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E-Learning and Pedagogy Performance at Public Tertiary Institutions; A Case of Kenya Medical Training College

Kenneth Goga Riany[1] and Kamau, Maina[2]

Kenya Medical Training College, P.O. Box 30195-00100, Nairobi, Kenya.
[1]Email: rianyken@gmail.com; [2]Email: kkamanje@yahoo.co.uk

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Abstract: The Kenyan government has an enormous task in tertiary education of crafting economically viable methods of expanding access, refining the curricula quality, significance of the courses offered, and strengthening institutional-based research and technology transfer. With the augmented demand of higher education and E-Learning gaining acceptance steadily, the Kenyan government endorsed the establishment of the National Open University of Kenya in December 2014 in an effort to expand enrolment through distance and E-Learning. While studies have shown that E-Learning has the potential to accelerate pedagogy performance in the public tertiary institutions, it is not clear to what extent the technology has had an impact on pedagogy. The study sought to investigate the relationship between E-Learning and pedagogy performance at the Kenya Medical Training College, Kenya. The study reviewed E-Learning system infrastructure quality, E-Learning instructor and course materials quality as well as E-Learning administrative and user support quality as independent variables, socio-demographic characteristics as a moderating variable and pedagogy performance as the dependent variable. A theoretical review anchored on the Grounded Theory Methodology followed by an empirical review in line with the study variables. The study adopted a descriptive research design targeting 39021 students and 1900 staff members from the 71 Kenya Medical Training College Campuses in Kenya as at December 2019. Cochran's formula was applied to generate a sample size of 96 respondents (68 students and 28 staff members). The study found that E-Learning had a significant and positive influence on pedagogy performance. Additionally, it was determined that socio-demographic characteristics moderates the role played by E-Learning on Pedagogy Performance. The study recommended that the Kenyan higher learning institutions ought to embrace e-learning as a way of enhancing the quality and effectiveness of learning.
Keywords: E-learning, Pedagogy, Performance, System infrastructure, Administrative support, materials and Technology acceptance.

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1.0. Introduction

1.1-Background of the Study: The overall mandate of tertiary institutions is to create knowledge and information by pedagogy, community service as well as catalyzing the boundaries of knowledge via research (Lawal and Viatonu 2017).

Tertiary institutes occupy a fundamental position in personal and societal advancement and development and are traditionally mandated to offer comprehensive and quality education to produce knowledgeable, competent, self-sufficient, self-fulfilling alumni thereby allowing them to achieve self-actualization and optimum productivity in life.

The status of pedagogy, knowledge acquisition, research and productive skills for a meaningful socio-economic and political advancement of any society cannot be over-emphasized (Viatonu, Asikhia, Fabinu & Ademola, 2018). The association between tertiary education and the aspects that lead to pedagogy performance have been examined extensively in traditional classroom setups where interaction between students and tutors take place directly in physical classrooms on campus (Martinez-Arguelles and Batalla-Busquets, 2016). Nevertheless, whilst technological advancements are undoubtedly creating new prospects of value addition and advancement with ground-breaking products and services, they are also removing boundaries in equal measure thereby disrupting all industries and sectors (Paba and Solinas, 2018). According to Chow and Shi (2014) tertiary education has not been spared and the popularity of Electronic Learning commonly referred to as E-Learning has been steadily skyrocketing in academic fields, institutions and has been extensively accepted.

As a concept E-learning has elicited numerous debates amongst scholars about a common definition but as a paradigm, it encapsulates an array of learning approaches, tactics, applications, procedures as well as academic areas (Hubalovskya, Hubalovskab and Musileka, 2019). Rodrigues, Almeida, Figueiredo and Lopes (2019) define E-Learning as advanced web-based systems built on digital platforms, technologies and other systems of educational materials with the key objective of offering scholars a learner-centric, bespoke, open, pleasant as well as an interactive learning atmosphere supplementing and augmenting learning methods whereas according to Mahande, Jasruddin and Nasir (2019), it is leveraging on telecommunications technology to offer and improve the quality of information services, dynamic learning, tailor made education and training environment by providing access to resources as well as distance collaboration.

Despite the existence of diverse definitions, nonetheless, scholars frequently agree that E-Learning involves the utilization of Information Communication Technologies (ICTs) to support pedagogy and provides an opportunity to facilitate interaction between learners and tutors are separated by different time zones, geographical zones or both consequently enhance learning experience and performance (Alzahrani, 2019; Baporikar, 2019; Edumadze, 2019; Hssina and Merbouha, 2017; Mothibi, 2015).

Globally E-learning has been embraced rapidly, according to Piccioli (2014) Asia had the world's highest regional E-Learning growth rate, of 17.3%. followed by Eastern Europe, Africa, and Latin America at 16.9%, 15.2%, and 14.6%, respectively. In the USA, for instance, E-Learning is no longer fringe or supplementary but a fundamental component of mainstream pedagogy (Makonjio, Odera and Warentho, 2019). Elbasuony, Gangadharan, Janula, Shylaja and Gaber (2018) explain that E-Learning has been introduced to curricula in a number of developed nations such as Australia, Canada, Greece, Ireland, New Zealand, United Kingdom and America. In China E-Learning adoption grew at a rate of 25.0% in 2015-2016 and by end of 2016 the number of E-Learning users had surpassed 130 million (Xe, 2019). The 39th Report of Internet Development in China (CNNIC, 2017) noted that in China the current régime has strived to constantly develop policies that support the implementation of E-Learning. To this end, as at 2017 the number of students accessing E-Learning platforms had been increasing at a sturdy rate of 85%.

Regionally, an Ambient Insight Regional Report (AIRP, 2011-2016), depicted that Africa had observed a higher growth rate in E-Learning compared to other nations with the growth rate for self-paced E-Learning in Africa at15.2%. Senegal had the highest growth rate in Africa at 30.4%, followed by Zambia, Zimbabwe and Kenya at 27.9%, 25.1% and 24.9% respectively.

Unwin *et al.*, (2010), concurs that the adoption of E-Learning has shown a tremendous recognition in emerging nations, via a study regarding the status of E-Learning in Africa from 25 African nations revealed that (49% of the total sample) had used an E-learning approach for pedagogy with higher learning institutions in Kenya Senegal, Zambia, Zimbabwe, South Africa, Angola, Nigeria, and Tunisia recording commendable advancement in the adoption of E-Learning.

Locally, with the augmented demand of higher education and E-Learning gaining acceptance steadily, the Kenyan government endorsed the establishment of the National Open University of Kenya in December 2014 in an effort to expand enrolment through distance and E-Learning. To meet the growing demand most Kenyan tertiary institutions as well as universities are leveraging on E-Learning portals to tap the unexploited niche clientele who may have time to study online but no time to attend traditional classes (Muuro, Wagacha, Kihoro and Oboko, 2014). In light of the foregoing, digitally catalyzed pedagogy approaches are no longer optional but a prerequisite to manage the augmented demand and with this background data at hand, it is essential to reconnoiter E-Learning elements in line with pedagogy.

1.2 Problem Statement

Tertiary institutions are crucial in the attainment of the United Nations Sustainable Development goal number four (SDG4) on ensuring inclusive and quality education for all and promoting lifelong learning. Locally they propel the realization of the Kenyan development blueprint known as the Kenya Vision 2030 Agenda. Akintoye (2016) noted that the role of tertiary institutions includes pedagogy, manpower development, research and development and training of players in both formal and informal sectors of the economy.

In light of the foregoing, tertiary Institutions play different roles in national development, support a key role in the production and distribution of national income and in emerging economies such as Kenya, they are a critical pillar for achieving prosperity and eliminating poverty (Bunoti, 2011). To this end, under ideal circumstances, the institutions not only shape the future via pedagogy but similarly generate a research base for sustainability efforts and providing outreach and service to societies and countries (Balashov, 2018).

The knowledge produced and skills imparted by the tertiary institutes contribute to faster growth in national income, an expansion of the system contributes to more equal sharing of the national income. With expansion of the knowledge economy, the knowledge produced by the system and the skills possessed by its graduates are becoming deciding factors in promoting economic progress and social welfare.

However, over the years, there has been a growing concern about the performance of tertiary institutions. According to a RoK (2012) report on the evaluation of the performance of public agencies detailed that out of the 69 tertiary institutions at that time, none attained “Excellent” grade. 30, representing 43.5 per cent, achieved “Very Good” grade. 37, representing 53.6 per cent, achieved “Good” grade. None of the tertiary institutions achieved “Fair” grade, while two (2) representing 2.9 per cent achieved the “Poor” grade.

Seven years later a policy report by (WB 2019) titled improving higher education performance in Kenya painted a grim picture that while Kenya aims to be an upper-middle-income economy by 2030, its gross enrollment rate in tertiary education is at 11.7 % slightly higher than the continental average of 9 %. Additionally, despite the Kenya's Vision 2030 underscoring that the nation purposes to realize standards like South-East Asian 'recently industrialized nations' such as Singapore; Hong Kong, Taiwan, China and the Republic of Korea, Kenya trails the nations it seeks to emulate (Asian Tigers) significantly. The Kenya's tertiary gross enrollment rate is substantially lesser compared to the aforementioned nations, as all have attained over 70 % in the gross tertiary education enrollment.

Today, the Kenyan government has an enormous task in tertiary education of crafting economically viable methods of expanding access, refining the curricula quality, significance of the courses offered, and strengthening institutional-based research and technology transfer. To this end, the failure of tertiary institutions to realize their key objective of delivering an all-inclusive and qualitative pedagogy that enable them serve as catalysts of transformation via research, knowledge creation, education, training and dissemination is now a primary concern to scholars, policy makers, strategists and other stakeholders (Viatonu, Asikhia, Fabinu, & Ademola, 2018). E-Learning is increasingly being used in tertiary institutions to support the delivery of learning in outcome-based education. Broadly speaking, E-Learning is considered to be the application and integration of educational technology to the learning process. In response to this problem, this study sort to investigate the relationship between E-Learning and pedagogy performance at the Kenya Medical Training College, Kenya from the perspective of students as the primary external customers and service recipients.

1.3 Purpose and Hypothesis

1.3.1 Objectives of the Study

In order to carry out the study successfully, four key objectives were identified.

a) To assess the influence of E-Learning system infrastructure quality on pedagogy performance at public tertiary institutions.
b) To establish the influence of E-Learning instructor and course materials quality on the pedagogy performance at public tertiary institutions.
c) To determine the influence of E-Learning administrative and user support quality on the pedagogy performance at public tertiary institutions.
d) To investigate the moderating effect of socio-demographic characteristics on the relationship between E-Learning and pedagogy performance at public tertiary institutions.

1.3.2 Hypotheses

The study aimed to test the following null hypotheses:

H_{01}: E-Learning system infrastructure quality does not directly affect pedagogy performance at public tertiary institutions in Kenya.

H_{02}: E-Learning instructor and course materials quality does not directly affect pedagogy performance at public tertiary institutions in Kenya.

H_{03}: E-Learning administrative and user support quality does not directly affect pedagogy performance at public tertiary institutions in Kenya.

H_{04}: Socio-demographic characteristics has no moderating effect on the relationship between E-Learning pedagogy performance at public tertiary institutions in Kenya.

2.0 Review of Literature

2.1 Theoretical Review

This study adopted the Grounded Theory Methodology (GTM), a transcendental theory generating methodology founded by Glaser and Strauss (1967). GTM "has the purpose of generating concepts and their relationships that explain, account for and interpret the variation in a substantive area under study" (Glaser, 1992). Through grounded theory, the voice of the respondents can be heard. It allows actors to define situations, the definitions to be produced in their natural contexts and is not influenced by explicit expectations about what the study might find; instead it allows the study to make discoveries without a priori knowledge (Matavire *et al.*, 2010). The theory supports the construct "E-Learning" by providing a unique perspective for exploring additional insight into the reasons for high failure rates associated with under-utilized E-Learning systems in developing countries. It also highlights the need to move beyond or synthesizing the current dominant theories and models that might overlook multiple perspectives, and guide E-Learning implementation plans that aim to address factors associated with E-Learning acceptance and subsequent positive use behaviour, in less established and more challenging environments.

2.2 Empirical Review

Over the last few years, researchers have strived to determine the association between E-Learning and pedagogy performance for example Gaebel, Kupriyanova, Morais and Colucci, E. (2014) did an E-Learning in European Higher Education Institutions mapping survey targeting 800 European University Association (EUA) member institutions in 47 European countries. 249 institutions (of which 241 are EUA members) from 38 countries and higher education systems completed the survey. The survey found it conspicuous that 249 Higher Education institutions of different categories and pursuing diverse mandates from 38 unlike countries and leveraging on diverse structures shared largely similar motivations for leveraging on the technological advancement.

The key motivating factors were effective usage of classroom time and more flexibility in pedagogy, irrespective of whether students are onsite or off campus, fresh school leavers or mature learners. The study concluded that E-Learning can inspire and inform institutional methodologies as well as reforms therefore should be shifted from the realm of specialist discussion into a wider European debate on learning and teaching methods in higher education, in which leaders, practitioners and researchers at institutions could all take part.

Mitchell *et al.*, (2016) conducted a non-linear, student-centered study on the effectiveness of teaching undergraduate and graduate nursing courses by means of a complexity-based pedagogy approach augmented with E-Learning at the York University, Canada. The study was conducted over a period of two years whereby the nursing faculty team co-created course outlines, teaching plans, learning resources with meeting frequently organized to strategize, allocate resources and mentor one another. Each faculty documented their experiences of E-Learning and complexity pedagogy. All faculties teamed up to produce a descriptive report that suggested improved student-teacher interaction and higher quality critical thinking than experienced earlier with traditional learning approaches concluding that complexity pedagogy augmented with E-Learning provides superior learning warranting deeper examination. It is also noteworthy that WHO (2015) departments of Health Workforce and Department of Knowledge, Ethics and Research commissioned the Imperial College London's Global eHealth Unit (GeHU) to conduct a systematic review of scientific literature to assess the efficacy of E-Learning for undergraduate health professional education.

The systematic review leveraged on the methods recommended by the Higgins and Green, (2011) Cochrane handbook for systematic reviews of interventions and 209 studies were identified that met the inclusion criteria for the systematic review. A combination of the studies included in the review and grey literature reports were used to evaluate the advantages and disadvantages of E-Learning, the critical success factors for the implementation and adoption of E-Learning methods, the strategies to introduce E-Learning equitably and effectively, strategies to institutionalize and sustain E-Learning, and the quality of E-Learning. The study noted that there was a high degree of heterogeneity among the included studies in terms of the types of degrees, seniority of students, delivery mode used by the interventions, duration and frequency of exposure to the interventions, and measures of outcomes. Additionally, the majority of studies had important methodological flaws that may have biased the findings. For this reason, it was impossible to conduct a meta-analysis to determine an effect size of E-Learning on learning outcomes.

Elsewhere, in Australia Salter, Karia, Sanfilippo and Clifford, (2014) conducted a systematic review of literature investigating the quality of E-Learning effectiveness studies in pharmacy, E-Learning's progression as an emerging pedagogy in pharmaceutical training, linking the effectiveness measures, and synthesizing the evidence as per the Kirkpatrick (1959) hierarchy model for evaluating and analyzing the outcomes of pedagogy curricula. The review strategy targeted 459 records from database searches. After adjusting for duplicates, 424 records were screened and 362 omitted as they did not evaluate E-Learning interventions. The analysis, concluded that E-Learning was effective in increasing knowledge immediately after training for all pharmaceutical curricula and frameworks. Consequently, the study generalized that if applied in any setting E-Learning can supplement knowledge.

Regionally, compelled by the scanty literature on the pedagogical use of E-Learning systems despite the augmented implementation of E-Learning initiatives in Higher Education Institutions (HEIs), Dube (2014) did an interpretative research on the assessment of the pedagogical use of E-Learning in higher learning institutions of Zimbabwe. The research leveraged on a case study methodology owing to its ability to integration data collection as well as analysis methods for understanding the HEIs setting and dynamics. Due to a huge pool of potentially information-rich HEI cases random purposive sampling was used with the sample generated from three reputable national universities. For triangulation and complementarily questionnaires interviews and observations were used as the research instruments. The data analysis was more qualitative though reliant on the quantitative results used for participant profiling. A scholarly review and elucidation regarding the pedagogical use of E-Learning was drafted highlighting applied, theoretic and methodological contributions to fill the prevailing knowledge gap on E-Learning and pedagogy. Based on analysis of the E-Learning initiatives pertinent data was generated and a comprehensive contextual analysis of E-Learning developments akin to pedagogy phenomenon not yet understood established.

Locally Makokha and Mutisya (2016) sort to evaluate the status of E-Learning in Kenyan public universities. Data collection was via questionnaires administered to lecturers and students randomly sampled from seven public universities. The data collected was then analyzed qualitatively and through use of descriptive statistics. Findings revealed that E-Learning was at its infant stage in universities in Kenya, the universities were yet to fully adopt E-Learning as a mode of pedagogy and have not made significant strides in that direction. The study recommends that universities partner with the private sector to improve ICT infrastructure, build capacity, and standardize E-Learning programs in the country.

2.3 Conceptual Framework

Figure 1 presents the conceptual framework of the research model proposed in the study and summarizes the following specific objectives and hypotheses which are to be explored.

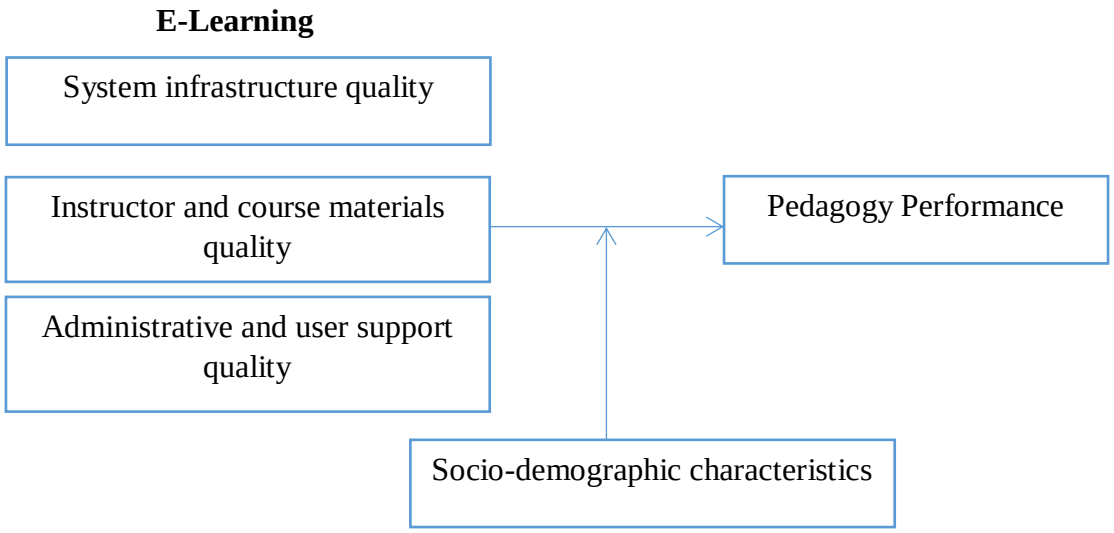

Figure 1. Conceptual framework of the research model

3.0 Methodology

3.1 Research Design and Philosophy

To achieve the current study's objectives, positivism philosophy was adopted. The study adopted a descriptive research design which is defined by Babbie and Mouton (2012) as an attempt to describe what is happening in more detail, by filling in the missing parts and expanding understanding. The choice of descriptive study was informed by the fact that though a descriptive study is simple, easy to conduct and it enables one to capture all important aspects of a situation (Riany, Were & Kihara, 2019).

3.2 Target Population and Sampling

To gather the information required, the study targeted 39021 students and 1900 staff from the 71 Kenya Medical Training College Campuses in Kenya as at December 2019. The students and the staff especially the teaching staff are at the central point for utilizing e-learning materials and knowing how effective the entire learning system is. This influenced their choice as the target population.

In addition, the study generated a sample size by use of Cochran's formula as depicted below since it is considered particularly suitable when dealing with large populations, allows the computation of an ideal sample size given a desired level of precision, desired confidence level, and the estimated proportion of the attribute present in the population (Cochran, 1963).

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where:

n_0 is the sample size, Z_2 is the abscissa of the normal curve that cuts off an area α at the tails (1- α equals the desired confidence level, e.g., 95%) 1, e is the desired level of precision, p is the estimated proportion of an attribute that is present in the population, and q is 1-p. The value for Z is found in statistical tables which contain the area under the normal curve.

$$n_0 = \frac{(1.96)^2(0.5)(0.5)q}{(0.10)^2}$$

n_0 = 96.04 the sample size therefore as 96 respondents where 68 (70%) were drawn from students while 28 (30%) were drawn from the staff.

3.3 Data Collection and Instrument Design

In the research, the primary data that is information gathered directly from respondents was collected through administration of questionnaires divided into various sections to adequately cover the objectives of the study and consisted of open ended, structured as well as unstructured questions. The primary data gathered was supplemented by secondary data obtained via the collection and analysis of published material and information from documented sources such as annual reports, journals, organizational websites, newspapers and published data.

3.4 Data analysis

The study applied descriptive and inferential statistics. The data collected on each construct of the independent variable E-Learning (system infrastructure quality, instructor and course materials quality, administrative and user support quality) was scored to determine the E-Learning level at each point. Similarly, the moderating variable socio-demographic characteristics as well as the dependent variable pedagogy performance were equally measured at the same time. The study leveraged on descriptive statistics as they generate the basis upon which correlational and experimental studies emerge as well as offer hints about the important subject matters that need special attention thereby leading to further studies (Mugenda & Mugenda, 2019).

To predict the influence of E-Learning (as independent variable) on the Pedagogy Performance (as dependent variable) the study applied regression analysis. The broad regression model (without moderator) was:

$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$

Where:
Y - Pedagogy Performance
α_0 - Is the constant
X_1 - System infrastructure quality
X_2 - Instructor and course materials quality
X_3 - Administrative and user support quality
β_1 - Coefficients
ε - Error term

Whereas the model for the moderating effect was as follows;
$Y = \alpha_0 + \beta_1 X_1 * Z + \beta_2 X_2 * Z + \beta_3 X_3 * Z + e$
Where X is the predictor and Z is the hypothesized moderator.

4.0. Results and Data Analysis

4.1 Descriptive Analysis of the Study Variables

System Infrastructure Quality

The first objective of the study was to assess the influence of E-Learning system infrastructure quality on pedagogy performance at public tertiary institutions in Kenya. The

descriptive results as shown in Table 1 revealed that there were inadequate infrastructure to support e-learning while there was no frequent upgrade of the existing e-learning infrastructure which could negatively affect the adoption of e-learning. The respondents however, believed that the quality of the system infrastructure would play a significant role in enhancing effective adoption of e-learning, towards promoting educational performance (Mean= 3.88 & Std. Dev. = 1.24). The findings compare with the arguments by Mtebe and Raisamo (2014) that lack of quality system infrastructure contributes to continued poor uptake of e-learning in Sub-Saharan Africa.

Table 1. System infrastructure quality

Statement	Mean	Std. Dev.
There are adequate infrastructure to support e-learning in the institution	2.49	1.17
There is frequent upgrade of the available e-learning infrastructure in the institution	2.33	1.25
The systems available are able to support and effectively run e-learning platforms	2.28	1.28
There are minimal delays in configuring and accessing the e-learning systems in the institution	2.53	1.52
I believe that the quality of the system infrastructure in our institution is able to support effective e-learning	3.88	1.24

Instructor and Course Materials Quality

The second objective of the study was to establish the influence of E-Learning instructor and course materials quality on the pedagogy performance at public tertiary institutions. The descriptive results as shown in Table 2 revealed that the materials provided for e-learning were not adequate and of the required quality while continuous improvement of the available e-learning materials was not effectively done. The respondents, however, indicated that with quality instructor and course materials, the effectiveness of e-learning in the institutions would be enhanced (Mean=4.07). According to Makokha and Mutisya (2016), e-learning highly relies on the quality of the learning and teaching materials based on the fact that the entire process is based on ICT which again is a continually changing parameter. In order to enhance the use of e-learning, it is therefore important for the institutions to ensure the quality of the available materials is up to data and meets the recommended standards.

Table 2. Instructor and course materials quality

Statement	Mean	Std. Dev.
The materials provided to the infrastructure for e-learning are adequate and effective	1.97	1.21
The instructors are keen to ensure the materials used in e-learning meet the required standards	2.28	1.27
The learners are given an avenue to give feedback on the quality of the availed e-learning materials	1.86	1.21
There is continuous improvement of the e-learning materials to ensure they are up-to date	2.01	1.17
The quality of the instructor and course materials significantly contributes to the effectiveness of e-learning in the institution	4.07	0.98

Administrative and User Support

The third objective of the study was to establish the influence of administrative and user support in e-learning on the pedagogy performance at public tertiary institutions. The management of the institutions is critical to the success of e-learning. The study found that the management of the institution was actively taking part in implementing e-learning (Mean=3.67) but it did not allocate adequate resources such as funding to cater for the entire process. The role of management is to come up with clear framework to facilitate e-learning. The framework should be based on policing, funding, monitoring and evaluating the success of the process (Kasse & Balunywa, 2013).

Table 3. Administrative and user support quality

Statement	Mean	Std. Dev.
The management of the institution is actively involved in enhancing the success of the e-learning in the school	3.67	1.15
There are adequate resources such as funding and personnel put in place to promote e-learning in the institution	2.60	1.36
The management has set a department to oversee e-learning in the institution	3.77	1.20
There is a framework and channel for learners and instructors to give their views on the status of e-learning to the management	2.80	1.23
I believe the support given by the administration of the institution has contributed to the success of e-learning	2.98	1.16

Socio-Demographic Characteristics

The study sought to assess the moderating effect of socio-demographic characteristics on the relationship between adoption of e-learning and pedagogy performance in higher learning institutions in Kenya. The descriptive results revealed that the respondents disagreed that cultural and religious believes and practices of the instructors and learners influenced their uptake of e-learning. The respondents however agreed that age of the stakeholders influenced their support and acceptance of the e-learning while disagreed that sex of the stakeholders influenced their support. The level of education was found to be a key demographic aspect affecting the uptake of e-learning. Previous evidence from Sujit, Wotto and Bélanger (2017) revealed that social and demographics characteristics such as age and educational background influenced an individual's attitude and aptitude towards uptake and acceptance of E-learning. This is supported by Singh and Lewa (2014) who indicate that social cultural factors may affect e-learning but with adequate awareness creation, the acceptance ought to increase.

Table 4. Socio-Demographic Characteristics

Statement	Mean	Std. Dev.
The learners' and instructors' cultural and religious practices affects their involvement and commitment in adopting e-learning	1.87	1.09
The age of the stakeholders influence their support and acceptance to integration of e-learning in the institution	3.77	1.35
Instructors Learners from one sex have a more interest in integration of e-learning than those from the other sex	1.79	0.87
The level of educational qualification of given stakeholders influences their support to the adoption of e-learning in the institution	3.70	1.17
There is a significant disparity in the levels of e-learning acceptance based on the demographics of the stakeholders	2.14	1.14

Pedagogy Performance

The study sought to establish the pedagogy performance in the surveyed institution. The findings as shown in Table 5 revealed that the quality of education had not increased in the institution with the introduction of e-learning while the level of enrollment increased. It was also established that the students' academic performance in the institution did not increase with adoption of e-learning an indication that the learning system would not have been effectively implemented. Lašáková, Bajzíková and Dedze (2017) argue that one of the major drivers of innovation in higher education institutions is use of e-learning which also plays a significant role in enhancing the quality of education.

Table 5. Pedagogy Performance

Statement	Mean	Std. Dev.
The quality of education in the institution has increased over the recent past	2.92	1.19
The level of enrolment has increased in the institution since the inception of e-learning	4.02	1.10
The students' academic performance has increased since the inception of e-learning in the institution	2.86	1.25
There has been a decrease in unit-completion timelines following inception of e-learning in the institution	2.77	1.38
The level of subject mastery among the students is higher when using e-learning than the ordinary learning	3.80	1.30

4.2 Inferential Statistics of the Regression Model

Inferential analysis was carried out to establish the statistical relationship between the variables. The regression model adopted was of the form. This was done in two steps. The first step was analyzing the unmoderated effect of the independent variables (Administrative and user support quality, Instructor and course materials quality and System infrastructure quality) and the dependent variable (pedagogy performance) while the second step was to establish the moderating effect of socio-demographic characteristics.

The model summary results shown in Table 6 revealed that the R-Square (R^2) value for the model was 0.808. This implies that the combined variation of administrative and user support quality, Instructor and course materials quality and System infrastructure quality would lead to 80.8% variation in the pedagogy performance in the higher learning institutions. This is an implication the e-learning through Administrative and user support quality, Instructor and course materials quality and System infrastructure quality play a strong significant role in promoting pedagogy performance.

Table 6. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.899[a]	.808	.806	.36448
a. Predictors: (Constant), Administrative and user support quality, Instructor and course materials quality, System infrastructure quality				

The ANOVA results shown in Table 7 revealed that the p-value for the overall model was 0.000<0.05 an indication that when combined, administrative and user support quality, Instructor and course materials quality and System infrastructure quality have a significant effect on pedagogy performance in higher learning institutions in Kenya.

Table 7. ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.516	3	4.505	17.736	.000[b]
	Residual	20.831	82	.254		
	Total	34.348	85			
a. Dependent Variable: Pedagogy Performance; b. Predictors: (Constant), Administrative and user support quality, Instructor and course materials quality and System infrastructure quality						

The regression coefficients shown in Table 8 revealed that each of the independent variables had a significant effect on pedagogy performance. The model is therefore revised to read;
$Y = 0.149 + 0.424X_1 + 0.320X_2 + 0.348X_3 + 0.476$

The findings imply that a unit change in system infrastructure quality would explain up to 42.4% increase in pedagogy performance, a unit change in instructor and course materials quality would explain up to 32% of pedagogy performance while administrative and user support quality would influence performance by up to 34.8%. The variables had P-values of 0.001, 0.002 and 0.001 respectively all which are less than the standard p-value of 0.05. This therefore implies that we reject all the null hypotheses.

Table 8. Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.149	.476		.313	.755
System Infrastructure	.424	.123	.340	3.451	.001
Instructor and Learner Materials	.320	.128	.237	2.493	.002
Administrative Support	.348	.159	.333	2.189	.001
a. Dependent Variable: Pedagogy Performance					

Table 9 shows the moderating effect of socio-demographic characteristics. The findings revealed that socio-demographic characteristics had no significant moderating effect on the relationship between e-learning and pedagogy performance of the higher learning institutions. This is an indication that although in some instances the socio-demographic characteristics may influence adoption of e-learning, they do not have a control on the role played by e-learning in promoting pedagogy performance.

Table 9. Moderating Effect of Socio-demographic Characteristics

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.412	2.963		-.477	.635
	Infrastructure quality	-.848	.651	-.680	-1.304	.196
	Learning Materials	1.533	.862	1.135	1.779	.079
	Administration Support	.910	.822	.873	1.107	.272
	Socio-Demographics	.464	1.176	.329	.394	.694
	Infrastructure*Moderator	.483	.244	1.775	1.982	.051
	Materials*Moderator	-.466	.326	-1.599	-1.432	.156
	Administration *Moderator	-.213	.306	-.952	-.696	.488
a. Dependent Variable: Pedagogy Performance						

5.0 Conclusions and Implications

The study sought to establish the relationship between e-learning and pedagogy performance of the public institutions of higher learning in Kenya. From the findings, the study concluded that the quality of system infrastructure is key in enhancing the effective adoption and implementation of e-learning in the higher learning institutions. Through appropriate infrastructure and aligned mainstreams of ICT use in learning, the adoption of the e-learning is enhanced.

The quality and availability of instructor and learners materials play a critical role in enhancing adoption of e-learning and promoting pedagogy performance. The administrative and user support also significantly enhances pedagogy performance through e-learning through provision of resources and having proper policies on e-learning. The study further concluded that some socio-demographic characteristics such as age and educational level have influence on adoption of e-learning and pedagogy while others such as gender, race and cultural believes have not effect on e-learning.

6.0 Recommendations

The study recommended that there is need for public institutions of higher learning in Kenya to focus on e-learning as a way of promoting the quality of education and effectiveness of the entire learning process. The institutions through the management have the mandate to embrace new technologies and have proper ICT infrastructure which are key to effective adoption of e-learning.

The Kenyan higher education institutions can follow the example of innovative universities in other parts of the world, which have demonstrated good practices in building, implementing, and scaling up digital programs, addressing challenges similar to those faced by the Kenyan higher education system. Examining how these institutions have implemented such strategies and models can provide useful lessons that Kenya can learn from to deliver its priorities and programs.

The government and management of these institutions should embrace initiatives such as investing in expertise in online course development; developing student support structures; innovating in program design through the use of OER; innovating in program delivery by leveraging online learning to serve working adults; and providing practical ICT skills education through partnerships with coding education providers, hubs, and industry leaders.

7.0 Limitations and Future Lines of Research

The study was limited to one public institution (Kenya Medical Training College) which may not represent a replica case in other public higher learning institutions. To this end, there is need for a study to focus on all public higher learning institutions to establish whether they face the same challenges as far as e-learning and pedagogy performance is concerned. Moreover, the study was limited to a scope of three aspects of e-learning which were system infrastructure, instructors' and learners' materials and administrative and user support. It is on this basis that that study suggest for future study to focus on other aspects that could be affecting e-learning.

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