Craving for Knowledge: The Urge to Access Online Reading Materials by Students during Scientific Research Writing, a Case of Urban Universities of Uganda

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Abstract

Addressing concerns related to online reading materials is paramount as the internet establishes itself as the defining medium for literacy in higher education institutions among the current generation. Globally current debates consistently underscore the relevance of online reading materials to scientific research writing among university students. The current study explored the students' urge to access online reading materials based on four selected universities in an urban geographical context of Uganda. Using a cross-sectional exploratory research design comprised of mixed approaches, we used descriptive statistics and Analysis of Variance (ANOVA) to investigate the disparity in accessed online reading materials across the universities. An ordinal logistic model established the factors that influence access to online reading materials. The study revealed that university students exhibited moderate utilisation of online resources, primarily accessing materials through platforms like MyLOFT, Google Scholar, University online catalogs, Directory of Open Access Journals (DOAJ) and Directory of Open Access Books (DOAB). Additionally, the findings underscored notable variations in the mode of access across the studied universities, with access influenced by factors such as sex, type of degree pursued, availability of university ICT equipment, and the research level of students. These insights shed light on the need for tailored strategies to enhance online reading materials accessibility and to support diverse student populations in their academic pursuits, such as subscribing to the publishers of scientific journals. This may improve students' scientific research writing skills and completion rate, which have remained a formidable challenge in higher education institutions in Uganda.

Keywords: *Accessibility; Online reading materials; University students; Scientific writing; Uganda.*

Introduction

Globally, digital reading is consistently prevalent across numerous developed nations. Notably, however, the United States of America (USA) has played a pivotal role in advancing e-learning within the realm of higher education (Mensah et al., 2023). Within the European framework, Fidas et al. (2023) note that, predominantly, this achievement was realised through the utilisation of Video Conferencing Tools (VCTs) alongside Learning Management Systems (LMSs). The objective was to sustain academic endeavours such as instructional sessions, laboratory tasks, and assessments within a digital milieu. The integration of Information and Communication Technology (ICT) within educational contexts augments the process of student learning, extends educational opportunities to individuals lacking or having restricted access to traditional forms of education, supports the effective training of educators, contributes to the growth of a proficient workforce, and fosters advancements in societal mobility (Adarkwah, 2021). In line with

Apuke and Iyendo's (2018) views, the importance of confronting concerns linked to comprehending online reading gains prominence, especially as the internet increasingly solidifies its role as the fundamental platform for literacy within the present generation.

Access to online reading materials significantly enhances scientific research writing skills in Asian universities. Research shows the benefits of digital reading environments in improving comprehension (Nguyen & Tuamsuk, 2023). Younger generations favour e-books for their academic advantages (Venkatasubramanian, 2018). Ding (2020) emphasises the role of new media technology in shaping reading habits, citing the appeal of e-reading and increased engagement with it. Studies in Australia and India indicate a shift towards electronic formats due to cost, environmental concerns and improved information accessibility (Divya & Haneefa, 2020; Johnston & Salaz, 2019). Despite challenges like eyestrain and distractions, the convenience of digital resources outweighs the drawbacks. Thus, the trend towards e-reading, supported by new media technology, significantly improves scientific research writing outcomes among college students. Accessing online reading materials emerges as a transformative force, bridging gaps in scientific research writing (Lembani et al., 2020). By delivering academic materials online, distance education becomes a catalyst for expanding the reach of higher education, offering equal opportunities for students across all geographical barriers. This is particularly crucial given the discrepancy in educational experiences between students in urban settings who benefit from advanced ICT infrastructure, and those in peri-urban and rural areas with limited access to digital resources (Nguyen & Tuamsuk, 2023).

In Uganda, universities, backed by the government and development partners, strive to shift towards research-focused institutions. Digitising printed resources and preserving them digitally can enhance research skills (Bisaso, 2017). Online reading can target specific research objectives, improving comprehension (Fidas et al., 2023). Internet resources are pivotal for 21st-century literacy and education (Klain & Shoham, 2019). This study explores university students' access to online reading materials to foster scientific research writing, aligning with the goal of quality education (UNESCO, 2017).

In addition, after the country attained independence in 1962, it started focusing on developing higher education institutions through research that would help move the country forward. Although research has become one of the primary core values in universities, there is low uptake of graduate research programmes and, thus, availability of fewer academic scientists according to the Status of Higher Education and Training in Uganda 2018/19 report (National Council for Higher Education (NCHE), 2019). One critical aspect that requires immediate attention is the liberalisation of the idea of accessing online reading materials. Recognising the limitations posed by a scarcity of experienced faculty, it becomes imperative to empower students to engage with scholarly materials independently as a way of fostering quality research and writing skills to meet high-impact journal publications, which is a requirement before doctoral completion in many universities. This can be achieved by fostering a culture that strongly encourages students to access online scientific documents and publications. This will equally enhance the quality and practicability of academic knowledge among graduates, as advocated by the National Council for Higher Education (NCHE, 2020).

Rationale and research gap

Ugandan higher education institutions aim to transition into research-driven institutions, supported by the government and development partners (Bisaso, 2017; Kaweesi et al., 2019). Kawooya et al. (2011) argue that creating research reports is an effective method for postgraduate student instruction and assessment, fostering various skills, including academic writing. Library resources are essential for teaching, learning and research needs (Klain & Shoham, 2019), including online materials (Apuke & Iyendo, 2018). Internet resources define literacy and education in the 21st century, making online academic library resources vital for educational purposes (Heck et al., 2020). Limited access to online reading materials among university students in developing countries hinders scientific research writing (Apuke & Iyendo, 2018; Mahmood, 2021). Enhanced access to these resources could empower students to address community issues through research dissemination and promote scientific writing (Apuke & Iyendo, 2018). There is a lack of information on the deficiency of online reading material access among Ugandan university students, posing a significant obstacle to research capacity development. Our study aims to bridge this gap by exploring online reading platforms accessed by students and determining factors influencing access to

online resources. We focused on four Kampala-based higher education institutions: Makerere University (A), Kyambogo University (B), Victoria University (C) and Ndejje University (D). These research questions guided our study:

1. RQ 1. What are the online reading platforms and materials accessed by university students?
2. RQ 2. What are the factors that influence access to online reading materials among university students?

This information is very valuable while the students augment their research skills. Empowered with a wealth of diverse online reading materials, students are poised to formulate and explore scientific problems independently, focusing more on resolving real-world issues within their communities and beyond than they would without the availability of online reading materials.

Insights into disparities of access to online reading materials among university students

Online reading platforms and materials

E-reading, or the practice of digitally decoding textual content, involves the interpretation of material that has undergone conversion into a digital format (Wiley et al., 2018). Apuke and Iyendo (2018) underscore the significance of addressing challenges related to online reading comprehension, given the gradual displacement of print media by the internet as the predominant mode of literacy for contemporary generations. List and Alexander (2017) have delineated a sequence of five cognitive steps implicated in the process of comprehending and engaging with online research. These stages encompass the location of pertinent information, the formulation of salient inquiries, the critical assessment of sourced material, the amalgamation of acquired knowledge, and the articulation of insights through both spoken discourse and written composition.

Traditional scholarly articles, disseminated in academic journals, exhibit a dichotomy, noted by Huisman (2019) and Kaweesi et al. (2019), which distinguishes publications emphasising research and scientific inquiry, such as science and public policy and research policy, from those with an inverted focus. Concurrently, students increasingly rely on online artificial intelligence tools like ChatGPT and Googlebot for language editing and grammar correction, enhancing research communication and scientific writing (Ifelebuegu, 2024). Educators should transcend textbooks, encouraging the incorporation of these tools to enhance research writing abilities (Labadze et al., 2023). Online learning access varies globally, with top-tier U.S. private schools offering extensive resources (Puma et al., 2022), contrasting with Ghanaian institutions that favour affluent students in online material provision (Aboagye et al., 2021). Socioeconomic factors result in unequal access to online resources, necessitating efforts to ensure equitable access globally (Puma et al., 2022).

Factors that influence access to online reading platforms and materials

Reducing disparities in online reading material access can enhance the quality of scientific research writing in higher education (Adarkwah, 2021). In Uganda, Baguma and Wolters (2021) stress the impact of ICT equipment availability, library resources and institutional repositories on shaping students' scientific writing skills. This underscores the crucial link between technology access and academic achievement, particularly in research (Ojok, 2018). Ojok highlights the challenges faced by students with disabilities in accessing reading resources, emphasising the importance of internet resources for inclusive education (Ojok, 2018). Accessible online resources, including audio, print, video and interactive materials, are essential for creating an equitable educational environment. Understanding university students' experiences with accessing and utilising online reading materials for research projects is vital (Adarkwah, 2021).

Methodology

Research design and approach

A cross-sectional exploratory research design utilising both quantitative and qualitative methods was employed. This approach, also supported by Mehta et al. (2014) and Molin et al. (2021), facilitated data collection from multiple students simultaneously. The study primarily employed quantitative methods but incorporated some qualitative techniques. The cross-sectional design was chosen for its efficiency in data

collection while ensuring the accuracy of respondents' current perspectives through thorough interviews and surveys. Makerere and Kyambogo universities, longstanding public institutions, along with Ndejje University and Victoria University, renowned private universities with modern research facilities, were purposively selected for the study. Undergraduate and graduate students at various stages of research development participated. The target population comprised 83,000 students, with approximately 38,000 at Makerere University, 33,000 at Kyambogo University, 6,000 at Victoria University and 6,000 at Ndejje University (Wikipedia, 2019; Independent, 2019; Victoria University, 2023; Ndejje University, 2017). The sample size of 382 respondents was determined using the Krejcie and Morgan (1970) formula, employing simple random and stratified sampling methods.

$$n = \frac{x^2NP\ (1-P)}{e^2(N-1) + x^2\ P(1-P)} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots . Equation\ (i)$$

Where:

$\boldsymbol{n}$ is the sample size,

$\boldsymbol{N}$ is the total number of the targeted population,

$\boldsymbol{e}$ is the level of precision expressed as (0.05), and

$\boldsymbol{x^2}$ is the chi-square for 1 degree of freedom at the desired confidence level (3.841). However, of the 382 individuals who received the questionnaire, only 70% (230) returned complete responses, and these were considered for analysis in this study.

We used questionnaire surveys, key informant interviews (KIIs) and focus group discussions (FGDs) to collect data for the study. The survey utilised both online Google Forms and hard copies, with 230 responses received out of 382, resulting in a 70% response rate. Key informant interviews involved six supervisors and seven librarians from the four universities, providing additional insights and data triangulation. These interviews allowed respondents to share their experiences candidly, enhancing understanding of access to online reading materials during student research. A predefined set of themes guided the interviews, with key informants selected on the basis of their expertise in research supervision and student guidance. We also conducted eight FGDs, selecting two from each university, one for male and one for female students, to enhance freedom of expression and data accuracy, particularly among female participants. Each group consisted of eight students from both undergraduate and postgraduate levels. Focus group discussions were chosen to gather data from a purposive group rather than solely relying on a statistically representative sample, allowing participants to express underlying beliefs, attitudes and motivations. A moderator, always a member of the research team, facilitated the discussions, leveraging social dynamics within the groups (Bijayalaskhmi, 2017).

Ethical considerations

Throughout the study, we strictly adhered to ethical guidelines. Participants were informed about the study's purpose and potential consequences, emphasising voluntary participation. All information provided by participants was treated with confidentiality and used solely for academic purposes. Participant names were not disclosed in the questionnaire or at any stage of reporting. Non-disclosure to third parties was maintained to prevent harm to participants. The study received clearance from the Victoria University Graduate School and Research Ethics Committee before data collection. To ensure data quality and validity, we employed reliable data collection techniques, including consistency checks, triangulation and validation (Taherdoost, 2018). Pretesting with 15 respondents from two universities helped refine the tools. Statistical tests, using SPSS version 23, were conducted to normalise data outliers, with Cronbach's alpha ensuring data reliability. To maintain confidentiality in reporting, pseudonyms (A for Makerere University, B for Kyambogo University, C for Victoria University, and D for Ndejje University) were used, and were unrelated to the universities' performance in accessing online reading materials.

***Table 1**: Reliability analysis indices for the data*

		N	%	Reliability Statistics	
Online reading materials accessed	Valid	230	100.0	Cronbach's Alpha	N of Items
	Excluded[a]	0	0.0	***.791***	12
	Total	230	100.0		
Factors that influenced access	Valid	230	100.0		
	Excluded[a]	0	0.0	Cronbach's Alpha	N of Items
	Total	230	100.0	***.930***	10

Cronbach's alpha index for the data on access to online reading materials was 0.79 (79%) and 0.93 (93%) for factors that influenced access to online reading materials. As advanced by Mohajan (2017), our alpha indices were higher than the cut-off alpha value of 0.6, below which data is regarded to be highly inconsistent. This informed our decision to accept the data for analysis and make reliable interpretations.

Data analysis

After receiving the filled questionnaires from the surveys, we started cross-checking the completeness of the data, coding and entry of such data into SPSS version 23 for analysis. Microsoft Excel was also used for the visualisation and presentation of results through graphs and tables. One-way Analysis of Variance (ANOVA) was used to model the variation in students' access to online reading materials across universities during research writing. Responses were recorded on a five-point Likert scale, with 1 being the most inaccessible and 5 being the most accessible, and these scores automatically allowed the ANOVA model in SPSS. Secondly, the Ordinal Logistic Regression (OLR) model was also used to estimate the relationship between ordered responses on the level of access to online reading materials and one or more explanatory variables (in this case the socio-demographic characteristics such as sex, age etc. of the students). The mathematical equation for OLR (seen in Equation ii) as used by Adeleke and Adepoju (2010) can be written as:

$$ln\left(\frac{\sum pr(event)}{1-\sum pr(event)}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [Equation\ ii]$$

Where:

β_0 is the threshold,

β_1 are the dependent variables or parameters (i.e. ranks/scores for access to (i) MyLOFT, (ii) Google Scholar, iii) university online catalogs, (iv) DOAJ and (v) DOAB), and

X_1 are the sets of predictor factors (i.e. sex, age, academic year, university equipment, online device, academic year, and level of research).

Qualitative data was analysed through thematic and content analysis following the research questions under the study objectives (Bengtsson, 2016).

Results

Access to online reading materials and platforms among university students

MyLOFT

The study found moderate MyLOFT use among university students, averaging 3.02 out of 5. Significant usage variability existed across universities ($F(230)=30.6$, $p<0.001$), as detailed in Table 2. University C students notably engaged with online reading resources, scoring 4.23 out of 5. Conversely, students of other universities scored below 3. University C's emphasis on technology and innovative teaching methods enhanced scientific research writing proficiency through online tutorials, demonstrative sessions and critical reviews. Access primarily relied on platforms like YouTube, journal databases and e-books, increasing demand for robust internet and ICT equipment.

> …My university has subscribed to the MyLOFT application. I learned about it during one of the training sessions organised by the library officials. During the meeting, I downloaded the app, registered, and acquired a subscription, allowing myself and other students to access the university's e-book and

> e-journal database. This database covers a wide range of topics, such as engineering, political science, social science and health care. I use it to research for assignments. Because I can use it whenever and wherever I want, it is adaptable and flexible. I am now capable of producing high-quality scientific writing that is based on authentic scientific studies... (*FGD, 2023*)

Students' use of the MyLOFT database improved their research writing skills by accessing resources like journal articles, magazines and research reports. However, students from other universities showed limited engagement with online reading materials for enhancing their research writing capabilities. This suggests a potential limitation in their ability to incorporate insights from other researchers into their own research efforts.

Google Scholar

University students demonstrated minimal usage of Google Scholar, with a mean score of 2.98 and significant variation ($F(230)=22.02$, $p<0.001$), as shown in Table 2. Notably, University C students outperformed, scoring 4.21 out of 5 for Google Scholar access in research writing. Conversely, students from other institutions scored below 3 out of 5. Technological access constraints likely contributed to this difference, with internet connectivity challenges hindering online resource utilisation and overall research processes. In a focus group, internet connection emerged as a major obstacle to accessing online reading materials.

> …The internet connection at the university is very poor on campus. It exists in certain locations but when it is very slow. Besides, I and most of my friends do not have a computer to use for good web searching on Google Scholar… **(***FGD at University B, 2023***)**

The limited and unreliable nature of internet connectivity posed significant challenges to university students, impeding their ability to engage in online learning and create high-quality scientific research documents sourced from credible outlets such as peer-reviewed publications.

University's online catalog

College students showed varied utilisation of the university's online catalog, with a mean score of 2.88 out of 5 and significant variation ($F(230)=21.4$, $p<0.001$). Particularly, University C students demonstrated heightened access, scoring 3.96 out of 5, compared to peers from other institutions. This preference for University C's catalog was due to its easy accessibility via devices like mobile phones, tablets and computers, enhancing convenience. Additionally, the catalog served as a communication platform within the university, enhancing student engagement. However, Table 2 highlights limited adoption of the catalog, despite its access to prior scientific materials on the university's official websites. The observed difference can be attributed to limited access to necessary technological devices, indicating the impact of technological barriers on students' catalog interaction.

DOAJ and DOAB

University students showed moderate but significant variation in the utilisation of DOAJ across universities with a mean score of 2.87 out of 5 and significant variation ($F(230)=28.7$, $p<0.001$). Notably, University C students displayed higher engagement, scoring 4.15 out of 5 compared to peers from other institutions. This can be attributed to the open access nature of DOAJ, providing unrestricted access to scholarly articles and research resources, thus enhancing the research process. Similarly, University C students engaged with DOAB with a mean score of 2.80 out of 5 and significant variation ($F(230)=43.7$, $p<0.001$). These openly accessible books played a pivotal role in enhancing students' comprehension and learning, setting them apart from peers at other institutions.

During a KII with one of the librarians at the main campus one of the universities, it was discovered that:

> …students frequently utilise the library for a range of purposes, including coursework and research. To substantiate their work, students are required to provide evidence of the sources supporting their claims. This demand for evidence has driven numerous students to turn to digital resources such as journals and e-books, which are already accessible via smartphones and computers. The transition to digital education is a contributing factor to the increased academic success of students… (*KII, 2023*)

Therefore, this shift towards digital education is playing a crucial role in enhancing students' academic achievements, as it offers convenient access to a wealth of information and research materials, ultimately benefiting their learning and success.

Table 2: *Variation of accessibility to online reading materials by students*

Online reading platforms	Groups	Descriptive statistics						One-way ANOVA Results			
		N	Mean	Std. deviation	Std. error	95% Confidence interval for mean		Sum of squares	Mean square	F	Sig.
						Lower bound	Upper bound				
My Loft (My Library on Finger Tips)	A	65	2.71	1.09	0.13	2.44	2.98	99.8	33.27	30.6	0.000*
	B	54	2.56	1.08	0.15	2.26	2.85				
	C	52	4.23	0.90	0.12	3.98	4.48				
	D	59	2.71	1.08	0.14	2.43	2.99				
	General	230	3.02	1.23	0.08	2.86	3.18				
Google Scholar	A	65	2.54	1.34	0.17	2.21	2.87	102.7	34.2	22.02	0.000*
	B	54	2.74	1.20	0.16	2.41	3.07				
	C	52	4.21	1.00	0.14	3.93	4.49				
	D	59	2.61	1.38	0.18	2.25	2.97				
	General	230	2.98	1.41	0.09	2.80	3.17				
University online catalogue	A	65	2.69	1.26	0.16	2.38	3.00	79.9	26.6	21.4	0.000*
	B	54	2.46	1.09	0.15	2.16	2.76				
	C	52	3.96	1.07	0.15	3.66	4.26				
	D	59	2.53	1.01	0.13	2.26	2.79				
	General	230	2.88	1.26	0.08	2.72	3.05				
Directory of Open Access Journals (DOAJ)	A	65	2.49	1.34	0.17	2.16	2.82	112.2	37.409	28.7	0.000*
	B	54	2.41	1.07	0.15	2.11	2.70				
	C	52	4.15	1.09	0.15	3.85	4.46				
	D	59	2.56	1.00	0.13	2.30	2.82				
	General	230	2.87	1.33	0.09	2.69	3.04				
Directory of Open Access Books (DOAB)	A	65	2.38	1.25	0.15	2.08	2.69	142.44	47.5	43.7	0.000*
	B	54	2.24	0.97	0.13	1.98	2.51				
	C	52	4.25	0.97	0.13	3.98	4.52				
	D	59	2.51	0.92	0.12	2.27	2.75				
	General	230	2.80	1.30199	0.08585	2.6352	2.9735				

N=Number of respondents; std= standard deviation; F=F-value; Sig=Significance/P-Value;*-Significant difference;

Factors that influence students' access to online reading platforms and materials

The findings showed that students with access to university ICT equipment were more likely to engage with MyLOFT, as demonstrated by the results from University C (B=2.4, p=0.000, 31.7 in Table 3). This is because they could easily navigate the MyLOFT database, accessing necessary reading materials for their studies. University ICT equipment also influenced accessibility to Google Scholar (B=2.4, p=0.000, 33) and the university's online catalog (B=2.6, p=0.000, 36.8). Computers and laptops with reliable internet enabled efficient exploration of Google Scholar and participation in online lectures. Additionally, they facilitated access to real-time university communications. University ICT equipment significantly affected access to DOAJ (B=3.3, p=0.000, 48.8), allowing students to explore open-access journals and understand diverse research methodologies. This helped students formulate robust concepts aligned with established research practices. Similarly, University ICT equipment influenced access to DOAB (B=2.7, p=0.000, 35). At University A, it notably impacted access to DOAB (B=-1.104, p=0.003, 8.887). The presence of ICT tools

like computers and printers in the university ecosystem improved access to online reading materials, especially for students without personal devices, ensuring equitable resource access.

Students' research project stage significantly affects Google Scholar access (B=2.65, P=0.044) while writing reports, coefficient 4.070. Google Scholar offers various academic publications, enhancing research depth and scope. Its advanced search aids material identification, emphasising peer-reviewed sources to improve work quality and enrich research design. Research proficiency also influences DOAJ access during proposal development (B=-2.65, P=0.035, coefficient 4.4), and DOAB access during composition (B=-22.776, P=0.000, coefficient 362.035). Open access enhances knowledge dissemination, increasing readership and citation rates. It ensures quality through peer review, improving work credibility and facilitating peer citation. Research proficiency notably affects DOAB utilisation during data collection (B=-21.260, P=0.000) and analysis (B=-21.020, P=0.000), aiding alignment with prior studies and enhancing document crafting understanding.

The academic year significantly affected students' access to DOAB, notably among second-year students, who were 4.6 times more likely to access DOAB (B=3.614, p=0.032). This trend stemmed from second-year students' growing use of open-access books for assignments and coursework, aiding academic task completion. Supervisors' consistent encouragement also played a significant role, motivating students to use online books to enhance research knowledge and reinforce comprehension of research concepts.

Discussion

Accessed online reading platforms and materials

Our investigation into online reading resource accessibility uncovered significant disparities among urban educational institutions, as corroborated by several scholars (Dahlström, 2019; Hynninen, 2018; Mangen & Walgermo, 2013; Mouza, 2014). We found certain universities to be exceptional models, offering comprehensive access to diverse online reading materials, as noted by Eagle Online (2020). This heightened accessibility was attributed to robust internet connectivity across campuses, facilitating seamless access via various ICT devices. However, uptake was low, especially in University B (Lubaale, 2020). These findings align with prior research by Kaweesi et al. (2022) and Adzifome and Agyei (2023), emphasising the potential of smartphones as educational tools, particularly in scientific teaching and learning. Barus et al. (2021) highlight students' enthusiasm for online reading and learning, boosting scientific research writing at Fajar University, Indonesia. Recent studies in Uganda by Kisira and Nabasumba (2024) and Kaweesi et al. (2022) acknowledge the role of online learning platforms during the Covid-19 pandemic, advocating for transformative education to keep students updated with modern developments. Ultimately, scholarly exploration influences students' ability to access online reading resources through e-learning platforms.

Factors that influence access to online reading platforms and materials

The findings of this research align with those of Yu et al. (2023), suggesting a positive link between perceived ICT competence and digital reading proficiency, with ICT utilisation playing a mediating role. Students with higher perceived ICT competence tended to engage more in leisure-based ICT usage at home, improving digital reading performance. However, Mella-Norambuena et al. (2021) and Kaweesi et al. (2022) present contrasting views, indicating a preference for computers over smartphones when using the Learning Management System (LMS). Students allocated more online time to computers. Nevertheless, the study revealed conflicting trends. University A ranked second-highest, followed by Universities D and B, each with varying access levels to online reading resources. Challenges included inadequate internet connectivity and a shortage of smartphones and personal computers, hindering access to platforms like Google Scholar. This was further discussed during an interview with a supervisor at University B in the Department of Psychology, who revealed that

> …the university's current internet connectivity on campus is inadequate. The network is exceptionally poor, rendering it unsuitable for teaching or even assigning tasks to students. Nonetheless, it might be

> more beneficial for students' academic progress if the university were to explore the implementation of offline learning applications.… (*KII, 2023*)

Hence, the investigation exposed a diminished level of student enthusiasm to actively interact with online reading resources, aligning with the conclusions drawn elsewhere by Basar et al. (2021). According to studies by Barber and Klauda (2020) and van der Sande et al. (2023), this reduced motivation could be ascribed to the universities' constrained endeavours in promoting and nurturing dynamic engagement with online reading materials to facilitate a more profound comprehension of scientific concepts. On the other hand, the deficiency in robust and dependable internet infrastructure, coupled with inadequate computer provisions and maintenance, as found by Kaweeesi et al. (2022) and Apike and Iyendo (2018), played a contributory role in the encountered impediments related to appreciation of the online format and accessibility of online reading resources.

The significant role of university ICT equipment influencing students' access to the use of online reading materials across the universities may not be a surprise. Lembani et al's (2020) study, in which they engaged in a scientific inquiry into (i) the propagation of computer and internet accessibility across generations and (ii) the effect of parental educational heritage on the ownership and utilisation of ICT among students hailing from distinct households, revealed that the level of scientific research writing significantly influenced students' access to online reading materials. Students who were crafting their research proposals significantly made use of DOAJ and DOAB.

Access to open-access books and journals supports research development (Azmuddin et al., 2020). Third-year students show significant e-learning comprehension and favourability (Twinamasiko et al., 2021). Students acknowledge online reading platforms but face challenges due to university infrastructure. Institutions need to prioritise e-resource utilisation, especially for scientific writing enhancement in research-focused universities.

Table 3: *Factors that influence students' access to online reading materials*

Predicting factors		Access (%)	Online reading resources														
			MyLOFT			Google Scholar			University online catalog			DOAJ			DOAB		
			B	Wald	P-v	B	Wald	P-v	B	Wald	P-v	B	Wald	P-v	B	Wald	P-v
Sex	Male	25.7	-.029	.008	.927	.252	.690	.406	.223	.526	.468	.465	2.239	.135	-.193	.355	.551
Academic year	Year 1	3.0%	-.162	.012	.912	.626	.231	.631	-.074	.003	.955	1.443	1.148	.284	.864	.315	.575
	Year 2	8.7%	2.590	2.915	.088	-.629	.290	.590	-.161	.018	.895	1.251	1.020	.312	3.614	4.574	.032
	Year 3	83.9%	-.657	.816	.366	-.167	.059	.808	-.509	.527	.468	.273	.152	.697	-.016	.000	.982
Age	18–34	77.0%	-.487	.525	.469	-.340	.294	.588	.183	.080	.778	-.281	.182	.669	-.102	.022	.881
	35–55	18.3%	-.757	1.065	.302	-.338	.254	.614	-.398	.325	.568	-.323	.207	.649	.060	.006	.936
University ICT equipment	A	28.3%	-.359	1.023	.312	.079	.051	.821	-.449	1.648	.199	-.499	2.015	.156	-1.104	8.887	.003
	B	23.5%	.156	.192	.661	-.194	.302	.582	-.397	1.248	.264	-.490	1.872	.171	-.889	5.749	.016
	C	22.6%	2.440	31.713	.000	2.404	32.332	.000	2.669	36.836	.000	3.309	48.824	.000	2.771	35.096	.000
Device	Yes	85.7%	.356	1.024	.312	.268	.580	.446	.348	.977	.323	.177	.250	.617	.056	.024	.876
Degree	Dissertation	87.8%	.352	.084	.772	-.160	.023	.879	-.240	.052	.820	.692	.409	.523	-.354	.073	.788
	Masters by coursework	.4%	-22.653			-23.2			-23.652			-23.140			-3.880	2.611	.106
Level of research	Proposal	83.0%	-20.131	.000	.997	-.615	.309	.578	-2.239	3.188	.074	-2.654	4.445	.035	-22.776	362.035	.000
	Field	8.3%	-19.239	.000	.997	.239	.044	.834	-1.442	1.261	.261	-1.969	2.319	.128	-21.260	283.246	.000
	Data analysis	3.9%	-18.637	.000	.997	.343	.085	.771	.155	.013	.908	-.855	.405	.524	-21.020	220.903	.000
	Report writing	3.0%	-18.457	.000	.997	2.654	4.070	.044	.656	.210	.647	.585	.168	.682	-20.532		

B=Coefficient; DOAJ= Directory of Open Access Journals; DOAB= Directory of Open Access Book; MyLOFT= My Library on Finger tips; University A–Makerere ; B–Kyambogo ; C–Victoria

Conclusion

There is low to moderate access to online resources among student with a significant disparity. While University C students extensively utilised platforms like Google Scholar, MyLOFT, university catalogs, DOAJ and DOAB, others, like Universities A, C and B, used them minimally for research projects. Access to university ICT equipment greatly influenced their online material accessibility. Availability of ICT and reliable internet improved access to platforms like MyLOFT, Google Scholar, university catalogs, DOAJ and DOAB for scientific research writing

Recommendations

Given the limited access to online reading materials in the sampled urban universities and yet it is crucial for students' research and scientific writing, universities must re-evaluate their internet infrastructural and equipment plans. They should invest in robust infrastructure for high-speed internet, including network set-up and maintenance. This proactive approach aims to improve scientific research writing (SRW) proficiency. Augmented funding for ICT equipment and internet infrastructure is essential. Students should utilise Online Resource Management (ORM) tools and visit campus libraries for updated materials. Engaging with supervisors can help identify relevant ORM resources, enhancing scientific writing quality.

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