various universities can be custom made to be taught and examined virtually to expand the population of students from a wide region.

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