

**EXPLORING THE EFFECTIVENESS OF MOBILE APPS IN PROMOTING
ELECTRONIC INFORMATION RESOURCE UTILIZATION BY POSTGRADUATE
STUDENTS IN FEDERAL UNIVERSITIES IN NASARAWA AND BENUE STATES**

BY

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Abstract

This study explores the effectiveness of mobile apps in promoting the utilization of electronic information resources (EIRs) among postgraduate students in federal universities in Nasarawa and Benue states, Nigeria. A descriptive survey design was employed, involving 106 postgraduate students selected through stratified random sampling from the Federal University of Lafia and Joseph Tarkaa University of Makurdi. Data were collected using a structured questionnaire and analyzed using descriptive statistics. The findings indicate that postgraduate students have a high level of awareness of mobile apps such as Google Scholar, ResearchGate, and JSTOR, while their awareness of other apps like Zotero, PubMed, and ScienceDirect remains low. Despite this awareness, the actual utilization of mobile apps for accessing EIRs is relatively low, with Google Scholar being the most frequently used. The study further reveals that mobile apps are highly effective in promoting EIR utilization, particularly through academic performance correlation, user engagement metrics, and frequency of resource downloads. However, significant challenges hinder their usage, including poor internet connectivity, high data costs, lack of digital literacy, and inadequate institutional support. To enhance EIR access, the study recommends targeted awareness campaigns, digital literacy training, improved internet infrastructure, and institutional support to encourage the effective use of mobile apps for academic purposes.

Keywords: Mobile apps, Electronic Information Resources, Utilization and Postgraduates

Introduction

In the digital age, the role of libraries in higher education has significantly evolved, with a focus on providing access to both traditional and digital resources. One of the major

developments in modern libraries is the transition from physical to electronic information resources (EIRs), which include e-books, e-journals, digital databases, and other online academic materials. These resources according to Olalere and Soyemi (2022) have become increasingly integral to academic research and learning, especially in postgraduate education, where access to up-to-date, peer-reviewed information is paramount. Naciri, Baba, Achbani and Kharbach (2020) opined that postgraduate students, in particular, EIRs are critical for conducting research, writing theses and dissertations, and staying informed about the latest developments in their fields. However, despite the growing availability of these resources, challenges related to accessibility, usability, and effective utilization continue to persist, particularly in Nigerian universities.

In Nigerian universities, including those located in Nasarawa and Benue states, libraries are beginning to incorporate digital platforms to support academic activities. Libraries in federal universities across these regions are increasingly adopting technological solutions to enhance the accessibility and use of EIRs, aiming to improve the academic performance of postgraduate students (Ekici and Ekici, 2021). In a similarly development, Demir and Akpinar (2018) observed that mobile applications (apps) have become a promising solution for overcoming barriers related to the physical limitations of traditional library services. With the widespread use of smartphones and mobile internet, mobile apps offer an effective means for students to access resources anytime and anywhere, fostering greater flexibility in academic research.

Mobile apps have been increasingly integrated into library systems globally as part of broader efforts to bridge the digital divide and facilitate access to EIRs. In particular, Odewumi, Onojah and Aderogba (2019) noted that the use of mobile apps in academic libraries has been shown to improve user engagement by making library services more interactive, accessible, and

personalized. These apps according to Bell and Avis (2016) provide features such as access to digital catalogs, journal databases, e-books, and even library accounts where students can renew books or check due dates. Additionally, apps can provide real-time notifications, updates, and alerts on new resources, events, or changes to library services, which can significantly enhance the user experience for postgraduate students. Studies such as Anthony (2012) have suggested that while mobile apps can enhance accessibility to resources, their success depends on a variety of factors, including app design, user interface, ease of navigation, and technical support. Additionally, Nsirim and Okeke (2024) opined that the level of digital literacy among postgraduate students is a key factor that influences the adoption and effective use of mobile apps in library settings. Postgraduate students in Nasarawa and Benue states, like their counterparts in other parts of Nigeria, may face challenges related to poor internet connectivity, limited digital skills, and lack of familiarity with mobile technologies, which could affect their ability to fully leverage these tools.

Moreover, Ahiauzu, Nyemezu and Nsirim (2020) observed that libraries may face infrastructural constraints, such as inadequate technical support and the need for continuous updates and maintenance of mobile apps, which can hinder their full potential in enhancing the use of EIRs. The researchers also noted that the lack of adequate awareness and training on the use of mobile apps among postgraduate students may further exacerbate the gap between the availability of resources and their actual utilization. Therefore, this study aims to investigate the role of mobile apps in promoting the utilization of EIRs among postgraduate students in federal universities in Nasarawa and Benue states. The research will examine factors such as the availability and functionality of mobile apps, the level of awareness and usage by postgraduate

students, the challenges faced by users. By exploring these aspects, the study will contribute to a better understanding of how mobile apps can be optimized to enhance the academic experience of postgraduate students in Nigerian universities, ultimately improving their research outcomes.

Statement of the Problem

Mobile applications have transformed access to electronic information resources (EIRs) in university libraries, yet postgraduate students in federal universities in Nasarawa and Benue states face challenges in effectively utilizing these tools. Limited awareness, insufficient training, and inadequate technological infrastructure contribute to their underutilization. This study aims to assess postgraduate students' awareness and usage of mobile apps for EIR access, evaluate their effectiveness, and identify challenges such as poor internet connectivity, high data costs, and lack of digital literacy. By addressing these issues, the study seeks to enhance mobile app adoption, improve EIR accessibility, and support postgraduate research and academic success.

Research Questions

1. What is the level of awareness of mobile apps for accessing electronic information resources (EIRs) among postgraduate students in federal universities in Nasarawa and Benue states?
2. What is the level of usage of mobile apps for accessing electronic information resources (EIRs) among postgraduate students in federal universities in Nasarawa and Benue states?
3. How effective are mobile apps in promoting the utilization of electronic information resources by postgraduate students in federal universities in Nasarawa and Benue states?

4. What challenges do postgraduate students face in using mobile apps to access electronic information resources in federal universities in Nasarawa and Benue states?

Conceptual Framework

Mobile Apps

Mobile applications have become essential tools in modern life, offering convenience across sectors such as communication, navigation, shopping, and education (Demir & Akpınar, 2018). Apps like WhatsApp, Google Maps, and Instagram allow users to interact with digital services efficiently. As noted by Dochev and Hristo (2006), mobile apps have transformed business operations, enabling direct, personalized engagement with customers. Odu and Omini (2017) observed that the rise of mobile-first strategies positions apps as central platforms for connecting with users. With advancements in AI, AR, and machine learning, mobile apps continue to evolve to offer increasingly tailored experiences.

Electronic Information Resources (EIRs)

Electronic Information Resources (EIRs) include databases, e-journals, e-books, and websites that support efficient access to knowledge (Yan, 2013). These resources are vital in academic, scientific, and business settings due to their accessibility and immediacy. Shilpa et al. (2020) emphasized their importance in teaching and research, particularly in academic institutions. However, challenges such as digital divide, information overload, and ethical concerns persist (Mamman & Abubakar, 2022). Institutions must also address issues like copyright, data privacy, and digital preservation (Smith & Doe, 2021). Despite these challenges, EIRs continue to play a key role in modern information dissemination.

Utilization of Library Resources

Ranganathan's principle that "books are for use" underscores the need for effective utilization of library resources. However, studies show underutilization among postgraduate students due to unfamiliarity with tools like OPAC, and lack of orientation (Oyediran-Tidings, 2019; Kakai et al., 2014). While handbooks and journals are commonly used, many students face difficulties in accessing and using resources efficiently. Electronic resources are increasingly popular, but poor search skills and low digital literacy, especially in Nigerian universities, hinder full utilization (Singh & Sharma, 2022; Tenopi, 2018). This knowledge gap negatively impacts academic performance (Edem, Ani & Ocheibi, 2009).

Postgraduate Students

Postgraduate students pursue advanced academic qualifications such as master's degrees or PhDs, often through research-intensive programs (Alzahrani, 2021; Adeyi, Annune & Tsegba, 2024). Their academic journey includes thesis writing, data analysis, and oral defense, often guided by supervisors (Osaheni & Osita, 2017). In contrast, Postgraduate Diploma (PGDip) programs focus on skill development and practical knowledge without significant research demands. These shorter programs (6 months to 2 years) are designed for career advancement in fields like business or IT (Chimah & Nwokocha, 2023). While they offer flexibility and specialization, PGDips may not be suitable for those pursuing academic or research careers (Osaheni & Osita, 2017).

Theoretical framework

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a theoretical framework that aims to explain the factors that influence an individual's intention to use a technology. Developed by Venkatesh, Morris, Davis, and Davis in 2003, UTAUT integrates

elements from several existing technology acceptance models, including the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and the Motivational Model (MM). By combining these elements, UTAUT provides a comprehensive framework for understanding the complex factors that influence technology adoption. UTAUT is significant to the research topic of exploring the effectiveness of mobile apps in promoting electronic information resource utilization among postgraduate students in federal universities in Nasarawa and Benue states. The theory can help explain why postgraduate students accept or reject mobile apps for electronic information resource utilization, identify the key factors that influence their decisions, and inform the development of effective strategies for promoting mobile app adoption. By applying UTAUT to this research topic, the study can gain a deeper understanding of the complex factors that influence mobile app adoption and provide insights for improving the effectiveness of mobile apps in promoting electronic information resource utilization.

Review of Related Empirical Studies

Odewumi, Onojah and Aderogba (2019) examined Postgraduate students' utilization of mobile technologies for learning and find out the differences in the utilization of mobile technologies by postgraduate students based on their mode of study. The study employed a descriptive survey method across eleven universities in Southwest Nigeria, selecting 658 participants based on accessibility. Data were collected using a researcher-designed questionnaire, with mean values used to address research questions and ANOVA applied to test the hypothesis. The instrument had a reliability coefficient of 0.87. Findings revealed that Ph.D. postgraduate students utilized mobile technologies for learning and research more than other postgraduate students. However, there was no significant difference in mobile technology usage

based on the mode of study ($p\text{-value} = 0.79$, greater than the 0.05 alpha level). The study concluded that effective mobile technology utilization enhances postgraduate learning and research both inside and outside the classroom.

Both studies used a descriptive survey design and structured questionnaires to analyze mobile technology use among postgraduate students. The previous study examined general mobile technology utilization for learning across eleven universities in Southwest Nigeria, focusing on differences based on mode of study, finding no significant variation. In contrast, the present study explores the effectiveness of mobile apps in enhancing electronic resource utilization in two Federal Universities in Nasarawa and Benue State, using a 60% benchmark for decision-making. The key gap addressed by the present study is the specific role of mobile apps in improving access to academic resources, which was not covered in the previous study.

Nsirim and Okeke (2024) investigated digital literacy of library and information science postgraduate students and ubiquitous learning in state universities in south-South, Nigeria. The study was guided by four objectives, four research questions, and four hypotheses tested at a 0.05 significance level. A correlational design was adopted, with a population of 221 Library and Information Science (LIS) postgraduate students from eight state universities in South-South, Nigeria. The entire population was sampled using the census sampling technique. Data were collected using Questionnaire. Data analysis involved mean and standard deviation for research questions and Pearson Product Moment Correlation for hypotheses testing. Findings revealed a significant relationship between digital literacy and ubiquitous learning among LIS postgraduate students in state universities in South-South, Nigeria.

Both studies explored the use of technology in academic settings among postgraduate students, utilizing structured questionnaires and statistical analysis methods such as mean and standard deviation. However, the previous study focused on the relationship between digital literacy and ubiquitous learning among Library and Information Science (LIS) postgraduate students across eight state universities in South-South Nigeria, employing a correlational design and census sampling technique. In contrast, the present study examines the effectiveness of mobile apps in promoting electronic resource utilization among postgraduate students in two Federal Universities in Nasarawa and Benue State, using a descriptive survey design and stratified random sampling. The key gap identified in the previous study is its lack of focus on mobile apps as a tool for accessing electronic resources, which the present study aims to address by assessing their role in enhancing postgraduate students' academic engagement.

Bulugu and Tweve (2022) examined the adoption and use of digital literacy among selected libraries in tertiary colleges in Tanzania. Two tertiary college were selected as cases studies, namely, Tanzania Public Service College (TPSC) and Dares Salaam Maritime Institute (DMI). The study aimed at examining the status of digital literacy adoption, determining the use of digital literacy on their day-to-day activities, and identifying challenges of digital literacy adoption and use among libraries in selected colleges. A sample of 98 library users were selected as respondents. Data was collected through questionnaire and faceto-face interview. Quantitative data was analyzed using Statistical Package for the Social Sciences, while content analysis was used for qualitative data. The findings show that majority of the respondents were aware of the adoption and use of Digital Literacy, but faced challenges such as technophobia, lack of enough and supported instructions on digital literacy, poor power supply to support internet, and

insufficient digital literacy facilities. In fact, the majority of respondents had adopted and used digital literacy for less than a year. The use of digital literacy has a number of benefits such as easy and quick access of information, retrieval of library information in cataloguing and classification, as well as accessing different databases to acquire relevant data and information.

Both studies explored digital literacy and technology adoption in academic settings, using for data collection and statistical analysis to interpret findings. However, the previous study focused on digital literacy adoption and use in libraries of two tertiary colleges in Tanzania, examining challenges such as technophobia, poor power supply, and inadequate digital facilities. In contrast, the present study investigates the effectiveness of mobile apps in promoting electronic resource utilization among postgraduate students in two Federal Universities in Nigeria, **using** stratified random sampling and setting a 60% benchmark for decision-making. The key gap left by the previous study is its lack of focus on mobile apps as a tool for accessing electronic resources. The present study aims to bridge this gap by assessing how mobile apps enhance postgraduate students' ability to utilize electronic information resources effectively.

Kolawole, Enang and Effiong (2024) investigated the differences between the utilisation of mobile library technologies and library service delivery in public and private universities in south west, Nigeria. The descriptive survey research design was adopted with a population of 162 library staff and a purposive sampling technique was used to select all 162 staff. A face-validated researcher-developed instrument titled: 'Utilisation of Mobile Technologies and Library Service Delivery Questionnaire' (UMTLSDQ) was used for the collection of data. A reliability coefficient of 0.83 was obtained using Cronbach alpha reliability statistics which made the instrument reliable. The data collected were analysed using mean and standard deviation to

answer the research questions, while Multivariate Analysis of Variance (MANOVA) was used to test all the hypotheses at a 0.05 significant level. The findings of the study showed that private university libraries utilise mobile technologies more than public university libraries. The study therefore concluded that the utilisation of mobile technology is important for effective library service delivery in South-West, Nigeria

Both studies employed a descriptive survey design and used questionnaires for data collection, with statistical analysis (mean and standard deviation) to interpret findings. However, the previous study focused on library staff in public and private universities in South-West Nigeria, examining differences in mobile library technology utilization and its impact on library service delivery. In contrast, the present study investigates postgraduate students in Federal Universities in Nasarawa and Benue States, assessing how mobile apps enhance electronic information resource utilization. While the previous study emphasized library staff and institutional differences in mobile technology adoption, it did not explore how mobile apps facilitate postgraduate students' access to electronic resources. The present study fills this gap by evaluating mobile app effectiveness in supporting students' academic and research needs, providing insights into their role in digital learning and resource utilization.

Adeniran and Onuoha (2018) investigated the influence of information literacy skills on postgraduate students' use of electronic resources in private university libraries in Nigeria. The study adopted the survey research design. The study population comprised 2805 postgraduate students in five private universities offering postgraduate programmes in South-West, Nigeria. Multistage sampling technique was used in the selection process. A purposive selection of four faculties from each of the five universities was carried out. Proportionate sampling technique

was used to select the sample size of 550 postgraduate students as the respondents for the study. Findings revealed that there was a significant positive correlation between information literacy skills and use of electronic resources ($r = 0.28$, $p < 0.05$). The study concluded that the utilization of electronic resources promoted access to current information among postgraduate students in the select selected private universities in South-West, Nigeria.

Both studies focus on postgraduate students' utilization of electronic resources and employ survey research designs with structured questionnaires for data collection. They both analyze factors influencing electronic resource usage, with the previous study examining the role of information literacy skills, while the present study investigates the effectiveness of mobile apps. The previous study targeted private universities in South-West Nigeria, using a multistage sampling technique, whereas the present study focuses on Federal Universities in Nasarawa and Benue States, using stratified random sampling. While the previous research established a positive correlation between information literacy and electronic resource usage, it did not explore the role of mobile applications as facilitators of access. The present study fills this gap by assessing how mobile apps enhance postgraduate students' engagement with electronic resources, contributing to a deeper understanding of digital learning tools in academic environments.

The Research Methodology

This study employed a descriptive survey design to collect data from postgraduate students across two Federal Universities in Nasarawa and Benue State, Nigeria. The approach was chosen for its efficiency in gathering diverse insights on mobile app usage for electronic information resource utilization. The study focused on the Federal University of Lafia and

Joseph Tarkaa University of Makurdi due to their large postgraduate populations and investments in digital learning technologies. A total population of 1,060 postgraduate students was considered, with a sample size of 106 selected using stratified random sampling to ensure representation across faculties. Data collection was conducted through a structured questionnaire, and descriptive statistics such as frequency, mean, and standard deviation were used for data analysis. Real limits of numbers were used in making decisions with 3.50-4.00, 2.50-3.49, 1.50-2.49, and 1.49 and below for higher and lower mean ratings of respondents on the various rating scales the questionnaire was design on.

Result and Discussion

This section presents the result of the data collected and analysed in line with the research questions that guided the study.

The level of awareness of mobile apps for accessing electronic information resources (EIRs) among postgraduate students in federal universities in Nasarawa and Benue states

Table 1: Mean and standard deviation of respondents on the level of awareness of mobile apps for accessing electronic information resources (EIRs) among postgraduate students

S/N	Item Statement	VHL	HL	LL	VLL	\bar{x}	SD	Dec.
1	Google Scholar,	50	44	12	0	3.36	0.68	HL
2	ResearchGate,	51	43	9	3	3.34	0.76	HL
3	Mendeley,	8	48	44	6	2.55	0.72	HL
4	Zotero,	3	22	65	16	2.11	0.68	LL
5	PubMed,	2	38	50	16	2.25	0.73	LL
6	IEEE Xplore,	1	38	42	25	2.14	0.79	LL
7	JSTOR,	18	50	20	18	2.64	0.96	HL
8	ScienceDirect,	0	49	50	7	2.40	0.61	LL
9	SpringerLink,	11	14	65	16	2.19	0.82	LL
10	Academia.edu	19	33	38	16	2.52	0.96	HL
	Cluster Mean					2.55	0.43	HL

Key: \bar{x} = Mean, SD = Standard Deviation, HL = High Level of Aware, LL = Low Level of Aware, Dec. = Decision.

The result in Table 1 shows that postgraduate students demonstrate a high level of awareness of certain mobile apps, particularly Google Scholar and ResearchGate, both with the highest mean score of 3.36. Other apps such as Mendeley, JSTOR, and Academia.edu also recorded mean scores above the 2.50 benchmark for high awareness. In contrast, apps like Zotero, PubMed, IEEE Xplore, ScienceDirect, and SpringerLink had mean scores below 2.50, indicating a low level of awareness. Zotero had the lowest mean score of 2.11. Overall, the findings suggest that postgraduate students in federal universities in Nasarawa and Benue states generally have a high level of awareness of mobile apps used for accessing electronic information resources, although the level of awareness differs across specific platforms.

Level of usage of mobile apps for accessing electronic information resources (EIRs) among postgraduate students in federal universities in Nasarawa and Benue states

Table 2: Mean and standard deviation of respondents on the level of usage of mobile apps for accessing electronic information resources (EIRs) among postgraduate students

S/N	Item Statement	VHU	HU	LU	VLU	\bar{x}	SD	Dec.
1	Google Scholar,	36	51	19	0	3.16	0.71	HU
2	ResearchGate,	36	44	23	3	3.07	0.82	HU
3	Mendeley,	3	48	49	6	2.45	0.65	LU
4	Zotero,	0	21	67	18	2.03	0.61	LU
5	PubMed,	1	33	53	19	2.15	0.71	LU
6	IEEE Xplore,	0	30	57	19	2.10	0.68	LU
7	JSTOR,	13	49	26	18	2.54	0.92	HU
8	ScienceDirect,	0	32	49	25	2.07	0.73	LU
9	SpringerLink,	5	13	70	18	2.05	0.70	LU
10	Academia.edu	13	35	42	16	2.42	0.89	LU
	Cluster Mean					2.40	0.38	LU

Key: \bar{x} = Mean, SD = Standard Deviation, HU = Highly Utilized, LU = Lowly Utilized, Dec. = Decision.

The result in Table 2 indicates that postgraduate students highly utilized mobile apps such as Google Scholar (\bar{x} = 3.16, SD = 0.71), ResearchGate (\bar{x} = 3.07, SD = 0.82), and JSTOR (\bar{x} = 2.54, SD = 0.92), as their mean ratings fall within the 2.50–3.49 benchmark for high

utilization. In contrast, other apps including Mendeley, Zotero, PubMed, IEEE Xplore, ScienceDirect, SpringerLink, and Academia.edu had mean scores below 2.50, indicating low utilization levels. Among these, Zotero recorded the lowest mean score of 2.03. Overall, the findings suggest a generally low level of usage of mobile apps for accessing electronic information resources among postgraduate students in federal universities in Nasarawa and Benue states, despite a few platforms being more widely used.

The effectiveness of mobile apps in promoting the utilization of electronic information resources by postgraduate students in federal universities in Nasarawa and Benue states.

Table 3: Mean and standard deviation of respondents on the effectiveness of mobile apps in promoting the utilization of electronic information resources by postgraduate students

S/N	Item Statement	HE	E	LE	NE	\bar{x}	SD	Dec.
1	User engagement metrics,	70	36	0	0	3.66	0.48	HE
2	Download and installation rates,	68	38	0	0	3.64	0.48	HE
3	Search query analysis,	57	39	10	0	3.44	0.66	E
4	Access logs and click-through rates,	53	48	5	0	3.45	0.59	E
5	Citation and reference usage,	49	53	4	0	3.42	0.57	E
6	Survey and feedback analysis,	51	46	9	0	3.40	0.64	E
7	Academic performance correlation,	72	34	0	0	3.68	0.47	HE
8	Frequency of resource downloads,	62	44	0	0	3.58	0.50	HE
9	Number of shared research papers,	55	51	0	0	3.52	0.50	HE
10	Usage trends over time	44	53	9	0	3.33	0.63	E
Cluster Mean						3.51	0.20	HE

Key: \bar{x} = Mean, SD = Standard Deviation, HE = Highly Effective, E = Effective, Dec. = Decision.

The result presented in Table 3 indicates that mobile apps are highly effective in promoting the utilization of electronic information resources by postgraduate students, particularly through academic performance correlation (\bar{x} = 3.68, SD = 0.47), user engagement metrics (\bar{x} = 3.66, SD = 0.48), download and installation rates (\bar{x} = 3.64, SD = 0.48), frequency of resource downloads (\bar{x} = 3.58, SD = 0.50), and number of shared research papers (\bar{x} = 3.52,

SD = 0.50). Among these, academic performance correlation emerged as the strongest indication of effectiveness. Overall, the findings show that mobile apps are highly effective in enhancing the use of electronic information resources among postgraduate students in federal universities in Nasarawa and Benue states.

The challenges faced by postgraduate students in using mobile apps to access electronic information resources in federal universities in Nasarawa and Benue states

Table 4: Mean and standard deviation of challenges faced by postgraduate students in using mobile apps to access electronic information resources

S/N	Item Statement	SA	A	SD	D	\bar{x}	SD	Dec.
1	Poor internet connectivity,	66	39	1	0	3.61	0.51	SA
2	High data costs,	63	41	2	0	3.58	0.53	SA
3	Lack of digital literacy,	68	36	2	0	3.62	0.53	SA
4	Limited device storage,	49	52	5	0	3.42	0.58	A
5	Compatibility issues,	47	54	5	0	3.40	0.58	A
6	Inadequate institutional support,	56	46	4	0	3.49	0.57	A
7	Frequent app glitches,	45	47	14	0	3.29	0.69	A
8	Power supply problems,	59	46	1	0	3.55	0.52	SA
9	Information overload,	45	57	4	0	3.39	0.56	A
10	Security concerns.	46	60	0	0	3.43	0.50	A
Cluster Mean						3.48	0.18	A

Key: \bar{x} = Mean, SD = Standard Deviation, SA = Strongly Agree, A = Agree, Dec. = Decision.

Result presented in Table 4 shows that postgraduate students strongly agreed that poor internet connectivity ($\bar{x} = 3.61$, SD = 0.51), high data costs ($\bar{x} = 3.58$, SD = 0.53), lack of digital literacy ($\bar{x} = 3.62$, SD = 0.53), and power supply problems ($\bar{x} = 3.55$, SD = 0.52) are the major challenges in using mobile apps to access electronic information resources. Among these, lack of digital literacy emerged as the highest challenge, closely followed by poor internet connectivity. Overall, the findings indicate that significant infrastructural and skill-based barriers hinder effective use of mobile apps for accessing electronic resources among postgraduate students in federal universities in Nasarawa and Benue states.

Recommendation

1. Awareness campaigns and training programs should be implemented to improve postgraduate students' knowledge and utilization of less familiar mobile apps for accessing electronic information resources.
2. Efforts should be made to promote and encourage the effective utilization of less frequently used mobile apps through training, workshops, and integration into academic activities.
3. Universities should leverage the effectiveness of mobile apps by integrating them into academic programs and providing structured training to maximize their potential in improving research and learning outcomes.
4. Universities should address these challenges by improving internet access, subsidizing data costs, providing digital literacy training, and ensuring better institutional support for mobile app usage.

Conclusion

This study highlights the significant role of mobile applications in facilitating postgraduate students' access to electronic information resources in federal universities in Nasarawa and Benue states. While awareness of widely known apps like Google Scholar, ResearchGate, and JSTOR is relatively high, familiarity with others such as Zotero, PubMed, and IEEE Xplore remains low. Despite this awareness, actual utilization of these apps is limited, indicating a gap between knowledge and practice. The study also confirms the effectiveness of

mobile apps in promoting EIR utilization, with academic performance correlation and user engagement metrics emerging as key indicators. However, various challenges, including lack of digital literacy, poor internet connectivity, and high data costs, hinder effective usage. Addressing these barriers through improved awareness campaigns, digital literacy training, and enhanced institutional support will maximize the benefits of mobile apps in academic research and learning.

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