MOBILE LEARNING APPLICATIONS AND ILLITERACY AMONG RURAL YOUTHS IN NIGER STATE, NIGERIA

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Abstract
This study examined the perceived effectiveness of mobile learning applications in reducing illiteracy among rural youths in northern Nigeria.A descriptive survey research design was employed, with the study conducted in selected rural communities in Niger state. The population comprised rural youths aged 15 to 35 years who have basic mobile phone literacy and access to mobile devices. A sample size of 200 respondents was selected. Data were collected using a structured questionnaire titled "Mobile Learning Applications Perception and Challenges Questionnaire" (MLAPCQ), which was validated by three experts and tested for reliability with a Cronbach's alpha coefficient of 0.84. Data were analysed using descriptive statistics including means and standard deviations, with a decision benchmark of 2.50 on a four-point Likert scale. The findings revealed that rural youths hold positive perceptions regarding mobile learning applications and view them as useful, convenient, and capable of improving literacy skills and employment prospects. Study concludes that Nigeria holds positive perceptions regarding mobile learning applications and recognize their potential value as tools for literacy development. Based on these findings, the study recommended that developers create culturally responsive applications with local language support and offline functionality, government agencies invest in improving rural infrastructure and subsidizing data costs, and non-governmental organizations establish mobile learning support centers to provide technical assistance to rural users.
Keywords: Mobile Learning Applications, Youth, Illiteracy

Introduction

Illiteracy is a significant global challenge, affecting individuals, communities, and economies. It encompasses not only the inability to read and write but also functional and digital competencies (United Nations Educational, Scientific and Cultural Organization, 2023; Stromquist, 2022). In Nigeria, particularly in the northern region, illiteracy rates are alarming, with approximately 69% of adults in some states lacking basic literacy skills (National Bureau of Statistics Nigeria, 2022). The causes of illiteracy are multifaceted, including poverty, lack of access to quality education, cultural factors, and inadequate infrastructure (Robinson-Pant & Wolf, 2021; Ahmed & Ibrahim, 2023). The consequences are far-reaching, contributing to poverty, unemployment, poor health outcomes, and social exclusion (Hanemann & Scarpino, 2020; Grotlüschen et al., 2021).

Mobile learning applications offer a promising solution to address illiteracy, providing flexible, accessible, and engaging content (Crompton & Burke, 2023; Ally & Tsinakos, 2022). These applications can operate offline, making them suitable for resource-constrained environments (Bose & Banerji, 2023). However, adoption and effectiveness depend on factors such as digital literacy, awareness, and cultural relevance (Lawal & Musa, 2022; Bello & Adamu, 2023). The Nigerian government and various organizations have initiated programs to address illiteracy, but progress has been slow (Federal Ministry of Education Nigeria, 2021; Abubakar et al., 2023). Mobile learning applications can help bridge the gap, offering personalized learning pathways, immediate feedback, and multimedia content (Kim & Kwon, 2022; Huang et al., 2021).

Studies in northern Nigeria have shown positive outcomes from mobile learning interventions, but scalability and sustainability remain concerns (Aliyu & Khamis, 2023; Abdullahi & Suleiman, 2022). Barriers to adoption include limited awareness, digital literacy, and infrastructure challenges (Garba &

Yusuf, 2023; Lawal & Musa, 2022). Understanding rural youths' perceptions and needs is crucial for designing effective mobile learning applications, including incorporating local languages, cultural values, and relevant content (Mohammed & Sani, 2023; Hassan & Umar, 2022).

The justification for investigating mobile learning applications lies in addressing the illiteracy crisis, leveraging mobile technology, and generating context-specific evidence (Yusuf & Mohammed, 2023; Nasir & Bala, 2022). Research must focus on understanding user perceptions, preferences, and challenges to inform policy and program design. Effective mobile learning applications can contribute to literacy improvement, economic development, and social inclusion in northern Nigeria (Ahmed & Bello, 2023; Garba et al., 2022).

Statement of the Problem

Universal literacy would provide young people with foundational competencies necessary for accessing further education, securing decent employment, managing health information, participating in democratic processes, and adapting to the demands of an increasingly digital economy. Mobile learning applications would serve as accessible, affordable, and effective tools that complement formal education systems and provide flexible learning opportunities for those unable to access traditional schooling.

The proliferation of mobile technology in Nigeria has brought about new opportunities for addressing pressing issues like illiteracy, particularly among rural youths. Niger State, with its significant rural population, presents a pertinent case for examining the potential of mobile learning applications in tackling illiteracy. Mobile learning applications offer flexibility, accessibility, and interactive content that can cater to the needs of rural youths who often face barriers to traditional education, such as distance, cost, and lack of infrastructure (Adeyeye & Olojede, 2022). Despite these advantages, there are concerns about the effectiveness of mobile learning in addressing deep-seated issues of illiteracy. Factors like limited internet access, poor network coverage, and low digital literacy among rural populations can hinder the adoption and impact of these applications (Ogunyemi et al., 2023). Additionally, the relevance and design of mobile learning content to suit rural contexts and needs are crucial for engagement and learning outcomes.

The situation is further complicated by the specific challenges faced by rural youths in Niger State, including poverty, inadequate educational facilities, and cultural barriers that may limit access to mobile technology and learning opportunities (Nwankwo & Nwosu, 2021). The potential of mobile learning applications to make a significant dent in illiteracy rates hinges on addressing these contextual challenges and ensuring inclusivity and adaptability of the technology. According to a report by the Nigerian Communications Commission (2023), mobile phone penetration in rural areas is on the rise, suggesting a growing opportunity for mobile-based interventions. However, translating this penetration into effective learning outcomes requires strategic design, local content, and support mechanisms tailored to the needs of illiterate rural youths

This study therefore investigated the perceived effectiveness of mobile learning applications in reducing illiteracy among rural youths in Niger state. Specifically, the research examined how rural youths perceive mobile learning applications as tools for literacy development, identify the specific features and characteristics of mobile learning applications that rural youths consider most valuable and effective for learning, explore the factors that influence rural youth adoption and sustained use of mobile learning applications for literacy improvement, and assess the relationship between perceived effectiveness and reported learning outcomes.

Research Questions

The following research questions guided this study:

1. What are the perceptions of rural youths regarding mobile learning applications in Niger State?
2. What are the challenges encountered by rural youths in Niger State when using mobile learning applications?

Methodology

This study employed a descriptive survey research design. The study was conducted in selected rural communities in Niger State. The population comprised all rural youths aged 15 to 35 years residing in rural communities who have basic mobile phone literacy and access to smartphones or feature phones capable of running mobile applications. The study utilized a sample size of 200 respondents. The instrument for data collection was a structured questionnaire titled "Mobile Learning Applications Perception and Challenges Questionnaire" (MLAPCQ), developed by the researchers based on literature review and adapted from validated instruments. The questionnaire comprised two clusters: Cluster A (12 items on perceptions of mobile learning applications), Section B (13 items on challenges encountered). Items were structured using a four-point Likert scale (Strongly Agree, Agree, Disagree, Strongly Disagree). The validity of the MLAPCQ was established through face validity procedures. The reliability was determined using Cronbach's alpha coefficient with 20 rural youths from communities outside the study area. Reliability coefficients were: Cluster A (0.83), and Cluster B (0.81) with overall reliability of 0.84, exceeding the 0.70 threshold recommended by Nunnally and Bernstein (1994). Data were analyzed using descriptive statistics. For all three research questions, mean scores and standard deviations were calculated based on the four-point Likert scale (Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1). A decision rule was established: mean scores of 2.50 and above indicated positive perception or agreement, while scores below 2.50 indicated negative perception or disagreement. Results are presented in tables below for clarity.

Results

Research Question 1: What are the perceptions of rural youths regarding mobile learning applications in Niger State?

Table 1: Mean and standard deviation analysis of perceptions of rural youths regarding mobile learning applications in Niger State

S/N	Item Statements	Mean	SD	Decision
1	Mobile learning applications are useful tools for learning to read and write.	2.89	1.13	Agree
2	Mobile learning applications make learning more interesting and enjoyable.	2.81	1.06	Agree
3	I believe mobile learning applications can help improve my literacy skills.	3.03	1.03	Agree
4	Mobile learning applications are easy to use for learning purposes.	2.85	1.07	Agree
5	Learning through mobile applications is more convenient than attending traditional classes.	2.94	1.12	Agree
6	Mobile learning applications provide learning materials that are relevant to my needs.	2.97	1.11	Agree
7	I trust the quality of educational content provided by mobile learning applications.	2.94	1.11	Agree
8	Mobile learning applications allow me to learn at my own pace.	2.77	1.15	Agree
9	Using mobile learning applications can help me get better job opportunities.	2.87	1.03	Agree
10	Mobile learning applications are suitable for rural youths like me.	3.04	1.09	Agree
11	I would recommend mobile learning applications to other youths in my community.	2.98	1.07	Agree
12	Mobile learning applications are better than traditional learning methods for rural areas.	2.88	1.16	Agree
	Grand Mean	**2.91**	**1.09**	**Agree**

Table 1 above presents the mean and standard deviation analysis of the perceptions of rural youths regarding mobile learning applications in northern Nigeria. The mean values of items 1 through 12, which are 2.89, 2.81, 3.03, 2.85, 2.94, 2.97, 2.94, 2.77, 2.87, 3.04, 2.98, and 2.88 respectively, are all above the 2.50 benchmark for acceptance. This indicates that respondents agree with all statements regarding their perceptions of mobile learning applications. Specifically, rural youths perceive mobile learning applications as useful tools for learning to read and write, making learning more interesting and enjoyable, capable of improving literacy skills, easy to use for learning purposes, more convenient than attending traditional classes, providing relevant learning materials, offering quality educational content, allowing self-paced learning, helpful for securing better job opportunities, suitable for rural youths, recommendable to other youths in their communities, and better than traditional learning methods for rural areas. The grand mean of 2.91, which is above the benchmark of 2.50, indicates that rural youths in Niger state, generally possess positive perceptions regarding mobile learning applications and view them favourably. 1.09, indicates diverse opinions or experiences among respondents about the impact of mobile learning apps on illiteracy.

Research Question 2: What are the challenges encountered by rural youths in Niger State when using mobile learning applications?

Table 2: Mean and standard deviation analysis of challenges encountered by rural youths in Niger State when using mobile learning applications

S/N	Item Statements	Mean	SD	Decision
1	Frequent power outages make it difficult to charge my phone regularly.	2.78	1.16	Agree
2	Poor internet network coverage limits my access to mobile learning applications.	2.95	1.06	Agree
3	The cost of purchasing data bundles is too expensive for me.	2.98	1.11	Agree
4	Many mobile learning applications are not available in my local language.	2.96	1.10	Agree
5	The content of most mobile learning applications does not relate to my daily life experiences.	2.90	1.12	Agree
6	Mobile learning applications require technical skills that I do not have.	2.85	1.09	Agree
7	The instructions on how to use mobile learning applications are not clear.	3.13	1.04	Agree
8	My smartphone does not have enough storage space for mobile learning applications.	3.05	1.14	Agree
9	Mobile learning applications consume too much battery power.	2.96	1.04	Agree
10	I cannot find mobile learning applications that teach the specific skills I need.	3.15	.99	Agree
11	There is no one to help me when I encounter problems using mobile learning applications.	3.06	1.14	Agree
12	My community does not support the use of mobile phones for educational purposes.	1.97	1.01	Disagree
13	I have privacy concerns about using mobile learning applications.	2.17	1.01	Disagree
	Grand Mean	**2.83**	**1.07**	**Agree**

Table 2 above presents the mean and standard deviation analysis of the challenges encountered by rural youths in northern Nigeria when using mobile learning applications. The mean values of items 1 through 11, which are 2.78, 2.95, 2.98, 2.96, 2.90, 2.85, 3.13, 3.05, 2.96, 3.15, and 3.06 respectively, are all above the

2.50 benchmark for acceptance. This indicates that respondents agree that these items represent significant challenges they encounter when using mobile learning applications. These challenges include frequent power outages making it difficult to charge phones regularly, poor internet network coverage limiting access to mobile learning applications, expensive data bundles, unavailability of mobile learning applications in local languages, content not relating to daily life experiences, lack of required technical skills, unclear instructions on how to use the applications, insufficient smartphone storage space, excessive battery power consumption, inability to find applications that teach specific needed skills, and lack of assistance when encountering problems. However, items 12 and 13, with mean values of 1.97 and 2.17 respectively, are below the 2.50 benchmark, indicating that respondents disagree with these statements. This suggests that rural youths do not perceive lack of community support for using mobile phones for educational purposes or privacy concerns as significant challenges. The grand mean of 2.83, which is above the benchmark of 2.50, indicates that rural youths in Niger State generally encounter various significant challenges when using mobile learning applications, particularly infrastructural, technical, and content-related problems, while a standard deviation (SD) of 1.07 suggests that the responses about challenges are somewhat spread out around the mean. Given this is for "challenges encountered", an SD of 1.07 likely means: Some youths face very high challenges (high ratings), Some face fewer challenges (lower ratings This variation could be due to differences in individual experiences, access to resources, or digital literacy levels among rural youths.

Discussion

The findings revealed that rural youths in Niger State hold positive perceptions regarding mobile learning applications and view them favourably as tools for literacy development. Respondents expressed strong agreement that mobile learning applications can improve their literacy skills and are suitable for rural youths like themselves. They perceive these applications as useful tools for learning to read and write, making the learning process more interesting and enjoyable compared to traditional methods. Rural youths also believe that mobile learning applications provide relevant learning materials and offer quality educational content that can be accessed at their own pace. This positive perception suggests a readiness among rural youths to embrace technology-based learning solutions despite their geographical and infrastructural constraints. The finding indicates that rural youths recognize the potential benefits of mobile learning technologies and are willing to integrate them into their literacy development efforts.

Furthermore, rural youths perceive mobile learning applications as more convenient than attending traditional classes, which is particularly significant given the accessibility challenges that characterize rural areas in northern Nigeria. The belief that these applications can help secure better job opportunities demonstrates that rural youths associate literacy acquisition through mobile learning with economic empowerment and improved livelihoods. The willingness of respondents to recommend mobile learning applications to other youths in their communities indicates not only personal acceptance but also a desire to share these educational opportunities with peers. This collective positive perception creates a favourable environment for the adoption and scaling of mobile learning interventions in rural northern Nigeria. The favourable disposition toward mobile learning applications suggests that rural youths are not resistant to technological innovations in education but rather view them as valuable alternatives that can address the educational gaps created by inadequate traditional schooling infrastructure in their communities.

The positive perceptions identified in this study align with findings from previous research on technology adoption in educational contexts. In alignment, Aliyu and Khamis (2023), reported that rural learners in northern Nigeria demonstrated favourable attitudes toward mobile learning technologies when exposed to them through pilot interventions. Similarly, Abdullahi and Suleiman (2022) found that participants in Kano and Katsina states expressed optimism about the potential of mobile applications to enhance their learning experiences. However, in contrast, Bello and Adamu (2023), showed that initial perceptions of mobile learning applications were mixed among rural populations in some northern states, with some expressing scepticism about the relevance and appropriateness of technology-based learning for their cultural context. The difference may be attributed to varying levels of exposure to mobile technologies and differences in

how mobile learning interventions were introduced and contextualized in different communities. Nevertheless, the predominantly positive perceptions found in this study are consistent with broader literature suggesting that when educational technologies are perceived as useful, easy to use, and relevant to learners' needs, they are more likely to be accepted and adopted by target populations.

The findings revealed that rural youths in northern Nigeria encounter numerous significant challenges when using mobile learning applications, particularly infrastructural, technical, and content-related obstacles. The most pressing challenges identified include the inability to find mobile learning applications that teach the specific skills needed by rural youths, unclear instructions on how to use these applications, lack of assistance when encountering problems, and insufficient smartphone storage space. These challenges highlight the gap between the design and delivery of existing mobile learning applications and the actual needs and capacities of rural users. The infrastructural challenges of frequent power outages making it difficult to charge phones regularly, poor internet network coverage, and expensive data bundles create significant barriers to consistent access and use of mobile learning applications. These findings underscore the reality that while mobile technology penetration is increasing in rural areas, the supporting infrastructure necessary for effective mobile learning remains inadequate and unreliable.

Additionally, rural youths identified content-related and usability challenges that limit the effectiveness of mobile learning applications. The unavailability of applications in local languages, content that does not relate to daily life experiences, and the requirement for technical skills that users do not possess create barriers to meaningful engagement with mobile learning resources. The finding that applications consume excessive battery power is particularly problematic in contexts where electricity access is limited and unreliable. Interestingly, rural youths did not perceive lack of community support for using mobile phones for educational purposes or privacy concerns as significant challenges, suggesting that social and cultural acceptance of mobile learning is not a major barrier in these communities. This indicates that the primary obstacles to mobile learning adoption are practical and technical rather than socio-cultural. The challenges identified demonstrate that despite positive perceptions of mobile learning applications, actual usage and effectiveness are hindered by multiple contextual factors that must be addressed for mobile learning interventions to achieve their intended literacy development outcomes in rural northern Nigeria.

The challenges identified in this study are consistent with findings from previous research on mobile learning implementation in resource-constrained environments. In alignment, Lawal and Musa (2022) reported that infrastructural barriers such as poor electricity supply and inadequate internet connectivity significantly limited educational technology adoption in rural northern Nigeria. Similarly, Garba and Yusuf (2023) found that the high cost of data bundles and limited smartphone storage capacity were major impediments to sustained mobile learning engagement among rural populations. Mohammed and Sani (2023) also documented that the lack of mobile learning applications in local languages created accessibility challenges for rural learners whose primary language is not English. However, in contrast, Nasir and Bala (2022) showed that in some rural communities with better infrastructure development, power outages and connectivity issues were less frequently cited as barriers to mobile learning adoption. Hassan and Umar (2022) found that when mobile learning content was appropriately contextualized and aligned with vocational skills training, rural youths reported fewer challenges related to content relevance. These variations suggest that the severity of challenges varies across different rural contexts depending on infrastructure availability and the quality of mobile learning application design. Nevertheless, the convergence of findings across multiple studies confirms that addressing infrastructural deficits, improving application usability, localizing content, and providing technical support are critical requirements for successful mobile learning implementation in rural northern Nigeria.

Conclusion

Based on the findings, the study concluded that rural youths in Niger State hold positive perceptions regarding mobile learning applications and recognize their potential value as tools for literacy development.

They view these applications as useful, convenient, relevant, and capable of improving their literacy skills and employment prospects.

Also, the most critical challenges include infrastructural barriers such as frequent power outages, poor internet connectivity, and expensive data costs, alongside technical and content-related obstacles such as unclear instructions, unavailability of applications in local languages, insufficient smartphone storage, lack of technical support, and inability to find applications that address specific learning needs.

Recommendations

The government through mobile learning application developers should design culturally responsive applications that incorporate local languages, improve internet access & affordability, boost digital literacy training, and provide targeted support for challenged youths in Niger State.

Government agencies and educational authorities should invest in enhancing mobile learning apps with offline capabilities, simplify user interfaces, provide local language support, and offer targeted digital literacy training to address key challenges faced by rural youths in Niger State.

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