



Relationship Between Digital Literacy Skills and the Effective Use of Online Educational Resources in Learning Among Undergraduate Students in Kenyan Public Universities

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Abstract

Digital technologies have expanded the availability of electronic databases, learning management systems, institutional repositories and online learning resources in the university environment. But, simply having access is not enough, students must be able to use the digital information in an effective way, which involves searching, evaluating, retrieving, and using digital information effectively. This study explored the relationship of digital literacy skills with usage of online educational resources for effective learning in the undergraduate students of Kenyan public universities. This was a descriptive survey using a mixed methods design (MCD) that included second year undergraduate students and librarians at the University of Nairobi and Dedan Kimathi University of Technology. A total of 328 respondents were studied, which included 322 students and six librarians. Data were gathered through structured questionnaires, semi-structured interview guides and analysed descriptively, through Pearson correlation and thematic analysis. Moderate to high access and use of resources online, such as access to course materials ($M = 3.88$, $SD = 1.02$); retrieval of academic materials ($M = 3.81$, $SD = 1.01$); navigation of university platforms ($M = 3.74$, $SD = 1.05$). Internet speed and stability had a lower rating ($M = 3.45$, $SD = 1.17$). In the case of access and use of online educational resources, digital literacy was positively and significantly correlated ($r = 0.62$, $p < 0.05$). The use of databases and the training on them, library support and ICT support were identified as important factors in effective use of resources, whilst low participation in digital literacy programmes posed a challenge for librarians. Based on the findings of the study, ICT integration training into curricula, strengthening of ICT infrastructure and better cooperation between librarians and lecturers are recommended to improve the results of digital learning.

Keywords: Digital literacy; Online educational resources; Undergraduate students; E-learning; Public universities

Introduction

Digital literacy is a key requirement in the learning and assessment processes of university education as it is increasingly dependent on electronic databases, learning management systems, institutional repositories and other electronic resources. It is expected that undergraduates will have access to, and own, digital devices; know how to search strategically; critically appraise information; be able to retrieve relevant scholarly material; and use digital information ethically. Digital literacy thus involves technical, information and academic skills which equip students to gain from online learning resources (Odede 2022).

The findings from higher education systems with more sophisticated technology indicate that digital access is not sufficient for learning to be effective. According to Murray et al. (2022), students who were more digitally competent were better able to find, evaluate and utilize online information in academic research. Likewise, Georgopoulou et al. (2024) noted difficulties in assessing the credibility of information and choosing appropriate digital tools. The results indicate that the digital literacy challenge is a general issue in higher education, even if it is manifested differently in each context.

While digital learning platforms have been expanded in African universities, there are varying levels of digital competence among students. Ben Youssef et al. (2022) reported that digital skills have an impact on student performance via access to relevant learning materials. Naeem and Mushibwe (2025) also point out that students need to be resilient and equipped with practical tools to deal with the complex digital landscapes. In Kenya, public universities have embraced e-learning platforms and databases while at the same time, students are still using general search engines instead of academic databases. Students can have the knowledge of basic digital tools but lack skills in advanced digital tools for academic searching (Nyamboga, 2024).

The issue tackled in this paper is the failure of the access to online learning materials in Kenyan public universities to keep pace with the ability of the students to effectively use the materials. Students might not be able to locate credible academic sources, access full-text materials, manage references, assess online information or be fully involved in online learning without digital literacy. Thus, the study sought to determine the relationship between undergraduate students in Kenyan public universities' proficiency with digital literacy and their efficient use of online learning resources.



Theoretical and Empirical Context

The study was based on the Technology Acceptance Model (TAM) which accounts for the use of technology in terms of perceived usefulness and perceived ease of use (Davis, 1989). For the purposes of this study, the usefulness of online learning platforms to students' studies, and their perceived ease of use, is associated with increased usage of this type of learning platform, digital libraries and academic databases. Ease of use however, needs to be contextualised in Kenyan public universities as internet stability, device suitability, library support and digital competence also affect ease of use. While a system could be beneficial, if it is not followed and students don't have the skills or guidance to find and assess academic information, it is not helpful.

The empirical literature lends credence to the idea of multi-dimensionality of digital literacy. Allam et al. (2020) concluded that self-directed learning and motivation are essential in developing computer skills and knowledge so that computer and internet literacy can be achieved. A number of studies have also shown that digital skills are self-assessed by students with confidence, although their awareness of the e-resources of the university is not at the level expected. Some studies also revealed that digital skills are evaluated by students with high self-confidence while their awareness of the e-resources of the university is not at the level expected. (Abdullahi, 2020; Öncül, 2021). All these studies indicate that competence, awareness, confidence and institutional support are critical factors in effective utilization of online learning resources.

Methodology

This study employed descriptive survey with a mixed approach. The approach was appropriate since it allowed the researcher to collect both qualitative information from the librarians who assist with digital learning and quantitative information about students' use of online resources and digital competence. This strengthened the interpretation of statistical patterns, through triangulation with institutional experiences.

The target population in this study was second year undergraduate students and University Librarians at University of Nairobi and Dedan Kimathi University of Technology. A total of 1,830 subjects were studied. The sample size of 328 respondents was calculated according to Taro Yamane formula. A total of 322 student questionnaire responses and six librarian interviews were collected. The students were selected by stratified and simple random sampling and the librarians by purposive sampling due to the role they are playing in the management of e-resources, user training and user reference services. The distribution of student respondents was not even across the institutions with University of Nairobi having 90.1% and Dedan Kimathi University of Technology with 9.9% of the respondents. Thus, it is not the intention of the findings to be a kind of institutional comparison.

Structured questionnaires and semi-structured interview guides were used to collect data. The student questionnaire adopted a scale of 1-5 (Likert scale) for the measurement of access to online educational resources, navigation of the platforms, retrieval of academic resources and the stability of the internet and digital literacy experiences. Librarian interviews focused on training, support mechanisms, database-search assistance, challenges to participation and the success of institutional digital literacy programmes.

Data were analyzed quantitatively by using descriptive statistics such as mean, standard deviation, frequency and percentage. The strength and direction of the relationship between digital literacy skills and effective use of online educational resources were determined using Pearson correlation analysis. Interviews were thematically analysed by using qualitative data analysis, which involved coding the data into recurring themes. Ethical considerations were adhered to by obtaining informed consent, ensuring respondent anonymity and confidentiality, and ensuring voluntary participation.

Results and discussion

Descriptive Findings on Access and Use of Online Educational Resources

The findings indicate that students felt that they had moderate to high access and use of online educational resources. The highest rating was for the ability to find the necessary information on-line with course materials when needed ($M = 3.88$, $SD = 1.02$). This implies that, in general, students have access to course materials on institutional online platforms. Students also indicated that they were able to easily find their notes, e-books and journal articles ($M = 3.81$, $SD = 1.01$); this is a reasonably high capacity for finding specific academic texts.



The overall rating for navigation on university Web platforms was positive ($M = 3.74$, $SD = 1.05$), indicating that there may be usability issues for some of the students. The quantity of online resources was rated moderately ($M = 3.62$, $SD = 1.08$), indicating that students think that the available material is useful, but not always adequate to meet all learning requirements. The smallest mean was found in the speed and stability of the internet ($M = 3.45$, $SD = 1.17$), indicating that even when students have digital skills, infrastructure continues to be a crucial challenge.

Table 1. Access and Use of Online Educational Resources

Statement	SA (5)	A (4)	N (3)	D (2)	SD (1)	Mean	Std. Dev.
I can reliably access required online course materials when needed	97 (30.1%)	81 (25.2%)	64 (19.9%)	48 (14.9%)	32 (9.9%)	3.88	1.02
University online platforms are easy to navigate	91 (28.3%)	81 (25.2%)	70 (21.7%)	48 (14.9%)	32 (9.9%)	3.74	1.05
The quantity of available online resources meets my course needs	86 (26.7%)	81 (25.2%)	75 (23.3%)	48 (14.9%)	32 (9.9%)	3.62	1.08
I can quickly retrieve specific materials such as notes, e-books and articles	97 (30.1%)	81 (25.2%)	64 (19.9%)	48 (14.9%)	32 (9.9%)	3.81	1.01
Internet speed and stability allow me to use online resources effectively	81 (25.2%)	81 (25.2%)	75 (23.3%)	54 (16.8%)	31 (9.6%)	3.45	1.17

Inferential Findings

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Table 2. Pearson Correlation Between Digital Literacy and Access to Online Educational Resources

Variables	Digital Literacy	Access to Online Educational Resources
Digital Literacy	1	
Access to Online Educational Resources	0.62*	1

Note: *Correlation is significant at $p < 0.05$ (2-tailed).

Qualitative Findings from Librarians

The findings of this qualitative evidence supported the findings of the quantitative evidence by illustrating how the students learn and apply the developments of the digital literacy skill. Students who had been trained in how to search a database were more successful in finding relevant academic resources and using subscribed databases, reported librarians. Technical and system support also helped students to resolve access issues on repositories and online platforms. Moreover, academic information evaluation and support for referencing were used to support students in using academic information ethically and critically.

The interviews also demonstrated that digital literacy programmes are beneficial but not always taken up. Low participation meant that few programmes had access, while trained students were more confident in online databases usage, according to librarians. The above finding helps to understand why some students can access course material and not be able to perform more advanced skills like reference management, critical evaluation and effective searching of databases. The least satisfactory competence in the general results was the use of reference management tools ($M = 3.23$, $SD = 1.21$), which has an impact on correct citations, academic integrity and research quality.

**Table 3. Qualitative Themes from Librarian Interviews**

Theme	Frequency Mentioned	Interpretation
Database searching skills	5	Training improves ability to locate relevant scholarly materials.
Technical and system support	4	ICT and library assistance help students resolve access challenges.
Referencing and information evaluation	3	Support strengthens ethical and critical use of academic information.
Moderate programme effectiveness	5	Digital literacy programmes help, but do not reach all student needs.
Increased use after training	4	Trained students show greater confidence in databases and platforms.
Low participation in training	3	Many students miss available programmes, limiting overall impact.

The findings back TAM as it demonstrates that students' adoption of online resources is influenced by their perceived ease of use and actual ability. Efficient navigation of platforms and retrieval of the materials make online resources more useful for learning. But, in a low-bandwidth internet environment or when students lack the needed academic abilities, they may not reap the benefits of the tools available to them digitally.

The findings also confirm Abdullahi (2020), who noted that the confidence of students in terms of basic ICT skills is not always proportional to the effective use of the e-resources of the university. They also back Öncül (2021) who stated that the measurement of actual digital competence should not assume that students are digitally prepared. The positive correlation between digital literacy and resource use showed that enhancing digital skills can directly enhance students' engagement in learning online education resources.

Conclusion and Recommendations

Lastly, the study concludes that among undergraduate students in Kenyan public universities, digital literacy is positively and significantly correlated with the efficient use of online educational resources. Students with better skills in searching, navigating, retrieving and evaluating academic information are more likely to be able to make the best use of online learning platforms and scholarly databases. The data also reveals that the students' access to online resources is in a moderate to high range, although connectivity issues and lack of certain skills such as reference management still limit its use.

The study also finds that institutional support is a pivotal factor in helping to make the access a meaningful academic experience. Students become confident and competent through library workshops, assistance in searching databases, assistance with ICT, guidance by the lecturer, and library reference services. The relatively limited impact of digital literacy programmes, however, suggests that support should not be ad hoc or optional. Digital literacy should be embedded in the curriculum at universities to deliver a progressive learning from navigating the platforms and search features, through to the evaluation and referencing of information and the handling of ethical issues relating to information.

The study suggests that there is a need to improve the ICT infrastructure of the public universities, particularly the internet speed and stability as technical problems lessen the importance of digital literacy. University libraries should work more closely with lecturers to incorporating the use of e-resources in assignments, reading lists and coursework. Regular practical workshops on database searching, citation management and evaluation of online sources should be established at institutions as well. Last but not least, universities should conduct more orientations and provide peer support, library ambassadors and digital communication platforms to make students aware of the available online resources and let them reap all the benefits of the institutional investments in online learning materials.

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