Research Journal of Education, Teaching and Curriculum Studies
Vol. 2 No. 2 (2024): ISSN (Online): 2958-8626
DOI: https://doi.org/10.58721/rjetcs.v2i2.683
Effectiveness of eLearning for educational advancement in selected universities in Nairobi City County, Kenya: The role of gender-based factors

Effectiveness of eLearning for educational advancement in selected universities in Nairobi City County, Kenya: The role of gender-based factors

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Article History
Received: 2024-04-24
Revised: 2024-08-08
Accepted: 2024-08-18
Published: 2024-08-27

Keywords
Advancement
eLearning
Gender
Learning
Universities

How to cite:

Thua, J. N., Okemwa, P., Mwatha, R. & Malenya, F. (2024). Effectiveness of E-Learning for educational advancement in selected universities in Nairobi City County, Kenya: The role of gender-based factors. *Research Journal of Education, Teaching and Curriculum Studies, 2*(2), 30-39.

Abstract
eLearning has provided a favourable education platform for access to timely, quality, and cost-effective education advancement in Kenyan universities. It has not, however, achieved its expected potential and suffers numerous challenges that affect its full implementation. A notable challenge is its effectiveness in catalysing educational advancement by enhancing transition and completion rates in various academic programs. This study aimed to assess the gender disparities that influence the effectiveness of eLearning in select universities. The indicators for effectiveness were defined as the functionality of the eLearning Management Systems (ELMS), benefits accrued from eLearning and progression and completion rates in the programs offered under eLearning. This was a descriptive study using multistage sampling with a sample size of 395 students and 32 KII. The questionnaire, key informant interview guide and content analysis were used as the data collection tools. Data was quantitatively, and qualitatively analysed. Analysis of the ELMS found that the instructor's availability and guidance on inline interaction was the most effective functionality of ELMSs with means of 4.10 and 4.31 for males and females, respectively. The least concern was the provision of technological devices for eLearning, 3.49 and 3.42, for males and females respectively. There was notable gender disparity in information received during course registration, protection of student data, academic progress data, and support by technical staff. The composite means were 3.81 and 4.01 for males and females respectively. Most females (3.92) found that simplification of e-materials was the most important enabler for eLearning whereas males (3.68) stated that eLearning had improved their accessibility to educational advancement. The highest gender disparities influencing eLearning were the cost-effectiveness and availability of e-materials. These factors influenced completion rates which were slightly higher for males than females as previously reported. This study provides data that can be used to formulate gender-responsive policies that promote, enhance, and sustain the effectiveness of eLearning by minimizing gender-based

disparities that would otherwise negatively impact educational advancement.

Introduction

The integration of ICT in educational institutions, the use of ICT as a pedagogical tool to enhance teaching and learning, coupled with the fast-growing internet connectivity, has spurred the growth of eLearning in Kenya (Ferrell, 2007; MoE, 2018; MoE 2021). According to Hennessy et al. (2010), virtual learning has become one of the key drivers of the academic revolution in Kenya. Online learning has become a favourable academic mode option as it surmounts challenges such as inaccessibility to higher education due to geographical distance, financial cost, and work-related, social, and cultural barriers that impede education advancement. Despite its attractiveness, online learning has not achieved its expected potential and suffers from many barriers that have impeded its full implementation (Njihia et al., 2020). These barriers include poor eLearning pedagogical skills of learning facilitators (Odoyo & Olala, 2020), gender-based factors that hinder effective participation in eLearning (Thua et al., 2024), poor internet connectivity and low investment (including the lack of course material, few lecturers handling many learners and low payment rates for online teaching) (Smith, 2022) among others. The effectiveness of eLearning is an important cog in the successful implementation of eLearning. The effectiveness of eLearning in terms of definition, measurement and solutions has been extensively reviewed by Noesgaard and Ørngreen (2015). An eLearning program aims to promote e-learning effectiveness and measure its impact on teaching, learning, student transition and completion rates. A major component of achieving effectiveness is the eLearning Management Systems (ELMS) functionality. The ease and consistency of use of the ELMS is deemed essential as it enables students to navigate online courses easily and ensures they are motivated and comfortable with their online experience. It also ensures that the students find it easy to use online instructions to enhance their training. There are concerns about equitable access and participation for both men and women (Kibuku, Ochieng & Wausi, 2020; Pete & Soko, 2020; Mwangi, 2021; Thua et al., 2024). The role of gender-based factors on the effectiveness of eLearning is poorly documented. This study, therefore, assessed the challenges and opportunities presented by e-learning by examining the role of gender-based factors in its effectiveness in four (two public and two private) universities within Nairobi City County in Kenya. This study aims to inform policies and practices that promote inclusive and equitable educational advancement for women and men using eLearning by understanding these specific factors.

Theoretical Framework

The study was guided by two theoretical approaches: Gender Schema Theory (Bem, 1981) and Feminist Theory (Acker, 1987). Gender schema theory (GST) presents an awareness of how individuals acquire, process, and apply gender-related information, forming their self-perception and views of others within society. It underlines the role of social learning and cognitive processes in shaping and maintaining gender roles and identities. The study employed the GST to interrogate the roles of gender-based factors concerning the effectiveness of e-learning effectiveness on educational advancement. Nonetheless, The GST does not challenge inequalities; thus, there is a need for Feminist Theory (FT) that focuses on analyses of social, political, economic and cultural issues to challenge and transform power structures and inequalities while advocating for the rights and dignity of marginalised individuals, especially those affected by gender norms.

Method

This study employed multistage sampling, as previously described by Thua et al. (2024). The Yamane formula was employed, and a sample size of 395 students was obtained (Thua et al., 2024). Additionally, 32 university staff respondents from two public and two private universities within Nairobi City County were selected based on their established e-learning modules and student population (Commission for University Education, CUE, 2019). Guided questionnaires and interview guides were virtually administered to the sampled e-learning students and KII after pre-testing 32 respondents. Data quality was assured by consistently administering the same tool to similar categories of respondents, interviewing individuals separately, triangulation of data from different sources and relying on actual quotations. All primary data was anonymised. Quantitative data was analysed using the Statistical Package for Social Sciences (SPSS), and findings were presented in tables and graphs. Qualitative data was analysed using the 5-point Likert Scale. Ethical considerations were addressed through obtaining informed consent and ensuring confidentiality.

Results and Discussion

The study documentation of the learners' demographic characteristics focused on age, employment, marital status, and the computer literacy skills of the respondents by gender. The study found men (63.1%) and women (71.7%) had prior computer literacy skills. Interestingly, the study found more female respondents aged 18-25, employed in the informal sector, of single marital status and had prior computer literacy skills than their male counterparts, as previously reported by Thua et al., 2024.

Effectiveness of eLearning Management Systems

The variables used in assessing the effectiveness of eLearning Management Systems (ELMSs) were information received by students during course registration, students' data protection, saving and updating of the students' academic progression data, instructor availability and guidance on online participation, universities' provision of digital devices, support of the technical staff and level of upgrading the eLearning system by gender. These variables were uniformly employed in the universities under study. A Likert Scale of 5 points was used to determine the frequency of the responses and the average mean on the effectiveness of eLearning systems in the participating universities. The findings are presented in Table 1.

Table 1: Effectiveness of eLearning Systems Per University and by Gender

S/No.	Category	Public Univ. A	Public Univ. B	Private Univ. A	Private Univ. B	Male (Mean)	Female (Mean)
1.	Information on e-learning during registration	3.24	3.77	4.25	4.20	3.80	4.02
2.	Protection of students' data from unauthorized access	3.86	3.86	4.25	4.26	3.94	4.18
3.	Academic progress data saved and updated	3.71	3.97	4.42	4.22	4.01	4.20
4.	Instructor's guidance on online learning participation	3.59	4.19	4.38	4.32	4.10	4.31
5.	Technological devices provided for e-learning	2.44	3.43	3.74	3.79	3.49	3.42
6.	Promptness of technical staff support	3.28	3.73	3.74	3.96	3.59	3.80
7.	Continuous technological upgrade for easier interaction	3.11	4.10	4.21	4.22	3.80	4.14
	Composite Mean	**3.32**	**3.86**	**4.14**	**4.13**	**3.81**	**4.01**

Legend:

Note: 1-1.4 = Very Low, 1.5-2.4= Low, 2.5-3.4= Moderate, 3.5-4.4= High and 4.5-5.0= Very High.

Results in Table 1 show different levels of effectiveness of eLearning for educational advancement by gender, per university, and by the categories of the universities (public and private). The composite means for the private universities (4.14 and 4.13) was higher than for public universities (3.32 and 3.86). This shows that students from private universities interact more with ELMSs than their counterparts in public universities. These findings suggest that private universities invested more in these variables than public universities, leading to a better ELMS interaction experience and learning environment for their learners. A previous study by Smith (2022) showed a low investment in eLearning. These findings allow public universities to re-evaluate and reassess their ELM processes to enhance and strengthen them for better eLearning experiences and ultimately attract more students to enrol on online courses. The findings cohere with Feminist Theory, which advocates for institutional structural changes exacerbating inequalities (Acker, 1987).

Overall, more female (4.01) compared to male (3.81) students highly rated the effectiveness of ELMS. This difference is attributable to several reasons. It is plausible that men may have less time to devote to this interaction, as previously observed by Thua et al., 2024 due to work-related reasons. Secondly, men may have a poor perception and attitude towards the usefulness of regular ELMS interaction. Thirdly, men may be experiencing poor navigation of the ELMS compared to females. The findings reflect GST, which accentuates social conformity across genders. The findings present interesting gender-based disparities that provide an opportunity for institutions of higher learning to address and achieve gender parity in ELMS interaction and the effectiveness of eLearning.

The instructors' guidance on online learning participation was the most highly rated variable by men (4.10) and women (4.31). Previous studies have shown that teaching practices significantly influence the use of virtual learning (Smith, 2022). This finding is further supported by a KII who stated that e-*instructors play a key role in students' online interaction. They are the subject experts.* The results reveal that

instructor's availability and guidance on online participation were more effective in private universities than in public. The comment from another KII, "*With adequate funding, the university can employ more staff to reduce individual workload hence able to pay attention to e-content development*", elucidates the importance of adequate funding to achieve optimum e-content facilitation. The gender-based disparity between men and women was, however, recorded. Women rated the instructor's availability and guidance on online participation more effectively than men. A KII attributed this gender difference to *the use of video and audio that are more appealing to learners, especially female students because they interact more online.* This suggests that the instructors' pedagogical methods were more effective for females and, similarly, better in private universities than public universities. The findings are further corroborated by previous studies that found insufficient learner support services, delayed learning materials for study, poorly designed learning materials, and insufficient academics as obstacles that hinder the success of Open and Distance Learning programs at Kenyatta University (Njihia et al., (2020).

There was variation in the rating of the effectiveness of saving and updating data on academic progress in all the selected universities. Private universities were generally rated higher than public. This rating suggests that there was variation between private and public universities in how learners' data on academic progress was saved and updated for the students' access, use and management. This difference will ultimately translate into different perceptions of student academic records' authenticity, validity and safety. The study reported a gender-related disparity in this rating. Women students rated the effectiveness of universities saving and updating their academic progress higher (4.20) than their men (4.01 mean) counterparts. The respondents associated their high rating with the availability of Continuous Assessment Tests (CATs) and examination grades in their portal. This view is corroborated by a KII who stated that *assessment is the most protected area in the university*. Respondents complained about delayed feedback on CATs, delayed end-of-semester results, and missing grades in some courses. These findings are supported by Hadullo et al. (2018), who found that assessments in institutions of higher learning are well-managed but with a few cases of non-compliance.

A university's capacity to protect students' data from access by unauthorised persons is a key element in inspiring confidence in eLearning. Private universities performed better than public universities in this ELMS variable. Women students (4.18) rated the effectiveness of data protection higher than men (3.94). A high level of trust in university protection of personal data by both genders was confirmed by their admission that they were allowed to use personal passwords to safeguard their data. More so, male students further emphasised the use of strong passwords. Nonetheless, some students confessed to accessing their eLearning portal from the cybercafé spaces and offices, which subjected them to probable internet threats. This finding agrees with Almahasees et al. (2021), who argue that prior experience with data management influences an individual's perception of effective data management.

To achieve the desired results in the effectiveness of eLearning, continuous technical upgrades of the eLearning management system are paramount. This variable was more highly rated in private universities than in public universities. Continuous technical upgrading of the eLearning management system was more effective for women students (4.14) than men (3.80). This was corroborated by the KII, which stated that upgrading is done to comply with any service provider innovation while *software deemed helpful to students is considered.* This will positively support students' ability to easily navigate the ELMS and enhance their learning experience and outcomes.

The effectiveness of information received during course registration is key to the successful uptake of eLearning. Private universities performed better than public universities in this variable. This suggests that private universities have invested more in registering and orienting new students than public universities. Gender-based differences, given the effectiveness of information received during course registration, were noted. Women (4.02) had a higher rating than men (3.80). We hypothesise that these differences may be attributed to work-related differences, perceptions and attitudes about the usefulness of this process by men compared to females.

The promptness of technical staff support, defined as troubleshooting user concerns and empowering learners to make the most of digital resources, was generally higher in private universities compared to public universities. The differences in the levels of effectiveness per university may be attributed to factors such as the student population and the ever-advancing technology that requires re-tooling and training to enhance technical skills. This can be achieved through higher financial, infrastructure and human resource investment. Additionally, gender-based differences regarding the effectiveness of technical staff support were recorded. The results suggest that female students (3.80) received more prompt technical staff support than their male (3.59) counterparts. Previous research in Kenya (Hadullo et al., 2018) found that many students struggle to receive adequate technical assistance. Universities must invest more in this variable to provide learners with a better learning experience by easily navigating the ELMS and learning environment.

The provision of digital learning devices was higher in private universities compared to public universities. Digital learning devices include tablets and computers. The study revealed that all the selected institutions recommended students' laptops while the universities provided computer laboratories and eLearning libraries mounted with computer desktops. It implies that providing eLearning devices is more effective at private universities than at public ones even though both categories of universities provide computer laboratories for eLearning. This variable may not have been of major concern because the eLearning students are involved in other responsibilities, such as family and work-related, where they may have access to learning devices. The access to university computer laboratories and learning devices may, therefore, not be as helpful to this group of learners who are not regularly stationed at the university.

The Effectiveness of benefits accrued from e-Learning for Educational Advancement.

E-learning aims to provide accessible, high-quality interactive learning programs that are flexible, learner-centred, and affordable. Based on these key principles, the study examined the availability of simplified e-learning materials, the flexibility of learning at any place and time, accessibility, distance coverage, and cost as enablers of effective learning.

Table 2: Rating Effectiveness of e-Learning

		Male		Female	
		F (%)	Mean	F (%)	Mean
E-learning has enabled me to advance my education with minimum distance coverage	**S. Disagree**	22(12.5)	3.56	8(5.0)	3.66
	Disagree	15(8.5)		14(8.8)	
	Uncertain	18(10.2)		24(15.1)	
	Agree	84(47.7)		91(57.2)	
	S. Agree	37(21)		22(13.8)	
E-learning has enabled me to advance my education due to availability of simplified e-materials.	**S. Disagree**	20(11.4)	3.65	12(7.5)	3.92
	Disagree	19(10.8)		7(4.4)	
	Uncertain	18(10.2)		15(9.4)	
	Agree	64(36.4)		72(45.3)	
	S. Agree	55(31.3)		53(33.3)	
E-learning has enabled me to advance my education due to flexibility of learning any time any place.	**S. Disagree**	24(13.6)	3.65	11(6.9)	3.84
	Disagree	12(6.8)		10(6.3)	
	Uncertain	12(6.8)		12(7.5)	
	Agree	82(46.6)		87(54.7)	
	S. Agree	46(26.1)		39(24.5)	
E-learning has enabled me to advance my education with less cost.	**S. Disagree**	32(18.2)	3.40	18(11.3)	3.74
	Disagree	16(9.1)		17(10.7)	
	Uncertain	22(12.5)		10(6.3)	
	Agree	61(34.7)		57(35.8)	
	S. Agree	45(25.6)		57(35.8)	
E-learning has improved accessibility of my education advancement.	**S. Disagree**	23(13.1)	3.68	13(8.2)	3.79
	Disagree	14(8)		8(5.0)	
	Uncertain	13(7.4)		11(6.9)	
	Agree	73(41.5)		95(59.7)	
	S. Agree	53(30.1)		32(20.1)	

Legend: ***Note: 1-1.4 = Very Low, 1.5-2.4= Low, 2.5-3.4= Moderate, 3.5-4.4= High and 4.5-5.0= Very High.***

Effectiveness of E-learning Minimum Distance Coverage

The study found that e-learning significantly reduces distance coverage for both men (3.56) and women (3.66), with many of both genders studying from home. Many men reported distance as an

ineffective variable due to their work locations, which are found in areas with limited internet access. On the other hand, women preferred community learning. This finding underscores the potential inequity of e-learning access for men working in remote areas. Key informants noted that *e-learning is context-dependent and influenced by the interaction environment*. This finding supports that distance as a barrier to educational advancement is partly surmounted by eLearning.

Effectiveness of E-learning Simplified Learning Material

More women (3.92) compared to men (3.65) found simplified learning materials effective in e-learning. The effectiveness of learning materials depends on learners' learning styles, the availability of multimedia, and instructional methods. Key informants opined that *online learners must have interactive learning resources to fulfil their academic requirements.* Further, a lot of time and financial implications are needed to use multimedia. Both students and key informants agreed that e-learning course content is generally provided and effective; however, some courses lack sufficient multimedia resources due to workload and funding constraints. Gender differences in learning preferences were noted, with women favouring collaborative discussion while men preferring diverse e-content. This aligns with previous findings by Tarus and Gichoya (2015), Morante et al. (2017), and Hadullo et al. (2018), who posited that the provision of interactive learning material and appropriate instructional methods gives an eLearning pedagogical sound capability of improving the effectiveness of eLearning.

Effectiveness of Flexibility of E-learning

More women (79.2%) than men (72.7%) agreed that the flexibility of time and space in e-learning effectively enabled educational advancement. Women attributed this effectiveness to their ability to multitask in different roles. This was supported by sentiments from a KII who stated that *Women have become independent as technology advances globally. They are learning, participating in the labour market, taking care of families and the old courtesy of online learning.* E-learning's flexibility benefits women by enabling them to break free from traditional gender roles and pursue education. Men, on the other hand, cited the ability to combine jobs and learning. Both genders mentioned poor internet connectivity as a hindrance to e-learning flexibility. Location can hinder this flexibility, as those in remote areas may face the challenges of poor internet coverage. This is supported by a KII who stated that *we will likely bridge the gender gap concerning education access. Still, this innovation might widen the geographical digital gap without close monitoring. Those from remote areas may not benefit equally as those living in urban areas.* There is a need for universities and eLearning policymakers and stakeholders to develop policies that consider geographical location and gender-related barriers to ensure equitable access and learning experiences for all students.

Effectiveness of Cost of E-learning

Both men (3.40) and women (3.74) acknowledged the effectiveness of reduced cost in pursuing e-learning, primarily because it eliminates commuting costs by allowing them to study from home. Women particularly benefit as they can combine academic work with family responsibilities, saving on childcare expenses. The amount of time spent online, which is higher for women due to their collaborative learning style, also influences internet costs. However, computer literacy skills play a role in choosing devices with varying processing speeds, potentially impacting costs. The study supports previous findings on the cost-effectiveness of e-learning and women's preference for community learning (Kitaka, 2023).

Effectiveness of Accessibility to E-learning

The study revealed that both women (79.8%) and men (71.6%) found e-learning accessible and effective for their educational advancement. Women particularly valued its flexibility in balancing

work and family responsibilities, while men highlighted continuous skills development opportunities. This underscores the importance of e-learning in providing educational access to individuals from different environments with varying commitments and aspirations.

Effectiveness of E-learning on Enrolment, Progression and Completion Rate

Since this was a nested study, our previous finding, as reported by Thua et al., 2024 shows a lower progression rate in public universities than in private ones. Notably, the completion rates in private universities are significantly higher than in public universities in different academic programs offered under the eLearning mode. The effectiveness of the E-learning Management Systems Section shows the plausible reasons for these observations, where private universities were highly ranked compared to public universities for the same variable. This suggests that disparities at the institutional level may influence gender-related factors at varying degrees, resulting in differential learning experiences and environments for both genders. It is probable that institutional readiness, investments, policies, and guidelines, as well as their implementation, influence the effectiveness of eLearning. FT recognise the importance of collective action in the institution of learning to challenge systemic oppression and achieve social change. It is therefore important to reassess, re-evaluate, and realign our institutional eLearning processes with CUE standards to strengthen and enhance them for more effective eLearning.

Conclusion

eLearning is a catalyst for change, transforming processes, breaking down barriers and opening up access to education. It has enabled lifelong and life-wide learning, giving unprecedented access to learning resources and facilitating personal learning pathways in Kenya. Institutional-based disparities appear to influence gender-related factors that differentially affect the effectiveness of eLearning. This study demonstrated these differences and showed that women and men from public and private universities had different experiences of the effectiveness of eLearning. The study demonstrated the attractiveness of eLearning as a mode of learning. Key enablers were increased access, reduced distance, cost-effectiveness, flexibility, and simplified learning materials for both genders. This study recommends re-evaluating, enhancing, and strengthening eLearning policies and guidelines, particularly in public universities, to mitigate gender-based barriers and promote eLearning effectiveness, student progression, completion rates, learning experiences, and learning environments.

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