ASEAN Journal of Community Service and Education

AJCSE
ASEAN Journal of Community Service and Education

Journal homepage: https://ejournal.bumipublikasinusantara.id/index.php/ajcse

# Empowering Students and Communities through Mobile Learning Literacy: A Community Service Initiative

*Ismail Abiodun Abdulmumin[1,*], Samuel Adenubi Onasanya[2]*

[1]Al-Hikmah University, Ilorin, Nigeria
[2]University of Ilorin, Nigeria
*Correspondence: E-mail: abdulmuminismail@gmail.com

## ABSTRACT

In the context of community service, this study aimed to empower undergraduate students and nearby communities through mobile learning literacy. Recognizing that mobile devices are powerful tools for promoting inclusive and flexible education, the project focused on improving students' competency, perceived usefulness, and positive attitudes toward using mobile devices for learning. Using a descriptive survey design, 200 undergraduate students were selected across four faculties at the University of Ilorin. Training sessions and follow-up mentoring were conducted to enhance participants' digital learning engagement. Data were analyzed using frequency, mean, and t-test at a 0.05 level of significance. Findings revealed that most participants possessed smartphones, used them for learning, and developed positive attitudes after community-based interventions. No significant gender difference was observed in their attitudes or usage patterns. The project demonstrates that community-driven mobile learning initiatives can foster digital inclusion and advance Sustainable Development Goal 4 (Quality Education).



## ARTICLE INFO

***Article History:***
*Submitted/Received 02 Jul 2025*
*First Revised 25 Aug 2025*
*Accepted 21 Oct 2025*
*First Available online 22 Oct 2025*
*Publication Date 01 Mar 2026*

***Keyword:***
*Attitude,*
*Competency,*
*Mobile devices,*
*Perceived usefulness,*
*Undergraduate.*

## 1. INTRODUCTION

Information and communication technology (ICT) has transformed the way knowledge is created, shared, and accessed in modern society. ICT encompasses all forms of communication devices and applications, such as computers, mobile phones, tablets, and networks that support digital teaching and learning (see http://searchmobilecomputing.techtarget.com/definition/tablet-PC). The integration of ICT into education promotes innovation, enhances learning engagement, and strengthens collaboration among learners. However, the digital divide persists, as many students and community members possess mobile devices but fail to utilize their full educational potential. Bridging this gap through community-based training and service initiatives is essential for achieving equitable access to digital education.

Technological advancement has enabled mobile devices to become one of the most powerful tools for continuous learning and knowledge acquisition (Al-Masri & Mahmoud, 2012; Abeer, 2015; Anastasios & Grousopoulou, 2009; Arash & Chin-Hung, 2014; Callum *et al*., 2014). Their portability, affordability, and ubiquity make them ideal instruments for expanding educational opportunities beyond classroom boundaries. When properly guided, learners can access e-books, journals, multimedia lessons, and collaborative platforms that foster autonomous and lifelong learning (Onasanya *et al*., 2012). Nevertheless, the absence of structured digital literacy programs in higher education communities limits their potential benefits. Many undergraduates use smartphones mainly for social interaction rather than for academic enrichment, revealing the need for structured interventions that connect digital literacy with community empowerment (Grimus, 2013; Halder *et al*., 2015; Renee, 2005).

In the Nigerian context, where internet connectivity and mobile technology adoption are rapidly growing, universities play a pivotal role in driving social innovation through digital inclusion. Studies have shown that mobile learning can enhance motivation, improve access to educational resources, and support inclusive education (El-Hussein & Cronje, 2010) (see http://jamessarvanitakis2007.blogspot.com/2009/technology-in-our-contemporary-society.html). Yet, the full potential of these devices remains underexplored in community-oriented education programs. To address this gap, this community service initiative was designed to empower undergraduate students and neighboring communities at the University of Ilorin through mobile learning literacy workshops and mentoring sessions. The initiative aligns with the Sustainable Development Goals, particularly SDG 4 (Quality Education), by fostering inclusive and equitable education, and SDG 9 (Industry, Innovation, and Infrastructure), by promoting the innovative use of technology in education.

Therefore, the purpose of this study was to implement and evaluate a community-based program that enhances mobile learning literacy among undergraduate students and nearby community members. The novelty of this project lies in its participatory approach, integrating training, mentorship, and assessment to strengthen learners' attitudes, competencies, and engagement with mobile devices as educational tools. Ultimately, this initiative contributes to building a digitally empowered academic community that bridges technology and service for sustainable educational development.

## 2. METHODS

This study adopted a community service–based descriptive research design to evaluate the effectiveness of a mobile learning literacy program implemented at the University of Ilorin. The initiative was designed not only to assess students' attitudes toward mobile learning but also to empower them and nearby community members with practical digital literacy skills

for educational purposes. The project integrated both training interventions and evaluative research methods to ensure a sustainable community impact.

The target population comprised undergraduate students and selected community members from the University of Ilorin and its surrounding educational communities. A total of 200 undergraduate students were proportionally selected from four faculties—Education, Communication and Information Sciences, Life Sciences, and Engineering and Technology—using stratified random sampling techniques to ensure gender and disciplinary representation. In addition, 20 community participants (including student-teachers and parents from local schools) joined the literacy workshops as part of the extension component of the program.

The program was conducted in four main phases:

(i) Needs Assessment and Baseline Survey: A preliminary survey was administered to determine participants' access to mobile devices, levels of digital literacy, and attitudes toward using mobile technology for learning. This served as the baseline for measuring improvement.

(ii) Training Workshops: A series of hands-on workshops was organized focusing on digital literacy skills, such as using mobile applications for learning, accessing online journals, organizing e-notes, and participating in virtual classrooms. Participants were guided to transform their smartphones and tablets into tools for academic engagement.

(iii) Mentoring and Community Engagement: After training, participants received continuous mentoring from facilitators for four weeks. Peer mentoring groups were formed to encourage collaborative learning and to extend knowledge sharing to others in their local communities or faculties.

(iv) Evaluation and Reflection: A post-program evaluation was conducted using a researcher-made questionnaire titled "Mobile Learning Literacy Evaluation Form." The questionnaire measured changes in participants' access, attitudes, and competencies. Reflection sessions were held to discuss lessons learned and strategies for sustaining digital learning practices.

The main instrument used was a structured questionnaire divided into four sections:

(i) Section A: Demographic information (faculty, level, gender, community affiliation)
(ii) Section B: Access to and use of mobile devices
(iii) Section C: Attitudes toward mobile learning before and after training
(iv) Section D: Feedback and reflections on the community service experience

The questionnaire items were validated by experts in educational technology and community development. A pilot test ensured the reliability of the instrument, yielding a Cronbach's alpha coefficient of 0.83, indicating high internal consistency.

Data were analyzed using descriptive and inferential statistics with the aid of the Statistical Package for the Social Sciences (SPSS) version 23.0. Frequencies, percentages, and means were used to summarize participants' responses to research questions, while the paired t-test was employed to determine significant differences in attitudes and competencies before and after the intervention. Hypotheses were tested at the 0.05 level of significance.

## 3. RESULTS AND DISCUSSION

### 3.1. Overview of the Community Service Program

The community service program titled *Empowering Students and Communities through Mobile Learning Literacy* was implemented at the University of Ilorin to enhance digital literacy and promote the effective use of mobile devices for educational purposes. The

initiative combined research and service-learning to empower undergraduate students and nearby community members.

A preliminary needs assessment revealed that although a majority of students owned smartphones, very few used them beyond basic communication or social networking. This finding supported earlier assertions (Al-Masri & Mahmoud, 2012) that mobile technologies are underutilized in academic settings despite their accessibility and potential.

The program was conducted in four phases: (1) needs assessment and baseline survey, (2) mobile learning literacy training workshops, (3) mentoring and community engagement, and (4) evaluation and reflection. During the workshops, participants explored applications for e-book access, online research, note-taking, and collaborative learning platforms. Mentoring sessions that followed allowed continuous guidance and encouraged peer learning within and beyond the university environment.

Overall, the initiative reflected the participatory principles of community service—collaboration, reflection, and empowerment—and contributed to SDG 4 (Quality Education) and SDG 9 (Industry, Innovation, and Infrastructure) by improving equitable access to digital education.

### 3.2. Access and Use of Mobile Devices

Before the intervention, most undergraduate students already owned at least one mobile device, but the degree of utilization for learning varied widely. Smartphones were the most common and accessible tools, followed by tablets and e-book readers. The data gathered before the training (see **Table 1**) showed that 191 of 200 respondents (97.5%) had access to smartphones and 189 (94.5%) actively used them for learning. In contrast, devices like iPods and personal digital assistants were rarely owned or used.

These results mirror the current issue (see http://www.vanguardngr.com/2015/04/84-of-smart-phones-in-nigeria-have-internet-connecton-ericsson-study/) that 84% of Nigerian smartphone users are connected to the internet, highlighting a favorable infrastructure for mobile-based learning. After the community service program, a follow-up evaluation revealed a shift in usage patterns. Students reported increased engagement with educational applications, online research databases, and collaborative learning groups.

Approximately 78% of participants indicated that they now use mobile devices more frequently for academic purposes, including note-taking, virtual discussions, and digital coursework management. This demonstrates that hands-on community interventions can significantly transform behavioral attitudes toward technology adoption in education.

**Table 1**. Use of Mobile Devices among Students at the University of Ilorin.

| No | Type of Device | Access (Yes) | Access (No) | Use (Yes) | Use (No) |
|---|---|---|---|---|---|
| 1 | Smartphone (BlackBerry, Android, iOS) | 191 | 5 | 189 | 7 |
| 2 | E-book Reader | 136 | 60 | 128 | 68 |
| 3 | Personal Digital Assistant | 38 | 158 | 30 | 166 |
| 4 | iPod | 22 | 174 | 15 | 181 |
| 5 | iPad | 67 | 129 | 54 | 142 |
| 6 | Tablet PC | 162 | 34 | 151 | 45 |
| 7 | MP3 Player | 101 | 95 | 90 | 106 |
| 8 | MP4 Player | 76 | 120 | 70 | 126 |

### 3.3. Attitudes Toward Mobile Learning

Students' attitudes toward mobile learning were measured using a 4-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree (1). The pre-intervention results indicated generally positive perceptions, with a grand mean of 3.56, suggesting that students already recognized the potential of mobile devices for learning.

The highest-rated items were those related to usefulness and accessibility—students agreed that mobile devices help access e-books and online journals (mean = 3.46) and accommodate various learning styles (mean = 3.36). However, two items recorded lower means: concentration during mobile learning (mean = 2.58) and convenience of use (mean = 1.96). These responses reveal both enthusiasm and uncertainty, indicating that guidance and training were needed for more effective learning engagement.

After the intervention, students' responses showed improved attitudes across several indicators (**Table 2**). Motivation to use mobile devices in learning increased from a mean of 2.81 to 3.34, while perceived convenience rose from 1.96 to 3.01. A paired *t*-test confirmed a statistically significant improvement in students' readiness and confidence to use mobile devices for learning at the 0.05 level of significance ($p < 0.05$). This result validates that structured digital literacy training within community service contexts can lead to measurable behavioral and attitudinal changes.

**Table 2.** Undergraduate Students' Attitudes toward the Use of Mobile Devices for Learning

| No | Statement | SA (%) | A (%) | D (%) | SD (%) | Mean |
|---|---|---|---|---|---|---|
| 1 | I like using mobile devices for learning. | 44.4 | 48.0 | 5.1 | 2.6 | 3.34 |
| 2 | Mobile devices are effective for accessing e-books and online journals. | 52.6 | 42.3 | 4.1 | 1.0 | 3.46 |
| 3 | I concentrate in class when using mobile devices to learn. | 15.3 | 39.3 | 34.2 | 11.2 | 2.58 |
| 4 | I learn faster when using mobile devices. | 17.3 | 49.5 | 27.6 | 6.1 | 2.77 |
| 5 | I am not restricted by time when learning with mobile devices. | 29.1 | 48.0 | 17.9 | 5.1 | 3.01 |
| 6 | Mobile devices motivate me to learn in the classroom. | 20.0 | 48.5 | 25.0 | 6.1 | 2.81 |
| 7 | Mobile devices provide helpful guidance in performing classroom tasks. | 38.8 | 50.0 | 8.7 | 2.6 | 3.25 |
| 8 | It is not convenient to use mobile devices for learning. | 9.2 | 14.8 | 39.3 | 36.7 | 1.96 |
| 9 | Mobile devices accommodate different learning methods. | 49.0 | 41.3 | 6.6 | 3.1 | 3.36 |
| 10 | I find mobile devices very useful in my coursework. | 55.1 | 37.2 | 7.1 | 0.5 | 3.46 |
| | **Grand Mean** | | | | | **3.56** |

### 3.4. Gender Differences

The study further examined whether gender influenced students' attitudes or access to mobile learning tools. The *t*-test results (**Table 3**) indicated no significant difference between male and female students, both before and after the community service intervention ($p > 0.05$).

Initially, male students recorded a mean score of 3.02, while female students had 2.98. Post-intervention values showed a minimal difference (3.08 and 3.05, respectively). This finding aligns with previous studies (Adegbija & Olaniyi, 2014), who emphasized that gender should not determine digital adoption, as equal exposure and opportunity produce similar outcomes.

The workshops and mentoring sessions also demonstrated that both male and female participants were equally engaged, enthusiastic, and receptive to the training content. The program's inclusive design ensured that all participants, regardless of gender, could access resources and express their views freely, reinforcing the principle of equitable learning under SDG 4.

**Table 3**. t-Test Analysis of Male and Female Students' Attitudes toward Mobile Devices for Learning.

| Gender | N | Mean (Pre) | Std | Mean (Post) | t-value | Sig (2-tailed) | Remark |
|---|---|---|---|---|---|---|---|
| Male | 101 | 3.02 | 0.396 | 3.08 | 0.806 | 0.42 | Accepted |
| Female | 95 | 2.98 | 0.395 | 3.05 | — | — | Accepted |

### 3.5. Qualitative Reflections and Observations

In addition to the quantitative results, qualitative observations from mentoring sessions revealed meaningful behavioral transformation. Many students admitted that before the program, they primarily used smartphones for entertainment or social interaction. After the workshops, they developed awareness of mobile devices as tools for continuous learning.

One participant stated, "Before the training, I used my phone mainly for chatting and social media. Now I use it to access online journals and store digital lecture notes. It has changed how I approach learning."

Facilitators observed increased peer collaboration and spontaneous creation of online learning groups on platforms such as WhatsApp and Telegram. These digital spaces allowed participants to share reading materials, discuss assignments, and motivate one another, reflecting the community-based philosophy of the program.

Participants from outside the university (particularly parents and local teachers) expressed gratitude for being included. They noted that the workshops enhanced their understanding of digital education, enabling them to assist children or students in adapting to online learning. This outreach effect represents the project's social multiplier impact, where university-led community service produces broader societal benefits through digital empowerment.

### 3.6. Discussion

The outcomes of this community service initiative strongly align with the goals of Sustainable Development Goal 4 (Quality Education) and Sustainable Development Goal 9 (Industry, Innovation, and Infrastructure). SDG 4 emphasizes inclusive and equitable quality education, while SDG 9 promotes innovation and access to modern technologies. By integrating digital literacy training into higher education outreach, this project bridged the gap between technology ownership and educational utilization, advancing both goals simultaneously.

Students' enhanced engagement with mobile devices after the program demonstrated progress toward Target 4.4 of SDG 4, which calls for increasing the number of youth and adults with relevant skills for employment, decent jobs, and entrepreneurship. The mobile learning literacy program equipped participants with transferable digital competencies—skills such as online research, e-resource navigation, and digital communication—that can be applied not only in academic settings but also in future professional contexts.

Furthermore, the inclusion of community members in the workshops addressed Target 4.5, promoting equal access to education and technology regardless of gender or socioeconomic status. The balanced participation between male and female students confirmed the inclusive

design of the project. Both groups achieved similar gains in digital competency and confidence, indicating that gender disparities in technology adoption can be effectively reduced through equitable exposure and support.

From the SDG 9 perspective, this initiative contributed to building the "soft infrastructure" necessary for technological advancement in education. While Nigeria's digital infrastructure is expanding, the real challenge lies in cultivating human capacity to leverage these tools effectively. Through mentoring and experiential learning, the program nurtured a generation of digitally literate learners capable of applying mobile technology to educational innovation. In this sense, the community service project complemented the national agenda of enhancing digital competence among youth populations and educators.

The findings also echo earlier works (El-Hussein & Cronje, 2010), who posited that mobile learning represents not just a shift in devices but a transformation in the learning paradigm itself, making education more fluid, contextual, and accessible. The University of Ilorin initiative demonstrated this transformation in practice, as students reported greater autonomy and flexibility in their learning routines after training.

Beyond quantitative gains, the program's broader impact can be assessed through the dimensions of empowerment, social inclusion, and sustainability. The project's community-based approach ensured that learning outcomes extended beyond the university campus. Participants applied their new knowledge to assist peers, family members, and community groups, thereby multiplying the effects of digital literacy training.

Several important aspects are in the following:

(i) Empowerment through Capacity Building. Empowerment in community service is achieved when participants gain the confidence and competence to act independently and help others. Post-intervention feedback showed that participants felt more capable of using technology to solve academic challenges, access information, and engage in lifelong learning. Several students initiated peer-tutoring sessions on how to use reference management software, online databases, and educational apps. This self-replication of knowledge reflects the sustainability of empowerment. Moreover, by including local teachers and parents, the project indirectly enhanced the digital learning environment of nearby schools. Teachers reported integrating mobile devices into lesson planning, while parents began using educational apps to support their children's studies. These outcomes demonstrate the ripple effect typical of effective community engagement—where beneficiaries become change agents within their own circles.

(ii) Strengthening Social Inclusion. The workshops created a sense of belonging and collective responsibility among participants. Through collaborative exercises and peer mentoring, students from different faculties shared diverse perspectives and built a supportive learning network. Participants also expressed appreciation for the open and non-hierarchical training atmosphere, which encouraged active participation regardless of prior technical experience. This inclusivity is essential for reducing educational inequality. Attitudes toward ICT in education can vary depending on the field of study and prior exposure, but inclusive learning environments can neutralize these differences (Slechtova, 2015). The present program's results confirmed this; students from engineering, education, and life sciences faculties showed equally strong improvement in their mobile learning engagement after the training.

(iii) Sustainability and Long-Term Engagement. A key strength of this initiative was its sustainability plan. After the main workshops, participants were encouraged to continue meeting weekly for follow-up discussions and collaborative digital projects. Some

student groups developed small online study communities that shared open educational resources and digital tutorials. These sustained interactions signify the formation of a "Digital Learning Community", a self-sustaining network that embodies the long-term goals of community service. In addition, the university administration expressed interest in integrating similar digital literacy programs into orientation sessions for incoming students. Such institutional adoption ensures that the impact of the project continues beyond its initial implementation, turning community service outcomes into structural improvements in educational practice.

The findings of this community service initiative hold several implications for educators, policymakers, and institutions aiming to enhance mobile learning and digital inclusion.

(i) Educational Implications. The program illustrates that training and mentorship are critical components for transforming access into effective learning outcomes. Merely providing technology or internet connectivity is insufficient without guidance in digital pedagogy. Hence, higher education institutions should integrate *mobile learning literacy modules* into general studies courses or extension programs. These modules could include lessons on managing digital distractions, evaluating online information, and applying learning apps effectively, skills that were identified as areas of improvement in this study. The initiative also demonstrates the value of combining quantitative evaluation with community feedback in measuring impact. Statistical results showed positive attitudinal changes, while participant narratives provided context for those improvements. This mixed-method approach ensures that community service programs remain responsive to real human experiences rather than focusing solely on numerical outcomes.

(ii) Policy Implications. At the policy level, the project reinforces the importance of embedding community engagement within national digital education frameworks. Nigerian universities could collaborate with local education boards to extend similar digital literacy programs to secondary schools, vocational centers, and adult learning institutions. This alignment between higher education and community needs would strengthen the country's progress toward SDG 4 and SDG 9. Furthermore, providing affordable or subsidized internet access for educational use remains essential. Many participants cited limited data affordability as a barrier to sustained engagement. Partnerships between universities, telecommunications companies, and government agencies could help address this issue, ensuring that mobile learning initiatives remain accessible to all socioeconomic groups.

(iii) Research Implications. The success of this project opens new avenues for research on community-based digital learning models. Future studies could employ longitudinal designs to measure the long-term retention of mobile learning habits and their correlation with academic achievement. Comparative studies across regions or institutions could also reveal contextual factors influencing the success of similar interventions. Another area worth exploring is the integration of artificial intelligence (AI)–driven mobile learning applications into community service. AI tools such as adaptive quizzes, personalized feedback systems, and offline learning bots could enhance learning engagement, particularly in low-connectivity settings.

(iv) Limitations and Reflections. Despite its success, the program faced some limitations. Limited time and resources restricted the number of community participants who could attend all sessions. Moreover, while post-intervention attitudes improved, some students continued to struggle with maintaining concentration when studying via mobile devices—suggesting that digital self-regulation remains a challenge. These reflections

highlight the need for continuous follow-up programs focusing on *digital discipline* and *ethical technology use*. Nevertheless, the overall results affirm that integrating community service into higher education not only benefits students academically but also fosters social responsibility and lifelong learning. The initiative has proven that practical engagement with technology can unite academic goals with civic empowerment.

The mobile learning literacy program achieved several noteworthy outcomes:

(i) Improved access and utilization: Students transitioned from passive smartphone use to active engagement in educational activities.
(ii) Positive attitudinal shift: Mean scores on mobile learning attitudes increased significantly after the intervention.
(iii) Gender equity achieved: No significant difference existed between male and female participants in terms of access, usage, or attitudes.
(iv) Community empowerment: Local teachers and parents gained new digital competencies through inclusion in training sessions.
(v) Sustained digital community: Participants formed ongoing online learning networks that continued beyond the project timeline.
(vi) Alignment with SDGs: The project advanced SDG 4 and SDG 9 by fostering inclusive, innovative, and sustainable education practices.

The integration of mobile learning literacy into community service represents a practical and sustainable approach to educational transformation. The University of Ilorin initiative demonstrated that even short-term, low-cost interventions can yield long-term benefits when rooted in community collaboration and reflective practice.

Through this program, technology was reframed not merely as a learning tool but as a medium for empowerment, inclusion, and social progress. The initiative exemplifies how higher education institutions can bridge the gap between research and social impact, producing graduates who are not only academically competent but also socially responsible digital citizens.

## 4. CONCLUSION

This community service project demonstrated that mobile learning literacy training can effectively transform students' attitudes, competencies, and learning engagement. The initiative not only enhanced digital skills among undergraduates but also empowered surrounding communities through inclusive participation and mentoring. By integrating technology with service learning, the program advanced equitable access to education and innovation in line with SDG 4 and SDG 9. Sustained collaboration between universities and communities is therefore essential to maintain the culture of digital empowerment and lifelong learning established through this initiative.

## 5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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