



Analyzing the Impact of Institutional Infrastructure on Learner Participation in Distance Learning: A Kenyan Perspective

Joyce Wagithi Kiruma¹
Dr. Ann Aseey²
Prof. Dorothy Kyalo³
Dr. Naomi Mwangi⁴

¹joyce.githae@gmail.com
²aaseey@uonbi.ac.ke
³dorothy.ndunge@uonbi.ac.ke
⁴nmwangi@uonbi.ac.ke

¹PhD Student, ^{2,3,4}Senior lecturer, ^{1,2,4}Department of Educational and Distance Studies, ³Department of Education Management, Policy and Curriculum Studies, ^{1,2,3,4}University of Nairobi, Kenya

ABSTRACT

The paradigm shift towards distance learning has spurred the importance of institutional infrastructure in ensuring effective educational delivery. This study examines the relationship between institutional infrastructure and learner participation in the context of distance learning within Kenyan higher education. The research adopted a mixed-methods research design. The population of the study consisted of 441 learners in undergraduate programmes from the department of educational and distance studies at the University of Nairobi for the academic year 2022-2023. From this pool, a purposive sample of 180 students was selected to participate. A survey questionnaire, incorporating both quantitative and qualitative elements, served as the primary data collection tool. The data analysis was done using SPSS version 26. Thematic analysis of qualitative data was conducted to get insights into how institutional infrastructure affected learners involvement in distance learning. The results show that learner involvement in distant learning and institutional infrastructure have a positive and substantial connection ($\beta_1 = 0.637$, $p \text{ value} < 0.000$). As a result, the study clarifies how important institutional infrastructure is to the development of fruitful remote learning opportunities. This study adds to the expanding corpus of research in the area of remote education and helps develop evidence-based tactics for encouraging student engagement in online learning settings.

Keywords: Institutional Infrastructure, Distance Learning, Learner Participation, Online Education

I. INTRODUCTION

The advent of online and other distant educational platforms has brought about substantial transformations in the transmission and acquisition of knowledge within the realm of higher education (Basar et al., 2021). The utilization of distance learning is gaining prominence as a feasible alternative in response to the challenges posed by the demands of present-day society (Alvarez, 2020). One of the issues faced by individuals is the need to effectively manage and prioritize their commitments to work, friends and family, and academic pursuits. Individuals are afforded the opportunity to engage in advanced academic pursuits while effectively managing their other responsibilities. The integration of digital technology has significantly expedited this transition since it provides students with unparalleled access to educational opportunities that transcend geographical limitations (Kaputa et al., 2022).

The concept of learner engagement is of utmost importance and serves as a fundamental aspect of distance learning programs that are deemed effective. Martin and Bolliger (2018) assert that learner involvement serves as a quantitative measure indicative of the extent to which students actively engage, interact, and participate in their educational endeavors. The fundamental element for the success of distant learning programs lies in the active engagement of learners. Nevertheless, the realm of distance education presents its own unique challenges. Many students often face the challenge of managing their educational journey independently, lacking the direct support and interactions typically offered in traditional classroom environments (Basar et al., 2021). The establishment of necessary infrastructure by educational institutions plays a crucial role in facilitating the implementation and effectiveness of distance learning. Within the realm of remote education, the ability of an educational institution to furnish a well-organized and interconnected infrastructure emerges as a crucial determinant in assessing the caliber of learning encounters (Coman et al., 2020).

Redesigning courses, developing new curricula, and creating new content are the responsibilities that fall on the shoulders of educational designers, who are another essential component of institutional infrastructure. Their efforts go beyond the creation of information, as they also design lessons that actively involve students who are enrolled in distant learning programs. They personalize the learning settings to meet the requirements of the students, encouraging critical thinking and interaction (Ludwig & Dunlap, 2013). This is done in collaboration with the teaching staff.

Another essential part of the infrastructure of educational institutions is known as the Learning Management System, or LMS for short. This all-encompassing software application is responsible for coordinating the many different aspects of the educational process. Notably, it offers learning resources, helps students register for classes, and evaluates areas in which they may be lacking skills. According to Abdul (2021), the transformative potential of LMS platforms is emphasized in reshaping methods of instruction and expanding the horizons of distance learning. The author suggests that deploying flexible and customizable LMS solutions improves learners' accessibility to study materials, regardless of whether or not they are constrained by geographical constraints.

The accessibility of internet connectivity stands out as an integral part of the physical infrastructure that facilitates distance learning. Access to the Internet comprises the whole range of technology, services, and software that make up the digital world. This makes it possible to create learning possibilities that are both sustainable and inexpensive (Ramya et al., 2020). Given these circumstances, it is more important than ever to cultivate an atmosphere that is internet-enabled because the absence of internet connectivity renders even the most advanced technologies and educational tools ineffective. In light of these circumstances, the purpose of this study was to establish the influence of institutional infrastructure on learner participation in distance learning in Kenya.

II. LITERATURE REVIEW

Infrastructure is the bedrock upon which distant learning institutions are built, and it plays a critical role in ensuring the efficient running of all educational endeavors. According to Gikonyo (2012), the Office of Career Services (OCS) has been specifically developed to provide support to students in their endeavor to engage in continuous education throughout their lives. Similarly, Limperos et al. (2015) argue that these services encompass a wide variety of areas, such as addressing non-course-related concerns, aiding in the selection of courses, offering support during the course, providing post-course counseling, and possessing expertise in remote learning platforms. In order to foster active engagement, it is imperative to ensure that students possess a comprehensive understanding of the obligations and anticipations associated with remote education (Ritt, 2008).

Another essential part of educational infrastructure is the learning management system, sometimes known as an LMS. This is a digital platform that coordinates educational and learning-related activities. According to Aslanian (2010) and Sujana et al. (2017), the incorporation of an LMS provides flexibility, ubiquity, and cost-efficiency. According to Sujana et al. (2017), learning management systems have grown to accept hybrid learning models such as blended and flipped learning, which has increased pedagogical diversity. Initially designed for remote learning, However, the usefulness of LMS is dependent upon access to and expertise with technology, with problems in technology, the internet, devices, and skills determining its impact (Petty et al., 2014). This makes it difficult for some people to use LMS.

The age of web-based distant learning is illustrative of the major effect that technology has had on the educational landscape. According to Exter and Ashby (2019), educational institutions use digital systems to circumvent temporal and spatial limitations, notably within the context of web-based distant learning. According to Mackenzie and Christensen (1971), efficient content delivery needs more than simply digitizing course materials. This is true despite the fact that web-based platforms offer greater flexibility. Viberg and Gronlund (2017) found that even if infrastructure improvement is ongoing, there is still a significant disparity between regions in terms of access and utilization.

The sum of these infrastructure components has a substantial impact, individually and together, on the engagement of learners in distant learning. However, in order to gain a better knowledge of the complexities of their influence and relationships, particularly in the context of Kenya, additional research needs to be conducted.

III. METHODOLOGY

This study utilized mixed-methods analysis, which enabled a full investigation of the link between learner involvement and institutional infrastructure within the setting of remote learning in Kenya. The population of the

study consisted of 441 learners in undergraduate programmes from the department of educational and distance studies at the University of Nairobi for the academic year 2022-2023. A purposeful sampling technique was used to select 180 participants for the study. Questionnaires were used to collect data. The quantitative data were subjected to an analysis that combined both descriptive and inferential statistical methods. The qualitative data was subjected to thematic analysis. The analysis of the qualitative data followed a methodical procedure that consisted of detecting reoccurring themes, patterns, and connections within the responses of the participants. The findings were presented in the form of tables and discussions.

IV. RESULTS

4.1 Influence of Institutional Infrastructure on Learner Participation in Distance Learning

The study sought to establish the influence of institutional infrastructure on learner participation in distance learning in Kenya. The result is presented in Table 1.

Table 1

Institutional Infrastructure Learner Participation in Distance Learning

Institutional Infrastructure	Mean	Std. D
OCS Academic advisors are readily available and accessible	3.66	1.119
Easy to track the scores for assignment/ Exams.	3.56	1.135
There is sufficient time available during the advising sessions	3.13	0.965
Internet connectivity influences my participation in distance learning	3.04	1.038
OCS Academic advisors help me set the goals and work towards achieving them	3.03	0.988
OCS Academic advisors are well trained to handle issues of the learners	2.99	0.983
It has integrated with tools that simplifies all processes, from the creation of teaching , courses, multimedia content, all the way to the creation of different types of reports and analytics	2.97	1.067
The instructional course designer design an optimum instructional environment to meet the needs of the learners	2.93	1.215
My instructor is able to interact with us in LMS and give feedback	2.92	1.067
Learning management system administrator is able to resolve issues in the LMS system promptly	2.84	1.026

The results in Table 1 indicate that academic advisors from the Office of Career Services (OCS) are readily available and accessible (mean = 3.66), tracking assignment and examination scores is easy (mean = 3.56), and there is sufficient time during advising sessions (mean = 3.13). Conversely, the items with the lowest mean scores in relation to institutional infrastructure were: the learning management system administrator's ability to resolve issues promptly (mean = 2.84), the instructor's ability to interact and provide feedback in the LMS (mean = 2.92), and the instructional course designer's ability to design an optimal instructional environment (mean = 2.93). These findings suggest that while students find support in accessing academic advisors and tracking scores, there are concerns related to technical support, instructor-student interaction, and instructional course design. These insights can guide the institution in improving areas such as providing instructors with updated online course delivery strategies, offering prompt technical support, implementing effective instructor-student interaction strategies, and designing instructional environments that better cater to the diverse needs of distance learners.

4.2 Learner Participation in Distance Learning

Learner participation in distance learning was the dependent variable of the study and was operationalized as students' commitment to learning, which follows a continuous academic evaluation approach intended to promote responsibility in which learners are required to participate regularly and actively in all educational tasks. To establish learner participation, the students were presented with 10 items that measured their levels of agreement or disagreement with statements related to participation in distance learning. The results in Table 4.8 show the means and standard deviations obtained for each of the ten items.

The results in Table 4.7 show that on a scale of 1 to 5 (where 1 = strongly disagree and strongly agree = 5), the items with the highest mean scores were: I get help when I am engaging with my learning (3.82), I am confident I will graduate on time (3.73), and I am able to interact with my peers as I participate in distance learning (3.23). On the other hand, the items with the lowest mean scores were: I am satisfied with the way the course is structured (2.91), I am satisfied with the quality of my course (2.95), and I am satisfied with my educational experiences at the University

of Nairobi (3.01). These findings indicate that while students generally felt supported in their learning process, had some confidence in their ability to graduate on time, and were able to interact with their peers to some extent, there were areas of concern related to the structure of the courses, the overall quality of the education, and their overall satisfaction with their experiences at the University of Nairobi. These insights could help the educational institution identify areas for improvement in their distance education programs, such as course structure, quality enhancement, and overall student satisfaction.

Table 2*Learner Participation in Distance Learning*

Learner Participation	Mean	Std. D
I get help when I am engaging with my learning	3.82	.958
I am confident I will graduate on time	3.73	.972
I am able to interact with my peers as I participate in distance learning	3.23	.885
I actively participate in learning	3.19	.857
I can confidently refer a friend to the UON because I enjoy my studies	3.12	.995
I am confident I will get all marks for my units on time	3.06	.940
I am confident I made the right decision joining University of Nairobi	3.01	1.014
I am satisfied with my educational experiences at University of Nairobi	3.01	1.038
I am satisfied with the quality of my course	2.95	.959
I am satisfied with the way the course is structured	2.91	1.015

The research process included focus group discussions (FGD) that were conducted with two groups of 12 students each (one group comprising male students and the other comprising female students). The FGD discussants reported that they made efforts to fully participate in learning by participating in assignments, taking up leadership positions, logging in to the LMS, interacting with other learners and instructors, and ensuring they were able to access the content. The FGD participants agreed that they regularly interacted with faculty members, with the main reasons for such interactions being: raising queries concerning the units, clarification on the progress of learners' work, missing marks, and online discussions on work given. The participants noted that they often obtained help related to their studies from instructors, fellow students, and ICT personnel. The main platforms through which learners interacted with their peers were online discussions and WhatsApp groups. From the FGDs, it emerged that 70% of the participants would recommend their friends or family members to join UON, with the main reasons for this being friendly staff and the availability of content. On the other hand, 30% of the FGD participants indicated that they would not recommend the program to their friends or family due to delayed feedback on their progress, especially issues of missing marks.

4.3 Inferential Statistics**4.3.1 Correlation Analysis**

The Pearson product-moment correlation analysis was used to establish the relationships among the variables of the study, that is, learning infrastructure and learner participation. A correlation coefficient close to +1 indicates a strong positive relationship, while a coefficient close to -1 indicates a strong negative relationship. A coefficient close to 0 suggests no significant relationship. Table 2 presents the correlation matrix.

Table 3*Correlation Matrix*

Variables		Learner participation	Infrastructure
Learner participation	<i>r</i>	1	
	<i>p</i>		
Infrastructure	<i>r</i>	0.706**	1
	<i>p</i>	0.000	

r = correlation coefficient, *p* = p-value



The results reveal a strong positive correlation ($r = 0.706$, $p = 0.000$) between learner participation and learning infrastructure. This indicates that as the quality of learning infrastructure improves, there is a concurrent increase in learner participation. The p -value of 0.000 suggests that this correlation is statistically significant, reinforcing the robustness of the observed relationship.

4.3.2 Regression analysis

Regression analysis for infrastructure and learner participation was undertaken. Table 3 presents the results of this analysis.

Table 4

Regression Analysis for Infrastructure and Learner Participation

Regression Model Summary					
R Square	Adjusted R Square	Std. Error of the Estimate		Durbin-Watson	
0.499	0.496	0.26852		2.271	
Analysis of variance					
	Variable	Coefficients	Std. Error	t-statistic	Sig.
	(Constant)	1.213	0.150		
	Infrastructure	0.637	0.048	13.305	.000

The results in Table 4 illustrate that the explanatory power of institutional infrastructure had an R square of 0.499 and an adjusted R square of 0.496. The results of the study demonstrate a positive and statistically significant relationship between the quality of institutional infrastructure and the level of learner engagement in distance education ($\beta_1 = 0.637$, p value < 0.000). Hence, a one-unit increment in institutional infrastructure resulted in a 49.9% increase in learner engagement in remote education.

This highlights the need for establishing a strong and supportive institutional framework to facilitate and augment learner engagement in online education.

4.3 Discussion

The findings suggest that there is a positive relationship between the improvement of institutional infrastructure and the level of student participation in distant learning (Nyagowa et al., 2013). According to Burnett, Harle, and Deans (2018), the establishment of a strong technological framework is essential for ensuring consistent access to digital platforms and resources. This infrastructure facilitates students' participation in educational activities and their smooth retrieval of course materials. The aforementioned factor can have a substantial influence on the capacity of learners to actively engage in discussions, fulfill assignments, and engage with instructors and other students.

The administrative support systems provided by institutions, such as timely and efficient academic advising or technical assistance, also contribute to the overall support and engagement of students. Previous research by Zhao et al. (2022) has shown that when students feel that they have readily available administrative support, it positively influences their motivation and willingness to participate in distance learning activities.

The communication system is another component of institutional infrastructure that promotes learner participation. Effective communication systems within the institutional infrastructure enable timely feedback, information dissemination, and interaction between instructors and students. These communication channels create a sense of community, facilitate discussions, and enhance learner engagement and participation. As pointed out by Kahu et al. (2022), relationships play a significant role in promoting student engagement. They add that, since online students often feel disconnected and isolated, tools that increase interaction and communication with staff and among students are important. The findings reported above suggest that universities offering distance learning programs can enhance learner participation by acknowledging the importance of institutional infrastructure and making efforts to improve it. Investing in technological resources, providing adequate administrative support, and fostering effective communication systems are crucial steps towards creating an environment that supports active engagement in distance education.

V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The purpose of this study was to determine how learners' involvement in distant learning is impacted by institutional infrastructure among University of Nairobi undergraduate program participants. The study's conclusions highlight how important institutional infrastructure is in determining how learners engage in distance learning. Student engagement and active participation in the online learning process have been found to be significantly predicted by institutional infrastructure, which consists of administrative assistance and technology resources. The correlation that exists between learner participation and institutional infrastructure is positive, which emphasizes the significance of building a solid basis to enable students to access learning platforms, timely educational guidance, and administrative services. The availability of dependable technology resources makes it easier for students to access communication tools, course materials, and digital learning platforms. Students may finish their tasks, engage in active conversation, and work in real-time collaboration with teachers and classmates because to this accessibility. Furthermore, the provision of timely administrative support services, including technical assistance and academic advice, promotes a positive and encouraging learning environment. Access to such resources increases the likelihood that students will interact with their coursework and feel equipped to tackle any obstacles they may face while pursuing remote learning.

5.2 Recommendations

In the context of distant learning, the findings of this study have consequences for both educational institutions and those responsible for formulating educational policy. The development and upkeep of a solid institutional infrastructure ought to be given top priority in order to guarantee that students will derive the maximum advantage possible from their time spent participating in remote learning. Institutions should avail resources to improve the atmosphere of online learning and encourage more active participation from students by making financial investments in technology resources.

REFERENCES

- Abdul, L.M. (2021). Online distance learning perception and readiness during Covid-19 outbreak: A research review article in international journal of academic research in progressive education and development. *International Journal of Academic Research in Progressive Education and Development*, 10(1), 63-73.
- Alvarez, A. V. (2020). The phenomenon of learning at a distance through emergency remote teaching amidst the pandemic crisis. *Asian Journal of Distance Education*, 15(1), 144-153.
- Aslanian, B. (2010). Distance learning learners Today. New York: The College Board.
- Basar, Z., Mansor, A., Jamaludin, K.A., & Alias, B.A. (2021). The effectiveness and challenges of online learning for secondary school students: A case study. *Asian Journal of University Education*, 17(3), 119-129.
- Burnett, P., Harle, J., & Deans, F. (2018). *Improving IT infrastructure to ensure better access to research. Learning, Reflections & Innovation*, INASP Pilot Project. Retrieved from: https://www.inasp.info/sites/default/files/2018-04/nren_lri_details_web_04_15.pdf
- Coman, C., Țiru, L.G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M.C. (2020). Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective. *Sustainability*, 12(24), 10367. <https://doi.org/10.3390/su122410367>
- Cox, S. (2013). *Practices and academic preparation of instructional designers*. Unpublished doctoral thesis, Brigham Young University, Provo, UT.
- Exter, E., & Ashby, I. (2019). Preparing today's educational software developers: voices from the field. *Journal of Computing in Higher Education*, 31(3), 472-494.
- Gikonyo, N.W.M. (2012). *Factors Influencing University Managers' Participation in Distance Education: A Case of Public Universities in Kenya* (PhD Thesis, University of Nairobi).
- Goetz, J. (2016). *Academic Advising: Learner affairs practice in higher education* (p.88). Springfield: Thomas Publisher.
- Haleem, A., Javaid, M., Qadri, M., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3, 275-285.
- Kahu, E. R., Thomas, H. G., & Heinrich, E. (2022). A sense of community and camaraderie: Increasing student engagement by supplementing an LMS with a Learning Commons Communication Tool. *Active Learning in Higher Education*. <https://doi.org/10.1177/14697874221127691>

- Kaputa, V., Loučanová, E., & Tejerina-Gaite, F.A. (2022). Digital transformation in higher education institutions as a driver of social oriented innovations. In: Păunescu, C., Lepik, K.L., Spencer, N. (eds) *Social Innovation in Higher Education. Innovation, Technology, and Knowledge Management*. Springer, Cham. https://doi.org/10.1007/978-3-030-84044-0_4
- Kinyanjui, E. (2010). The commonwealth of learning Distance learning and Open learning in Africa. What works or doesn't work. Commonwealth of learning. Paris.
- Kramer, L., & McCauley, E. (2015). *Academic advising as a comprehensive campus process*. National Academic Advising Association Monograph Series, (2) Manhattan, Kansas: National Academic Advising Association.
- Limperos, M., Buckner, M., Kaufmann, R., & Frisby, N. (2015). Online teaching and technological affordances: An experimental investigation into the impact of modality and clarity on perceived and actual learning. *Computers & Education*, 83, 1-9.
- Ludwig-hardman, S., & Dunlap, J. (2003). Learner Support Services for Online Students: Scaffolding for success. *The International Review of Research in Open and Distributed Learning*, 4(1), 1. Athabasca University Press.
- MacKenzie, O., & Christensen, E. L. (Eds.). (1971). *The changing world of correspondence study: International readings*. University Park, PA: The Pennsylvania State University Press.
- Martin, F., & Bolliger, D. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learning Journal*, 22(1), 205-222.
- Meoli, K., & Waema T. (2014). *E-readiness 2013 Survey of Kenyan universities*. Kenya Education Network.
- Nyagowa, H.O., Ocholla, D.N., & Mutula, S.M. (2013). The influence of infrastructure, training, content and communication on the success of NEPAD'S pilot e-Schools in Kenya. *Information Development*, 30(3), 1–12.
- Olubor, O., & Ogonor, O. (2018). Quality assurance in Open and distance learning in National Open University of Nigeria: Concepts, Challenges, Prospects and Recommendations. Paper presented at the 2nd ACDE Conference and General assembly Nigeria, Lagos
- Petty, L., Johnston, J., and Shafer, D. (2014). *Handbook of Distance learning for Adult Learners* (3rd Edition). Project IDEAL Support Center – Institute for Social Research, University of Michigan.
- Ping, Y. (2018). A learning management system to support instructional communications of the ACM: vol. 51, no. 4.
- Ramya, V., Purushothama, K., & Prakash, R. (2020). Design and Implementation of IT based remote laboratory for sensor experiments. *Digital Library*, 14, 227–238.
- Ritt, E. (2008). Redefining Tradition: Distance learning learners and Higher Education. *Adult Learning* 19 (1/2), 12–16.
- Sujana.J, Claire, M., & John G (2017). *An interaction visualization tool for a learning management system*.
- Viberg, O., & Gronlund, Å. (2017). Understanding students' learning practices: challenges for design and integration of mobile technology into distance learning. *Learning, Media and Technology*, 42(3), 357- 377.
- Watson, R., & Sunnie, L, (2015). An Argument for Clarity: What are Learning Management Systems, what are They Not, and What Should They Become? *Tech Trends*, 51.
- Zhao, X., Shao, M., & Su, Y. (2022). Effects of online learning support services on university students' learning satisfaction under the impact of COVID-19. *Sustainability*, 14, 10699. <https://doi.org/10.3390/su141710699>