LEARNING MANAGEMENT SYSTEM DIMENSIONS AND ACCESS TO HIGHER EDUCATION IN NAIROBI METROPOLITAN REGION, KENYA

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ABSTRACT

Despite the many educational technologies, the reality of a large gap in access to higher education is a global issue. Higher education institutions employ Learning Management Systems (LMS) to aid the achievement of target 4 of the Sustainable Development Goals (SDGs). Many institutions are using LMSs, but more critically, several researches do not discuss how the dimensions of learning management systems impact access to higher education. Adoption of LMS has been fast, but the problem of access to higher education still persists. This study analyzed the dimensions of Learning Management Systems (LMS) including user engagement, content personalization, organizational support, and content quality, and how they impact access to higher education in universities found in the Nairobi Metropolitan Region of Kenya. The study relied on the Technology-Organization-Environment framework, the Unified Theory of Acceptance and Use of Technology, the DeLone and McLean Information System Success Model, PEST A (Pedagogical, Equitable, Systemic, Technological, Accessibility) and other empirical studies. The approach used was quantitative, and data was collected by sending online structured company questionnaires to LMS users in the selected institutions. The sampling technique employed was stratified random to represent the several groups. At the end, 170 responses were collected, which represented an 85% response. The dimension of LMS accounted for 64.9% of the total access to higher education, as revealed by the regression. The authors found a positive and significant relationship between personalized content and higher education access via e-learning ($\beta = 0.312$, $p < 0.05$). Positive and significant relationships between personalized content and user satisfaction ($\beta = 0.287$, $p < 0.05$) were also detected. A positive effect of organizational support was noted on higher education access ($\beta = 0.254$, $p < 0.05$). The quality of content was noted to have the greatest positive effect ($\beta = 0.421$, $p < 0.05$) on access to higher education. The combined effects of user satisfaction, personalization of content, quality of content, and supportive organizational systems accounted for 68.4% of the challenges and obstacles to accessing higher education via e-learning ($R^2 = 0.684$). Therefore, the proposed recommendations are expected to enhance higher education access for various stakeholders, including policymakers and researchers. The study supported the call for the adoption and use of personalized learning systems, the enhancement of user satisfaction, and strengthened organizational systems and e-learning content in order to enhance the quality of e-learning content.

INTRODUCTION

There have been numerous revolutions in education, but with recent advancements in technology, things have moved even faster. Higher education has benefited the most from these changes as it is more flexible with regard to delivery and has a greater reach. Teaching and learning technologies occupy key spaces in the restructuring of learning and teaching on a global scale, and Learning Management Systems (LMS) hold prominent positions in this restructuring. Such systems enable a user to create, distribute, and manage learning and teaching content in an integrated way. This enables universities to be more adaptable and flexible in learning and teaching, and to enhance communication between learners and teachers and to enrich learning and teaching resources.

In Kenya and the Nairobi Metropolitan area, there has been increased use of LMS attributed to demand for flexible personalized education. The COVID-19 Pandemic-induced lockdowns that resulted in closure of schools accelerated this trend and heightened the reliance on online learning. While most schools use LMS, they have not significantly improved access to higher education. Empirical studies have shown that there are several factors which may contribute to the success of LMS platforms. User engagement demonstrates that higher levels of learner, content, and instructor engagement enhance the learning outcomes and the utilization of the system. Increased interaction and engagement enhance the effectiveness of the system (Ifinedo, 2021). The level of system usability and user satisfaction contributes to the retention of users and acceptance of LMS platforms (Al-Fraihat et al., 2021).

Global and national development goals also mandate the provision of educational opportunities to more people. Goal 4 of the Sustainable Development Goals (2015) advocates for an inclusive and quality education for all and lifelong learning. Similarly, the Kenyan Vision 2030 puts emphasis on education to drive sustainable socio-economic change and realization of more equitable access to quality education.

Pesonen (2017) further notes that the adoption and functionality of LMS at the higher education institutions is premised on the institutional and contextual factors and that the majority of universities have strived to introduce LMS to improve educational opportunities and service delivery to their clientele. Nonetheless, inequities in adoption and usage continue to reduce the anticipated impact (Maina & Nzuki, 2015). Additionally, although LMS have been widely introduced, several institutions have not succeeded in tailoring LMS to meet the diverse learner needs and addressing their challenges of relevance, usability and personalization of the systems (Kigundu, 2025).

Universities in the Nairobi Metropolitan Region have made significant investments in Learning Management Systems (LMS). Private and public universities have equally sought to improve service delivery and accessibility by integrating different modes of learning.

However, it is yet to be ascertained to what extent LMS have succeeded in improving access to education.

This study seeks to determine the effect LMS have on access to higher education in the Nairobi Metropolitan Region. It also studies LMS factors such as user engagement, content personalization, and content quality, among others. The study intends to provide both academic and practical insight on how LMS can be used to address the challenge of access to higher education in a more inclusive manner.

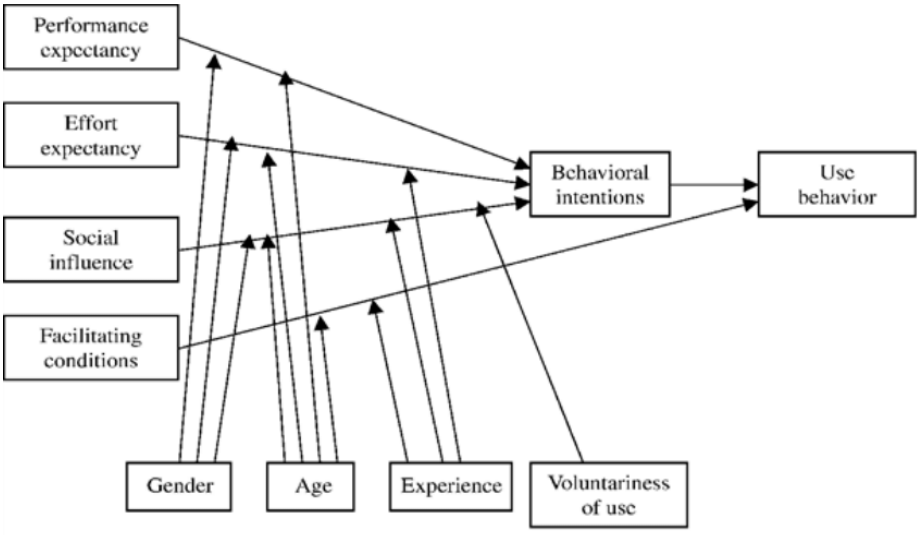
The research questions were:

i. How does user engagement within Learning Management Systems influence access to higher education in the Nairobi Metropolitan Region?
ii. To what extent does content personalization in LMS platforms affect educational access for university students?
iii. What is the effect of organizational support on the accessibility of higher education
    a. through digital platforms?
iv. How does the quality of content provided on LMS influence education access?

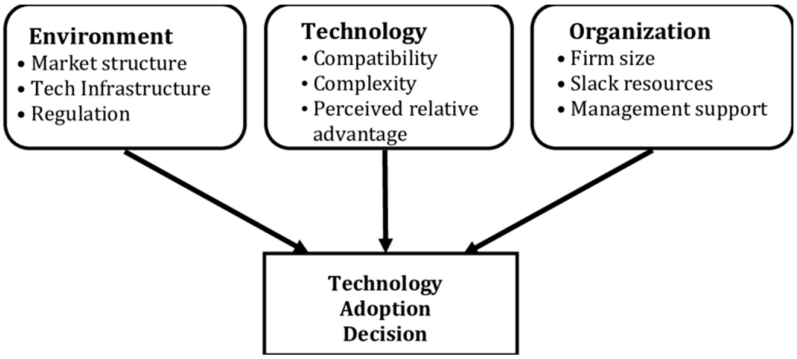
LITERATURE REVIEW

Theoretical Foundations

Recognized theories framing technology adoption, organizational context, and the success of systems were used as the foundation of this study. They provide a holistic understanding of the role Learning Management Systems play in facilitating access to higher education.
The Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003) focuses on how individuals adopt and use technology. The theory includes the components performance expectancy, effort expectancy, social influence, and facilitating conditions. This theory is applicable to this study and is highly useful, as it pertains to user views as well as context and the engagement of users with Learning Management Systems.



According to Tornatzky and Fleischer (1990), the Technology–Organization–Environment (TOE) framework offers a way to look at the organizational aspects of the relationship between context, the organization, and technology. When we consider Learning Management System (LMS) adoption, it is clear that the context is important, along with the management teams and factors beyond the institution. Collectively, they determine how the system functions. --It is not only about it functioning theoretically, but also about the practicality of the system.



The DeLone and McLean Information System Success Model (2003) outlines several dimensions of evaluating whether an information system can be considered 'successful'. Examples of dimensions include system quality, information quality, service quality, system use, user satisfaction, and the impact of the system on overall system benefits. In this study, the model is most useful for explaining how the combination of factors including content quality, system usability, and the presence of an organization's support within a given system impacts satisfaction, and also how the organization's system factors affect the availability of education for a given user.

The PEST-A model (Pedagogical, Equitable, Systemic, Technological, Accessibility) enables an evaluation of Learning Management System's (LMS) impact on the improvement of access to higher education, within a particular context. Within PEST-A, the Pedagogical dimension deals with the quality of the teaching/learning process mediated by the LMS, while the Equitable dimension focuses on addressing the digital divide and the inclusion of all. The Systematic dimension of PEST-A addresses the institutional frameworks within which the LMS is incorporated, and the Technological dimension of PEST-A addresses the institutional frameworks within which the LMS is incorporated, dealing with the institutional infrastructure and the functionality of the system. The Accessibility dimension, within PEST-A, complements the Technological and the Pedagogical dimensions of PEST-A, in the sense of the usability and the inclusion of all. The different components of the PEST-A framework offer a comprehensive description of the LMS within the Nairobi Metropolitan Region. Although it is an integrated framework, PEST-A is lacking in articulating the design of LMS in helping to reach potential learners, thus addressing the barriers to accessibility.

These frameworks present a synergistic view of how intertwined technology, the organization, and human factors are in LMS environments and how this relationship progresses.

Empirical Review

The incorporation of information and communication technologies (ICT) into teaching at the higher education level is almost unavoidable. One example of an academic process management system is a Learning Management System (LMS). Some of the LMS vendors market their services to academic institutions as Moodle, Edmodo, Canvas, Schoology, Blackboard Learn, and more (Nikola & Dijana, 2018).

User Engagement and Access to Higher Education

The engagement of learners is one of the primary reasons that Learning Management Systems (LMS) have been successful in higher education settings. One of the studies by Ifinedo (2021) observed the digital engagement and the psychological concept of "flow" on learners' continued use of LMS in the context of blended learning. The results showed that the use of LMS increased with deep engagement with coursework showing that both the platform's design and the learning content should include multiple ways of sustaining learners' interest and participation.

For the same reason, Letseka and Pitsoe (2023) studied how university teachers in South Africa employed different tools in the LMS to enhance their lessons and activities for their students in the classroom to determine how effective the tools are. The results showed that students also made use of conversation boards, videos, and tools for joint work. It further clarifies that if teachers are supported to use the LMS to teach while ensuring student participation and involving them in the activities, then digital learning will be more effective and efficient.

Content Personalization and Access to Higher Education

When personalizing content in Learning Management Systems, the primary goal is to enhance learner performance and engagement. Bourkoukou & El Bachari (2020) designed LearnFitII and researched it as an advanced personalized e-learning system that recommends learning objects based on student profiles and their history of learning. Their research suggests that adjusting content based on the student showed a positive effect on their motivation and satisfaction levels. However, their research note that this focus on the technical side of the system building does not include the evaluation of how the system functions in different settings and learning contexts.

Ibisu (2024) described a gamification model for LMSs to support personalization based on learners' personality types, as identified by MBTI. This model also suggested that learners show higher satisfaction and better engagement when their personality traits and gamified elements are aligned. However, this model does not include a thorough analysis over a

prolonged period of time, thus it is unknown if these effects sustain over time and how long the engagement remains.

Spriggs & Kamau (2025) suggested a model that incorporates LLMs (Large Language Models) to propose topics relevant to an LMS to improve the personalization of learning in an adaptive LMS. Their model suggested that LLMs supportlearning autonomy and enhance the interaction with learning content. Similar to the other models, their model also requires testing in a real university setting to better understand how it will function in a real-world setting.

Sareminia & Dehcheshmeh (2024) developed a study using data mining to adjust educational content to the learner's personality. They said learners' characteristics aligned with the approach used in the instructions created more satisfaction and achievement in the academics. This research study indicates that this line of consideration needs to expand its investigation to other academic disciplines and different segments of the population since this study is currently examining only a few fields of study.

Organizational Support and Access to Higher Education

The use of an LMS is facilitated by the level of support offered by the institution. Where support is offered, users are motivated and can confidently use the LMS. This makes educating the distant learner and those with unconventional learning schedules easy as they can decide to use the LMS to achieve their goals.

Amirah & Konidin (2023) indicate that the structures of organizations in teaching institutions are put in place to sustain learning processes, to adopt learning patterns that are less complicated and more productive in learning activities. In addition, these structures are innovative in the formulation of approaches and methods to provide additional knowledge and skills for both teachers and learners.

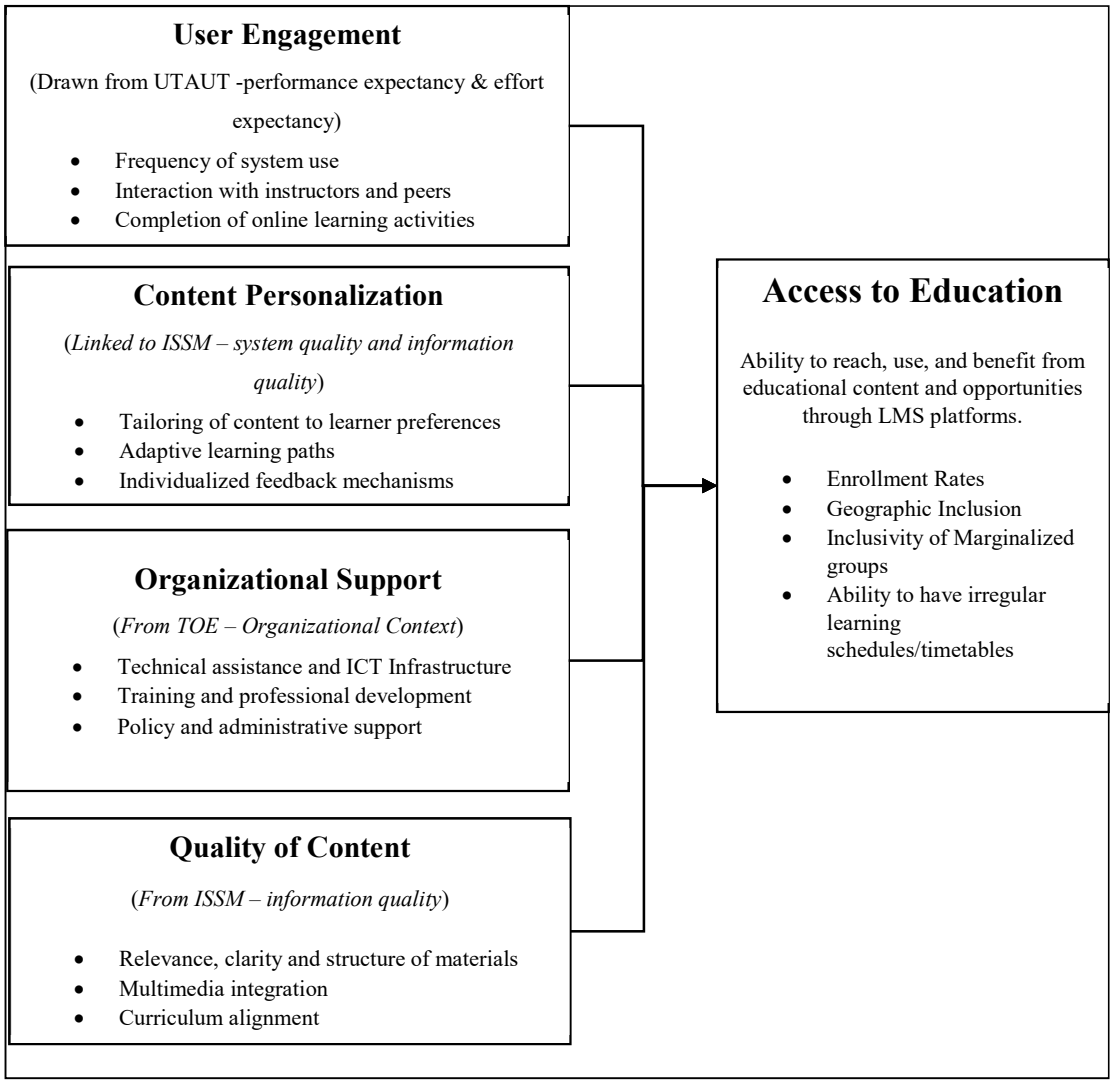
In 2024, Shisakha undertook a study on the use of e-Learning in Kenyan Universities. The researcher used a mixed methods research design approach to discuss, evaluate, and debate institutions, critique, and reflect on their capabilities. Examine a variety of data as sources for the analysis of the document and take and use a lot of government e-Learning books, magazines and research articles. There is need for the government, colleges, teachers, students and us, especially the Commission for University Education (CUE) to work hand in hand for e-learning to work. The study revealed that colleges should provide students with affordable Internet, develop and create an eLearning policy and investment in students' eLearning skills is a necessity.

Content Quality and Access to Higher Education

In Learning Management Systems, user satisfaction and the success of an e-learning system are highly related to the quality of content. Alterkait & Alduaij (2024) studied a sample of 333 college students to analyze the relationship of IQ and student satisfaction. As part of their analysis, they demonstrated that the satisfaction of students is increasingly correlated with the relevance and the accuracy of the information.

Achmadi & Siregar (2021) conducted another study based on the qualitative analysis of the quality of systems, information, and service, with a focus on user satisfaction, in a Master's program. As part of their research, information quality was found to influence user satisfaction; as a result, the e-learning modules need to incorporate informative and accurate content. Generalized Structured Component Analysis (GSCA) was the methodology used in this study.

Banu et al. (2024) found similar results in their research when looking at how well college students are able to judge the e-learning tools and systems. They demonstrated that the level of happiness that students exhibited was highly correlated with the quality of the systems and information provided.



RESEARCH METHODOLOGY

The purpose of the current research was to analyze the dimensions of the Learning Management System (LMS) and their role in facilitating access to higher education in the Nairobi Metropolitan Region via a cross-sectional descriptive method. This method of research allowed the researchers to obtain data on a specific population at a specific time without distorting or intervening in the variables.

The research sample comprised 27 universities in the Nairobi Metropolitan Region that were identified from the target population using the purposive sampling technique. The criterion used in the selection included the presence of an operational LMS and the ease of collecting data. This sampling ensured that the sample was relevant and helpful in the achievement of the research objectives.

The total population of the study was the students, the academic staff, and the administrative staff involved in the management and support of the LMS. With the use of stratified random sampling, each group of users would be represented and not one group to the exclusion of the others. The sample size was determined by using Cochran's (1977) formula:

$$n0 = (Z^2 \times p \times (1 - p)) / e^2$$

n0 = sample size
Z = Z-score (e.g. 1.96 for 95% confidence)
p = estimated population proportion
e = margin of error

For our study, we assumed a 95% confidence interval, a margin of error of 5%, and a population proportion of 0.5. Based on these assumptions, our initial sample size was 384. Due to sample and resource constraints, along with the finite nature of the population, the sample size was lowered to 200. This was done in an attempt to reduce sampling bias and to maintain the quality of the statistical results.

Our study used a structured, online survey that was developed using Google Forms. The survey gathered data on user engagement, content personalization, perceived organizational support, content quality and the degree of accessibility to education. These items were measured on a five-point Likert scale. The survey was also used in a pilot study to evaluate the tone and understand the structure and if the responses were clear and consistent.

As part of our study, we used Pearson correlation and regression as a means to understand how different dimensions of Learning Management Systems (LMS) interact with Educational Access. We set SPSS to analyze our data with a focus of achieving $p < 0.05$ as a threshold for our results to reach significance.

To assess the content of the proposed study, the questionnaire was reviewed by experts in educational technology and research methodology. Construct validity was assured by matching the items to relevant theories. Reliability was measured using Cronbach's alpha with acceptable internal consistency established with a score above 0.70.

RESEARCH RESULTS AND DISCUSSION

This section of the report covers the findings from the study regarding the impact of user engagement, personalized content, organizational support, and quality content on accessibility to higher education. Along these lines, 200 questionnaires were used to collect data from users of the LMS in selected public and private universities in the Nairobi Metropolitan Area. Of these, 170 (85%) were usable and therefore a sufficiently large sample for this survey. In addition, this sample will strengthen the trust in the research findings.

The respondent sample was used to analyze how different categories of university stakeholders interact with the LMS. Of the respondents, 57.6% were students, 22.4% were lecturers, 11.8% were ICT/system administrators, and 8.2% were policy or management staff. This clearly shows that students are the biggest stakeholder group and therefore the primary users of the LMS platform. In terms of balance, the sample comprised of male (55.3% males) and female (44.7% females), thus the LMS was therefore accessible to the general population. Most of the respondents were in the 21 to 40 age group, making them the most active LMS platform users. This indicates that persons in this age group have a greater interest in digital learning activities due to their higher digital application and mastery of technology tools and systems. In terms of level, the most number of student respondents was at the undergraduate (62.2%) level, followed by master's (27.6%) and PhD (10.2%). This shows that learning management systems are mostly used at the undergraduate level, where structured course delivery and digital learning aids are the most important. Regarding the type of learning, the major number of student respondents selected the hybrid learning (38.7%) option, followed by fully online learning (32.7%) and face-to-face learning (28.6%). This shows that in the context of university education, there is a tendency to prefer learning models that are more integrated, and that, within the framework of face-to-face learning, learning management systems have an important complementary role.

In regards to respondents' experience with learning management systems, the majority of participants had between 1 and 6 years of experience, and a minority had either less than 1 year or more than 6 years of experience. Based on this result, it can be said that most respondents had enough experience with learning management systems, to be able to respond adequately and accurately.

Descriptive Results

The engagement logs an overall mean of 3.71 (SD = 1.20) indicating a moderate-to-high level of agreement that LMS platforms do indeed provide opportunities for active engagement. Content personalization logs an overall mean of 3.70 (SD = 1.10) indicating that LMS platforms, in their current state, provide a moderate level of support for the learning needs of individual users. Of the independent variables, the type of support offered by the organization received the highest positive rating with an overall mean of 4.07 (SD = 0.94). This rated strong affirmative support by the organization for the use of LMS both in structure and strategy. Respondents provided a number of positive comments regarding the content quality including that LMS content is mostly accurate, easy to follow, and of great assistance to learners. The highest overall average of 4.40 (SD = 0.69) for the dependent variable higher access to education indicated a high level of support by LMS in maximizing access to education and learning. Respondents were especially positive regarding the support provided by the LMS to learners of varied capacities, including at-risk learners.

Inferential Results

The focus of the study wason user engagement and content personalization, along with the support of the organization and the quality of content, on higher education access using multiple linear regression. The results showed that combined, the four dimensions of the LMS explained 64.9% of the variance in access to higher education with R = 0.811, R^2 = 0.658, and Adjusted R^2 = 0.649 as illustrated in Table 1 below;

Table 1: Multiple Linear Regression Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.811	.658	.649	.28392

Table 1: Linear Regression Model Summary

Improving these dimensions has positive implications on access to and participation in higher education, and therefore, increased access to digital learning It therefore implied external factors counted for 35.1 percent of the variation on the access to higher education. This study examined how the Learning Management System (LMS) dimension, user engagement, content personalization, organizational support, and content quality affects access to higher education in universities in the Nairobi Metropolitan Region, Kenya. Data shows that all four elements of the LMS have a positive and significant influence on higher education access as reflected in Table 2 below;

Table 2: Regression Coefficients

Predictor	B	Beta	Sig.
User engagement	0.289	0.534	< 0.001
Content personalization	0.414	0.670	< 0.001
Organizational support	1.076	1.368	< 0.001
Content quality	0.279	0.450	< 0.001

Table 2: Regression Coefficients

Of all the factors, the most significant influence on higher education access was found to be the presence of organizational support. This reinforces the need to have adequate training, infrastructure, policies, and a supportive ecosystem for the use of LMS. This reinforces that, regardless of the functionality of the LMS, significant changes will not be realized in the absence of a supportive environment.

Personalized content also showed a positive influence, reflecting the need for an LMS to be geared toward the individual user. User engagement also reinforced access to the LMS through sustained use. Content quality influenced the access and use of higher education through LMS by ensuring high quality and relevant learning content. The findings confirm that access to higher education through LMS is a multi-dimensional exercise incorporating technology, organization, and user dimensions. As founded by Banu et al. (2024), the

success of LMS systems is based on multiple factors which influence learner behavior and support the utilization of the learning tools.

Recommendations

To increase user engagement, universities are instructed to blend discussion forums, cooperative tools, and interactive online activities throughout their daily course deliveries. Universities must also develop tools that incorporate adaptive technologies for content personalization through customized learning paths and feedback systems.

Furthermore, universities must invest in stable ICT services combined with technical support and training for their users. All academic units have the responsibility to ensure that content of the LMS is logically aligned with the academic units' goals and matched with appropriate multimedia materials.

Last, some constraints of this study must be understood. It only investigated universities within the Nairobi metropolitan area, making it difficult to generalize. The study relied on self-report questionnaires, which in some cases promotes the respondent bias. The quantitative nature of the study also limited understanding of the participant's experiences. Further, because the survey was done online, participants with weaker internet, or fewer, or lower digital literacy, may have been socially segregated.

Future Research

Future studies should focus on the remaining changes. Nearly 35.1% of the variance is unexplained. Other factors beyond the context of this research may help understand variables relating to access of higher education. More research in the present technological environment is needed, including reference to the use of AI in the context of learning, and learning analytics, both, theoretically, and practically.

REFERENCES

Achmadi, A., & Siregar, A. O. (2021). The effect of system quality, information quality and service quality on user satisfaction of e-learning system. The International Journal of Business Review, 4(2), 108–118. https://doi.org/10.17509/tijbr.v4i2.12345

AM J, N. (2021). Overview of cross-sectional studies. 10(121), 59–62.

Amirah, C., & Konidin, T. (2023). Organizational culture analysis and management information systems in educational environments. Journal of Management, Economic & Financial, 11–22.

Araka, E., Maina, E., Gitonga, R., Oboko, R., & Kihoro, J. (2021). University Students' Perception on the Usefulness of Learning Management System Features in Promoting Self Regulated Learning in Online Learning. International Journal of Education and Development Using Information and Communication Technology (IJEDICT), 17(1), 45–64.

Banu, R., Shrivastava, P., & Salman, M. (2024). An empirical study of students' perceptive on e-learning systems success. International Journal of Information and Learning Technology, 41(2), 130–143.

Beinicke, A. (2020). Evidence-based actions for maximising training effectiveness in corporate e-learning and classroom training. Studies in Continuing Education, 42(2).

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. Journal of Management Information Systems, 19(4), 9–30.

Maina, M., & Nzuki, D. (2015). Adoption determinants of e-learning management system in institutions of higher learning in Kenya: A case of selected universities in Nairobi Metropolitan. International Journal of Business and Social Science, 6(2).

Msekelwa, V. (2023). Artificial intelligence-powered personalization in digital learning platforms: Opportunities and risks. International Journal of Educational Technology, 10(3), 121–139.

Muuro, M. E., & Kihoro, J. M. (2017). Learner experience of e-learning mode in institutions of higher learning: A case of Kenyan Universities. 2017 IST-Africa Week Conference, IST- Africa 2017, 1–9. https://doi.org/10.23919/ISTAFRICA.2017.8102397

Nikola, K., & Dijana, O. (2018). Analysis of student behavior and success based on logs in Moodle. In 41st International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO 2018), Opatija, Croatia.

Shisakha, B. (2024). Institutional information communication technology capacity influence on e-learning utilization for instruction in Kenyan universities. Kenyatta University. https://ir-library.ku.ac.ke/items/b46e0a86-1563-4aac-8c85-64e3e9fd345f

Tornatzky, L. G., & Fleischer, M. (1990). The technology–organization–environment framework. Lexington Books.