EFFECT OF E-LEARNING TOOLS ON STUDENT ACADEMIC PERFORMANCE IN KENYATTA UNIVERSITY CITY CAMPUS

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Abstract: **Higher learning institutions have adopted e-learning systems in an attempt to make learning more accessible in a cost effective manner to large population of learners across the globe and to improve students' performance. E-learning involves the delivery of information through information systems. There has been a problem in student performance as there have been reports of low performance among e-learning students in some universities. Various measures have been implemented to ensure that success of e-learning in universities such as improved students' academic performance. Therefore, this study sought to find out the effect of e-learning tools on student academic performance in Kenyatta University City Campus. The study established that e-learning tools, e-learning programs, learning management system and e-library platforms all had positive and significant influence to academic performance of students. From the descriptive analysis, the study respondents strongly agreed that adoption of electronic learning systems contributed to improved academic performance outcomes. Regression analysis established that the changes in student academic performance in terms of high test scores was largely due to adoption and utilization of electronic learning systems at the Kenyatta University. The study therefore concluded that electronic learning systems influence student academic performance. The study also recommend to the universities to adopt digital learning systems and to the government to support and develop policies that push for adoption of e-learning systems in universities. When seeking high academic performance in students, the learning institutions should adopt e-learning systems.**

Keywords: **E-learning tools, student academic performance.**

1. INTRODUCTION

In the last few decades, electronic learning has been adopted by many universities an attempt to make learning more accessible in a cost-effective manner to large population of learners across the globe and to improve students' performance (Asad, Hussain, Wadho, Khand and Churi, 2020). According to Root and Rehfeldt (2021), Skinner came up with the initial learning system called the teaching machine in 1945. Learning Management Systems (LMS), such as Blackboard, were introduced by institutions of higher learning when learning standards had barely been introduced. According to Alazemi, Almutairi & Almutairi (2021), e-learning has made education more accessible without time or place restrictions giving learners more time to interact with instructional materials which has generally improved students grades and reduced time taken to complete courses.

Globally, electronic-learning has been adopted in the delivering of multiple academic programs. According to Oksana and Ruzana (2021), countries such as Finland, Spain, Scotland and Ital have embraced e-learning and it has become a norm. Elfaki and Abdulraheem and Abdulrahim, (2019) posit that e-learning students post better grades than those who attend the traditional classroom lessons. This is attributed to among other things the positive attitude by learners who find the online lectures interesting. In addition, learners rarely miss classes since one can conveniently login from any location. According to Dai and Xia (2020), China has highly adopted e-learning and especially after the outbreak of COVID-19 to allow for safe access to learning by students in higher learning institutions. Dai and Xia (2020) further assert that e-learning has contributed to improve student performance as the students less often miss classes and thus register high grades.

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Regionally, African nations have not been left behind and have been seen to embrace technology in all its facets. E-learning Africa Report (2020) acknowledges that many nations in Africa continue to experience rapid economic progression coupled with access to mobile phones, internet connectivity are major drivers of change transforming learning and skills development. Over the past two years, many countries in Africa have started implementing state sponsored projects that intergrate technology. According to Matthew and Kazaure (2020), e-learning has enabled many African learners to complete their programmes in the shortest time period since e-learning is cheaper and therefore fewer determent cases are reported. Nevertheless, e-learning has been found to be challenging in many African nations which has not well invested in e-learning tools such as computing devices, and the internet. In such areas, replacement of the physical classes with e-learning has impacted negatively on students' performance who often miss classes due to technical problems (Matthew & Kazaure, 2020).

Locally, Kenyan universities have implemented e-learning to facilitate student learning. The implementation challenges have made it difficult to effectively use these resources (Kibuku, Ochieng & Wausi (2020). Kenyan universities not fully explored the use of computer-based exams as most Kenyan institutions rely on the use of Moodle and blackboard as virtual learning platforms. According to Mutua, (2021), aacceptance of e-learning by Kenyan institutions has been a long process that has yielded many advantages raging from higher student enrollment, more students completing their programmes, higher grades and reduced time of program completion (Njenga, 2018). According to Ooko (2021), there is limited supervision on e-learning which to some extend degrades the quality of education and impact negatively on the individual student performance.

Using technology as a tool to deliver learning and instructional programs has become an increasingly key part of teaching, learning (Malik, 2018). According to Aranzabal, Epelde and Artetxe (2022), student performance can be measured using test scores, final exam grade, duration of program completion. According to Fernandes and Holanda (2019), higher learning institution can measure the academic performance of their students by considering time taken for the students to complete their various programs they have been enrolled to and the number of students completed the programs. Student performance in a affected by many aspects in the learning including the attitude towards the mode of learning. With many young people being technologically survey, many tend to find technology interesting to be used as a means of learning. Nevertheless, according to César, Elar, Jhonathan, Anthony, Gary and Laberiano (2020), there is an elusive balance in using technologies to enhance learning and using it for other uses which may be detrimental to the academic performance.

These are information systems that are used for formalized teaching and learning which is not constrained by geographic considerations designed to be conducted remotely by using electronic devices. E-learning systems reduce the physical material load for learners and also allow them to efficiently access all relevant learning material (Hussain, Zhu, Zhang, & Abidi, 2018). E-learning systems facilitate computer-based learning which is supported by; the internet, mobile devices and virtual learning platforms or applications. According to Budu, Yinping and Mireku (2018), e-learning systems are made up of; electronic-learning tools, electronic-learning programs, electronic-learning management system and electronic-library.

E-learning tools are the resources that facilitate the learning process over electronic platforms. These include the electronic devices used by both the learners in accessing academic content, the network infrastructure and internet connectivity that support e-learning (Deepika, 2021). According to Grabinski, Kedzior, Krasodomska and Herdan (2020), e-learning tools also include the actual modules or learning resource delivered through the e-learning system to the learners. Alenezi (2020) stated that, the ability of the learners to conveniently access the appropriate electronic learning tools impact the academic performance of the students. For instance, the learners who are able to accessing computer systems and stable internet connection are able to better participate in online classes realizing better performance than students using smart phones with unstable or weak internet connectivity. According to Martins et al., (2019), the university management information system in another e-learning which is not directly used to deliver online lessons but support the e-learning systems by proving data such as the list of students in every online class.

The Kenyatta University City Campus is one of the satellite campuses of Kenyatta University. The campus is located in Nairobi Central Business District and serves a large number of students, especially part time students due to its strategic location. Additionally, the city campus serves even a greater number of students from various regions through electronic learning systems. According to Nyagorme (2018) e-learning started in 2005 when the university adopted blackboard (Learning Management System) software. Major improvements took place in 2009 after the installation of the (Modular Object-Oriented Dynamic Learning Environment - MOODLE platform. The e-learning systems were thus fully adopted in Kenyatta University City Campus in the year 2009 following the accreditation of e-learning by the ministry of Education.

According to Gichuki (2017), e-learning systems were first adopted in the school of business and later in other schools. E-learning systems are used to deliver lessons virtually using electronic devices that are linked with the internet. The lessons are delivered using text, graphic and audio visual software. Adoption of e-learning was largely based on ease of using the system and its usefulness as perceived by the users and thus training were done to ensure that users willingly embraced the technology. E-learning platform provide students with Online Public Access Catalog, e-books and e- repository.

Despite e-learning systems adoption in an attempt to among other things improve students' performance, low performance is still reported in many universities (Almaiah and Alyoussef, 2019). The many benefits of e-learning such as cost effectiveness and convenience of attending lessons notwithstanding, many learners have not been in a position to complete their courses within the standard times (Bylieva, Lobatyuk, Safonova and Rubtsova, 2019). Globally, e-learning is becoming a trend and learners are getting used to the online delivery mode of lecture material. This requires the use of the internet which is an information superhighway. The internet is a rich source of all types of information including destructive content that can be additive and take too much learners time at the expense of learning leading to poor academic performance (Vate, 2020). African states are also adopting e-learning but there has not been substantial positive change in the performance registered by students' especially in mathematics and science related disciplines in universities other than increase in enrollment (Moreno, Aznar, Cáceres & Alonso, 2020).

According to Njambi and Mayoka (2021), after the outbreak of the novel COVID-19, many Kenyans institutions implemented e-learning since physical classes were abolished by the ministry of education trying to mitigate the spread of the respiratory disease. This exposed the underbelly of Kenyan higher learning institutions in the extent to which they have invested in e-learning tools since many learners complained of inability to easily attend online classes. This led to many inequalities which extended to students' academic performance as was portrayed through the exams that were done at resumption of face-to-face classes. Although there has been many studies done on the topic across many countries, few of them have been conducted locally. The few existing studies explore other objectives but the current study sought to assess how e-learning systems affect academic performance of students among selected universities in Nairobi County, Kenya.

STATEMENT OF THE PROBLEM

Despite e-learning systems adoption in an attempt to among other things improve students' performance, low performance is still reported in many universities (Almaiah and Alyoussef, 2019). The many benefits of e-learning such as cost effectiveness and convenience of attending lessons notwithstanding, many learners have not been in a position to complete their courses within the standard times (Bylieva, Lobatyuk, Safonova and Rubtsova, 2019). Globally, e-learning is becoming a trend and learners are getting used to the online delivery mode of lecture material. This requires the use of the internet which is an information superhighway. The internet is a rich source of all types of information including destructive content that can be additive and take too much learners time at the expense of learning leading to poor academic performance (Vate, 2020). African states are also adopting e-learning but there has not been substantial positive change in the performance registered by students' especially in mathematics and science related disciplines in universities other than increase in enrollment (Moreno, Aznar, Cáceres & Alonso, 2020).

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2. LITERATURE REVIEW

Theoretical Literature Review

Absorptive Capacity Theory

It was proposed by Cohen and Levinthal (1990). The theory holds that organizations have different capacity to recognize and assimilate innovations in their applications to improve performance. According to Cooper and Molla (2017), innovations include using of informational systems and other related technologies including e-learning tools. The theory provides that organizations will always be presented with innovations and knowledge from the external environment but will assimilate, transform and apply it differently. Most of the e-learning tools come from outside the institution but not all

the tools are assimilated in all institutions. Institutions adopt such innovations based on aspects such are level of expertise and financial implication of utilizing such tools. This theory thus anchors the study's first objective, "to determine the effect of e-learning tools on student performance in universities in Nairobi County, Kenya." It helped in explaining the varied reasons as to why e-learning tools are used or not used in universities in Kenya.

Empirical Literature Review

Nuland, Hall and Langley (2020) conducted a study on e-learning tool and students' performance. This research was done in America with the following specific objectives; to assess the electronic-learning tools used and their effect student performance, to assess the reason for use and non-usage of e-learning tools and how it affects performance of students and to assess e-learning tools ideal for various disciplines. The researchers used secondary data and thus the researchers did not collect primary data. The study established that e-learning utilizes handheld devices which can be used by learners to conveniently access lessons from anywhere and at any time. According to Nuland et al., (2020), laboratory tests are being replaced by three dimensional models complemented by online tutorials that can be repeated as the learners wish making them have a deeper understanding of the subject. In addition, it was found out that reliable internet connectively was a requirement for smooth e-learning lessons. The study thus established that handheld devices enabled learners not to miss classes and have more reading time, leading to improved performance in the continuous tests administered and the end-of-course exam grades. While the study utilized secondary data, this research study used questionnaires to collect data from primary sources in order to gather information on current e-learning tools and effects on students' performance.

Savithri (2021) carried out a study on e–learning effects on student's academic performance in colleges. It was conducted in Egypt with the following objectives; to find out the e-learning tools by college students in Egypt, to find out the attitude towards e-learning tools and assess influence of e-learning tools on college students' performance. The primary data was sourced from 250 female students from branches of Chennai colleges. The collected data was analyzed using Chi-square tests and percentages. It was found that online tutorials and the internet were key e-learning tools used by learners in e-learning. Additional results indicate availability of time flexibility through the use of e-learning which in turn leading to improved students' academic performance. While this study focused on female students only, this research sought information from students with both genders.

Deepika (2021) carried out a study on e-learning methodologies and tools during the coronavirus pandemic in China. The main study focus was on establishing if e-learning tools were used during the pandemic and their effect on students' performance. The researchers reviewed 45 full-text articles out of 1524 identified relevant articles and thus did not collect primary data. Findings showed that the electronic devices used by both the trainers and learners in accessing academic content, the network infrastructure, internet connectivity and tutorials shared with students are the major e-learning tools used during the pandemic. Further, the findings reveal that during the lockdown in abiding by health regulations on social distancing, the students were connected through e-learning and this helps to ensure that learners do not forget lessons taught preventing deteriorating students' performance. While this research was done in another jurisdiction, the present research was done in Kenya.

Morrisson and Nzuki (2016) conducted a theoretical review focusing on user acceptance and utilization of e-learning technologies. The aim of this paper is to examine the theoretical literature concerning the acceptance and use of e-learning technologies by both learners and instructors, utilizing the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). The study seeks to identify the factors that affect user acceptance and usage of information and communication technology, while also providing deeper insights into the challenges related to the acceptance of e-learning technologies by students and educators. The findings indicate that, although TAM is frequently cited as a model for predicting factors influencing technology acceptance and usage, it lacks sufficient robustness. Furthermore, the paper notes that many researchers referenced UTAUT in their works primarily to support a specific argument rather than to apply the theory effectively. Some researchers who claimed to use UTAUT did not fully implement it in their studies.

3.   RESEARCH METHODOLOGY

The study adopted descriptive research design and used the quota sampling method to get a sample size of 384 respondents picked from those undertaking undergraduate and master's programs. Primary data was collected using semi-structured questionnaires that produced qualitative and quantitative data. From the distributed 384 questionnaires, 270 were filled and returned. The analysis consisted of descriptive, inferential and content analysis and findings presented in tables, figures and discussions. The analysis was done using Statistical Packages of Social Sciences 25 (SPSS) program.

4. FINDINGS

Descriptive analysis was conducted by adopting the Likert scale with the scale rating ranging from 1 to 5 and thereafter means and standard deviations obtained as an indication to the extent that respondents either agreed or disagreed on the statements about the objectives. The results in the tables were followed by discussions;

Table 1: E-learning Tools

Statements	Mean	Std. Dev.
I am able to easily access all the tutorials online	3.981	0.942
Online tutorials are my reference points for clarification of study content	3.896	1.003
The material shared online is easy to understand	3.555	1.107
The material shared online are adequate for study	3.859	1.035
I have the required device to easily access e-learning platform	3.914	1.043
The devices used to access e-learning are user friendly	3.641	1.001
The internet connectivity always reliable	3.448	1.022
I am in a position to access the internet.	3.744	0.981
Aggregate Scores	**3.754**	**1.016**

Table 1 shows the aggregate score at (M=3.754), this average mean score indicate that e-learning tools has been effectively adopted and influences the academic performance of the respondents. The statements show that students who used e-learning tools could access online tutorials (M =3.981), they had devices that accessed the e-learning platform (3.914), the students made references on online tutorials while studying (M=3.896) and the shared materials on the online platform was adequate for studying (M=3.859). The respondents also revealed that they were able to access internet when using the online platforms (M =3.744), the devices were user friendly (M=3.641), the online study material was easy to understand (M =3.555) and internet connection was reliable had low scores an indication of low agreements at (M=3.448), implying that some students had challenges with reliability of internet connectivity. These findings show that students had embraced electronic learning tools and pursued their courses through online learning platforms. The ease, access and availability of e-learning tools improved academic performance.

The respondents were also asked how else e-learning tools impacted their academic performance in terms of encouraging independent learning process, distance learning and an opportunity for students to further their studies whenever and wherever they are. Online learning also improved academic performance since the students were able to easily make references from different books, publications and authors by a click of a button. The respondents also shared that e-learning tools are lighter as one does not need to carry voluminous books for studying and research. Learning can take place at any time through using audios and videos with study material that enhances comprehension of material and improves academic performance.

These findings are a similar to researches done by Nuland et al., (2020) who noted that e-learning tools can be done on hand-held devices and allow learners to conveniently access lessons anywhere and at any time. For smooth learning, there is need for reliable internet connectivity and online lessons can be recorded for students to repeatedly look at the material that improves academic performance. The findings also echo what the study by Savithri (2021) revealing that flexibility in learning enabled students to learn at their own pace and resulted in better student academic performance. In addition, Deepika (2021) shared that during the covid-19 lockdowns, the students were connected to teachers and fellow classmates by using e-learning tools. E-learning enabled continuity of the academic programs, access to academic content and sharing of tutorials that resulted in high academic performance scores.

Inferential Analysis Results

Correlation Analysis

Table 2: Correlation Analysis

		Student Academic Performance	E-Learning Tools
Student Academic Performance	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	270	
E-Learning Tools	Pearson Correlation	.618	1
	Sig. (2-tailed)	.000	
	N	270	270

Findings show that all the aspects under electronic learning systems adopted had positive correlation to academic performance of students. The correlation results for the variables showing the relationship between e-learning systems and academic performance are as follows: e-learning tools (r =.618). The association was significant since all the r values were above 0.5 and contributed to high academic performance of the students at Kenyatta University.

Regression Analysis

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.829[a]	.687	.683	.297346

Table 3 indicates that e-learning tools are significant predictors of academic performance of the university students. The adjusted R square =.683 as a combined set of predictors including that e-learning tools, accounted for 68.3 percent for variances in academic performance of students. The results imply that 68.3 percent of changes in academic performance of students at the Kenyatta University can be explained by adoption of electronic learning systems. This implies that adoption of electronic learning systems were effective in improving student academic performance in Kenyatta University.

Table 4: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	4.361	2.278		1.914	.000
E-learning Tools	1.383	0.911	1.209	1.518	.000

The adopted model was:

$$Y = 4.361 + 1.383 \, X_1$$

The results found constant 4.361 as a reflection that when e-learning tools are valued at zero (0), then the Kenyatta University students' academic performance will in turn be valued at 4.361. The results also revealed that e-learning tools positively and significantly influenced the academic performance of the students (β =1.383 and p-values <0.05). The researchers Nuland, *et al.* (2020) and Savithri (2021) agreed with these findings, by sharing that internet access, handheld devices and positive attitude towards the tools resulted in improved academic performance in the learners. Deepika (2021) noted that e-learning tools enhanced student performance.

5. CONCLUSIONS

The study concluded that through the e-learning tools, the students could access tutorials, and learning materials using any technological device. The only challenge was accessing reliable internet connection in some areas but the tools were simple and easy to use and had adequate study materials that improved comprehension and recall. The e-learning tools helped improve academic performance of Kenyatta University students. The study further concluded that performance of students was influenced by e-learning programs with learning materials in the form of text, audios, videos and graphics. Some programs combined these four formats in presentation of learning materials that made it easy to understand the concepts and perform well during the tests and exams.

6. RECOMMENDATIONS

This study proposes the adoption and utilization of electronic learning systems as a way of improving performance of the students. Thus, the study recommends to management of Kenyatta University and other institutions of higher learning to embrace electronic systems of learning. The learning institutions should invest in e-learning systems like blackboard and Moodle by setting a budget to acquire the systems and hire IT experts to install and maintain it. The universities should develop e-learning tools with online tutorial formats and e-learning programs that is in text, graphic, audio and video formats for high performance. Recommendations also advocates for learning management system that is secure, tracking performance and interaction during the learning process and e-libraries inclusive of e-books, publications and e-repositories with fully functional catalogs.

REFERENCES

[1] Almaiah, M. A., & Alyoussef, I. Y. (2019). Analysis of the effect of course design, course content support, course assessment and instructor characteristics on the actual use of E-learning system. *Ieee Access*, *7*, 171907-171922.

[2] Alazemi, B. F., Almutairi, I. L., & Almutairi, F. L. (2021). Learning Management Systems (LMS) and Future Vision. *Ilkogretim Online*, *20*(4).

[3] Budu, K. W. A., Yinping, M., & Mireku, K. K. (2018). Investigating the effect of behavioral intention on e-learning systems usage: Empirical study on tertiary education institutions in Ghana. *Mediterranean Journal of Social Sciences*, *9*(3), 201-201

[4] Bralić, A., & Divjak, B. (2018). Integrating MOOCs in traditionally taught courses: achieving learning outcomes with blended learning. *International Journal of Educational Technology in Higher Education*, 15(2)

[5] Donkin, R., Askew, E., & Stevenson, H. (2019). Video feedback and e-Learning enhances laboratory skills and engagement in medical laboratory science students. *BMC medical education*, *19*(1), 1-12.

[6] Dziuban, C., Graham, C. R., Moska, P. D., Norberg, A., & Sicilia, N. (2018). Blended learning: the new normal and emerging technologies. *International Journal of Educational Technology in Higher Education,* 15(3).

[7] Grabinski, K., Kedzior, M., Krasodomska, J., & Herdan, A. (2020). Embedding E-learning in accounting modules: the educators' perspective. *Education Sciences*, *10*(4), 97.

[8] Henge, D. S. K. (2021). Analysis of Teaching, Management Indicators and Supporting Factors for Mind-Mapping for Generating Efficient E-Learning Responses among Attendees and Presenters. *Management Indicators and Supporting Factors for Mind-Mapping for Generating Efficient E-Learning Responses among Attendees and Presenters (December 21, 2021)*.

[9] Koh, J. H. L., & Kan, R. Y. P. (2021). Students' use of learning management systems and desired e-learning experiences: Are they ready for next generation digital learning environments?. *Higher Education Research & Development*, *40*(5), 995-1010

[10] Lai, C., Hu, X., & Lyu, B. (2018). Understanding the Nature of Learners' Out-of-Class Language Learning Experience with Technology. *Computer Assisted Language Learning*, 31(1), 114-143

[11] Mpungose, C. B. (2021). Lecturers' reflections on use of Zoom video conferencing technologyfor e-learning at a South African university in the context of coronavirus. *African Identities*, 1-17.

[12] Mutua, S. N. (2021). *Factors Affecting Intention to Use E-learning by People With Hearing Impairment: a Case of Karen Technical Training Institute for the Deaf* (Doctoral dissertation, University of Nairobi).

[13] Morrisson, M. K., & Nzuki, D. M. (2016). User acceptance and usage of e-learning technologies: a theoretical review. *Int J Sci Res*, *5*(12), 525-9

[14] Ooko, M. (2021). Open, Distance, and E-learning Education in Kenya. *The Education Systems of Africa*, 705-715.

[15] Patricia F., Joan T., Oleksandr K. & José A. (2020). Students' perceptions on distance education: A multinational study. *International Journal of Educational Technology in Higher Education*, 17(18), 132-156.

[16] Ryman, N., Laikre, L., & Hössjer, O. (2019). Do estimates of contemporary effective population size tell us what we want to know?. *Molecular ecology*, *28*(8), 1904-1918.

[17] Savithri, D. R. (2021). Effect Of E–Learning On Student's Academic Performance At College Level. *PalArch's Journal of Archaeology of Egypt/Egyptology*, *18*(1), 4690-4694