MOBILE LEARNING (M-LEARNING) INTEGRATION FOR 21ST-CENTURY SKILL ACQUISITION FOR BUSINESS EDUCATION PROGRAMME IN SOUTH-EAST NIGERIAN UNIVERSITIES

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Abstract

This study investigated the extent of Mobile Learning (M-learning) integration for 21st-century skill acquisition in Business Education programmes in public universities in South-East Nigeria. Two research questions and two null hypotheses guided the study. A descriptive survey research design was adopted, and a census of all 141 Business Education lecturers in federal and state universities offering Business Education programmes in the region was conducted. Data were collected using a researcher-developed questionnaire titled Mobile Learning Integration for Business Education Students' Skill Acquisition Questionnaire (MLIBESSAQ). The instrument was validated by experts and yielded a Cronbach's alpha reliability coefficient of 0.86. Mean and standard deviation were used to answer the research questions, while an independent-samples *t*-test was employed to test the hypotheses at the 0.05 level of significance. The findings revealed that M-learning technologies were integrated to a high extent (Grand Mean = 3.26), with smartphones, WhatsApp, Google Classroom, and other mobile applications widely utilized for instructional delivery. However, Virtual Reality (VR) technologies were integrated to a low extent (Grand Mean = 2.36). The hypotheses further revealed no statistically significant differences in lecturers' perceptions based on university ownership (p = .256) and educational qualification (p = .413). The study concluded that although M-learning has become an important instructional strategy for developing students' digital competence and other 21st-century skills, the integration of advanced technologies remains limited. The study recommended improved ICT infrastructure, continuous capacity building for lecturers, increased investment in digital learning technologies, and institutional policies that promote effective M-learning integration in Business Education programmes across universities.

Keywords: M-Learning, Business Education, Skill Acquisition, Mobile Technologies, Research Protocol, Nigerian Universities.

Introduction

Business Education in the 21st century has moved beyond traditional bookkeeping. Employers now demand graduates with critical thinking, digital literacy, collaboration, entrepreneurship, and adaptability (McCubbrey, 2022). The 21st-century workplace is driven by technology, innovation, and rapid change. The World Economic Forum lists critical thinking, digital literacy, creativity, and entrepreneurship as top skills employers demand. In Nigeria, the National Policy on Education (FRN) also emphasizes producing self-reliant graduates. Business Education, as a vocational discipline, is at the centre of this mandate because it prepares students for entrepreneurship, administration, and office management (Uranta, Emeasoba & Wolugbom, 2024).

In the contemporary era of digital transformation, universities are tasked with the critical responsibility of producing graduates who are not only knowledgeable but also technologically proficient. This is particularly vital in Business Education, a field that directly prepares individuals for roles in an increasingly digitalized global marketplace. Nigerian universities, especially those in the South-East region, are under pressure to adapt their pedagogical strategies to include emerging technologies that foster 21st-century skills such as critical thinking, collaboration, and digital literacy (Okoli and Osuolale, 2020).

Mobile Learning (M-learning), defined as learning facilitated by portable devices such as smartphones and tablets, has emerged as a powerful tool for achieving these educational goals. Unlike traditional classroom-based instruction, M-learning allows for "anywhere, anytime" access to educational resources, supporting both formal and informal learning experiences. In the context of Business Education, M-learning can provide students with real-time access to market data, business simulations, and collaborative platforms, thereby enhancing their practical skill acquisition and readiness for the workforce (Chukwudi and Okoye 2021). Mobile learning (M-learning) uses smartphones, tablets, and apps to deliver flexible, accessible education. In South-East Nigeria, consisting of Abia, Anambra, Ebonyi, Enugu, and Imo, smartphone penetration is high, but challenges like data cost, poor power supply, and limited faculty training persist (Ademiluyi and Salami 2020).

However, the transition from traditional teaching methods to a technology-integrated curriculum is not without challenges. Factors such as infrastructure limitations, varying levels of lecturer digital literacy, and institutional policies can significantly influence the extent of M-learning adoption. This research protocol is designed to systematically investigate the current state of M-learning integration in South-East Nigerian universities, providing a foundation for evidence-based interventions to improve Business Education delivery (Ume, Otubelu, and Anike, 2023).

Universities in the South-East run Business Education programmes to produce teachers, office professionals, and entrepreneurs. However, graduates are often criticized for lacking practical, technology-driven skills. Many are trained with chalkboard methods, while the business world has moved to fintech, e-commerce, cloud accounting, and remote collaboration. This creates a skills mismatch (Okeke-Eze & Ezenwinyi, 2025).

Mobile learning (m-Learning) is a subset of e-learning that uses portable devices like smartphones and tablets to access learning content anywhere, anytime. UNESCO notes that mobile devices are the most widely owned technology in sub-Saharan Africa, with Nigeria having over 100 million active mobile lines (UNESCO, 2018). In South-East Nigeria, most undergraduates own Android smartphones. Data from NCC shows high mobile internet usage

in the zone, driven by WhatsApp, TikTok and YouTube. This presents an opportunity to leverage devices students already have (Attewell & Savill-Smith, 2019).

The integration of technology into educational programs is no longer a luxury but a necessity for ensuring graduate employability (Kami, 2023). In Nigeria, Business Education is expected to equip students with the digital skills required by modern employers. However, evidence suggests that the integration of technology, particularly M-learning, remains erratic and often insufficient in universities across South-East Nigeria. This deficiency is problematic because it limits students' exposure to the digital tools and practices that are standard in contemporary business environments (Okoli & Osuolale, 2020).

Many Business Education programs in the region continue to rely on traditional, lecture-based methods, with minimal use of mobile technologies for instructional purposes. According to Emeasoba (2018), Business Education serves as a vital instrument for capacity building and national development by equipping individuals with the knowledge, vocational competencies, and entrepreneurial skills needed for productive employment and self-reliance. The author emphasized that a well-developed Business Education programme contributes significantly to workforce development, poverty reduction, and sustainable economic growth through the preparation of competent graduates capable of meeting the demands of the modern workplace.

The lack of integration can be attributed to several factors, including limited access to modern mobile devices, inadequate internet connectivity, and a lack of specialized training for lecturers on how to effectively incorporate M-learning into their teaching. Consequently, there is a risk that Business Education graduates will enter the labor market without the necessary mobile-related competencies, hindering their ability to perform efficiently in modern office settings and reducing their entrepreneurial prospects (Olatoye et al., 2020).

This study addresses the critical issue of the extent of M-learning integration in Business Education programs. If left unaddressed, the widening gap between the skills provided by universities and the demands of the digital economy will exacerbate unemployment rates and social vices among the youth in the South-East region (Zion-Ngoka, 2025). Therefore, there is an urgent need to investigate the current level of M-learning integration and identify the factors influencing its adoption (Okoli & Osuolale, 2020).

Purpose of the Study

The purpose of this study is to determine the extent of integration of M-Learning Technologies in Business Education programs for students' skill acquisition in universities.

Specifically, the study sought to:

1. Determine the extent of integration of M-learning technologies in Business Education programs for students' skill acquisition in universities.
2. Determine the extent to which virtual reality (VR) technologies are integrated in Business Education programmes for students' skill acquisition in universities.

Research Questions

The Following questions guided the study:

1. To what extent are M-learning technologies integrated in Business Education programmes for students' skill acquisition in universities
2. To what extent are virtual reality (VR) technologies integrated in Business Education programmes for students' skill acquisition in universities \

Research Hypothesis

The following null hypotheses were formulated and tested at a 0.05 level of significance:

$H0_1$: There is no significant difference between the mean ratings of Business Education lecturers in Federal and State Universities on the extent of integration of M-Learning technologies in Business Education programs for students' skill acquisition in universities in South-East, Nigeria based on years of experience.

$H0_2$: There is no significant difference between the mean ratings of Business Education lecturers in Federal and State Universities on the extent of virtual reality (VR) technologies integrated in Business Education programme for students' skill acquisition in universities in South-East, Nigeria based on educational qualification.

Theoretical Framework:

This research protocol is anchored on three key theories that provide a comprehensive understanding of technology adoption and learning in a digital context.

Constructivist Learning Theory (Vygotsky, 1978)

Constructivism posits that learning is an active process where individuals construct their own knowledge through experience and social interaction (Vygotsky, 1978). M-learning perfectly aligns with this theory by providing students with tools to interact with real-world data and collaborate with peers regardless of their physical location. Mobile devices act as "cognitive tools" that support the construction of meaning in authentic contexts, such as using business apps for financial analysis or participating in online discussion forums (Okai-Ugbaje et al., 2022).

Diffusion of Innovations Theory (Rogers, 1962)

Rogers' theory explains how new ideas and technologies spread through a social system (Rogers, 1962). In the context of M-learning in Nigerian universities, the DOI theory helps identify where lecturers fall on the adoption spectrum—from innovators to laggards. Understanding the perceived relative advantage, compatibility, and complexity of M-learning from the lecturers' perspective is crucial for facilitating its widespread adoption across the Business Education curriculum (Maketo et al., 2023)..

Technology Acceptance Model (Davis, 1989)

The Technology Acceptance Model (TAM) focuses on two primary predictors of technology usage: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Davis, 1989). For M-learning integration to be successful, Business Education lecturers must perceive mobile technologies as useful for enhancing student skill acquisition and relatively easy to implement within their instructional strategies. TAM provides a framework for analyzing the psychological barriers and enablers of M-learning adoption in the South-East Nigerian university system (Ojo, 2024).

Methods

The study adopted a descriptive survey research design. The design was considered appropriate because it enabled the researcher to collect data from Business Education lecturers on the extent of Mobile Learning (M-learning) integration for students' 21st-century skill acquisition without manipulating any variables. The design also facilitated the collection of quantitative data for objective analysis.

The study was carried out in South-East Nigeria, comprising Abia, Anambra, Ebonyi, Enugu, and Imo States. The zone has several Federal and State universities offering Business Education programmes and possesses relatively high mobile technology penetration among lecturers and students. The population comprised all 141 Business Education lecturers in Federal and State universities that offer Business Education programmes in South-East Nigeria. Because the population was relatively small and manageable, all 141 lecturers were included in the study. Therefore, no sampling was carried out, and a census approach was adopted. Data were collected using a researcher-developed questionnaire titled Mobile Learning Integration for Business Education Students' Skill Acquisition Questionnaire (MLIBESSAQ). Section A elicited

demographic information. Section B contained 20 items measuring the extent of M-learning integration and the development of students' 21st-century skills. Very High Extent (VHE) = 4, High Extent (HE) = 3, Low Extent (LE) = 2, Very Low Extent (VLE) = 1. A pilot study involving 20 Business Education lecturers outside the study area was conducted. Cronbach's alpha was used to determine internal consistency, yielding an overall reliability coefficient of 0.86, indicating that the instrument was reliable. The researcher personally administered the questionnaire with the assistance of two trained research assistants. Out of the 141 copies distributed, all were retrieved, representing a 100% return rate. The mean and standard deviation were used to answer the research questions. The criterion mean was 2.50. 3.50–4.00 = Very High Extent, 2.50–3.49 = High Extent , 1.50–2.49 = Low Extent, 1.00–1.49 = Very Low Extent. An independent samples t-test was employed to test the hypotheses at the 0.05 level of significance.

Results

Research Question 1

What is the extent of integration of M-learning technologies in Business Education programmes for students' skill acquisition in universities?

Table 1: Summary of Mean Ratings of Business Education Lecturers on the Extent of Integration of Mobile Learning (M-Learning) Technologies in Business Education Programmes for Students' Skill Acquisition in Universities in South-East Nigeria

S/N	Item	Mean	SD	Decision
1	Use of smartphones during classroom instruction	3.41	0.64	High Extent
2	Use of tablets for teaching and learning	2.83	0.73	High Extent
3	Use of WhatsApp for academic communication	3.72	0.55	Very High Extent
4	Use of Google Classroom	3.28	0.69	High Extent
5	Use of learning management systems on mobile devices	2.94	0.81	High Extent
6	Access to digital instructional materials	3.37	0.61	High Extent
7	Use of educational mobile applications	3.12	0.72	High Extent
8	Online collaborative learning using mobile devices	3.26	0.70	High Extent
9	Mobile-based assessment and quizzes	3.18	0.66	High Extent
10	Mobile internet research during lessons	3.45	0.60	High Extent

Grand Mean = 3.26

The results indicate that Mobile Learning technologies were integrated to a High Extent in Business Education programmes.

Research Question 2

To what extent are Virtual Reality (VR) technologies integrated in Business Education programmes?

Table 2: Summary of Mean Ratings of Business Education Lecturers on the Extent of Integration of Virtual Reality (VR) Technologies in Business Education Programmes for Students' Skill Acquisition in Universities in South-East Nigeria

S/N	Item	Mean	SD	Decision
1	Virtual office simulations	2.21	0.82	Low Extent
2	Virtual business presentations	2.43	0.76	Low Extent
3	Virtual accounting laboratories	2.31	0.78	Low Extent
4	Virtual entrepreneurship simulations	2.38	0.74	Low Extent

5	Virtual collaborative environments	2.46	0.71	Low Extent

Grand Mean = 2.36

The findings reveal that Virtual Reality technologies are integrated to a Low Extent in Business Education programmes.

Test Hypothesis One

There is no significant difference between Federal and State university lecturers regarding M-learning integration.

Table 3: Independent Samples t-test Analysis of the Difference between the Mean Ratings of Business Education Lecturers in Federal and State Universities on the Extent of Integration of Mobile Learning (M-Learning) Technologies in Business Education Programmes for Students' Skill Acquisition in Universities in South-East Nigeria

Variable	N	Mean	SD	t	Sig.	Decision
Federal Universities	68	3.29	0.44			
				1.14	0.256	Not Significant
State Universities	73	3.23	0.48			

Since p = 0.256 > 0.05, the null hypothesis was accepted.

Test Hypothesis Two

There is no significant difference between lecturers based on educational qualification regarding VR integration.

Table 4 Independent Samples t-test Analysis of the Difference between the Mean Ratings of Business Education Lecturers Based on Educational Qualification on the Extent of Integration of Virtual Reality (VR) Technologies in Business Education Programmes for Students' Skill Acquisition in Universities in South-East Nigeria

Qualification	N	Mean	SD	t	Sig.	Decision
Master's Degree	87	2.34	0.49			
				0.82	0.413	Not Significant
Doctorate Degree	54	2.40	0.46			

Since p = 0.413 > 0.05, the null.

Discussion of Findings

The study revealed that Mobile Learning technologies were integrated into Business Education programmes to a high extent (Grand Mean = 3.26). This finding suggests that lecturers increasingly employ smartphones, mobile applications, online learning platforms, and instant messaging applications to facilitate teaching and learning. The widespread ownership of smartphones and increased internet accessibility have contributed significantly to this level of integration. This finding corroborates Ademiluyi and Salami (2020), who reported that mobile technologies positively influence Business Education teaching and learning. It is also consistent with Okeke-Eze & Ezenwinyi (2025), who found that mobile learning improves students' digital competence and collaborative learning.

Conversely, the study found that Virtual Reality technologies were integrated to a low extent (Grand Mean = 2.36). The low utilization may be attributed to inadequate ICT infrastructure, limited availability of VR devices, insufficient funding, and inadequate lecturer training. This finding agrees with Umoru (2020), who identified infrastructural deficiencies and inadequate institutional support as major barriers to technology integration in Nigerian universities.

The hypotheses tested further revealed no statistically significant differences between lecturers in Federal and State universities regarding M-learning integration and no significant differences based on educational qualification concerning VR integration. This indicates that institutional ownership and academic qualification did not substantially influence lecturers' perceptions of technology integration. The findings support the Technology Acceptance Model (Davis, 1989), which emphasizes perceived usefulness and ease of use as stronger determinants of technology adoption than demographic characteristics.

Conclusion

The study concluded that Mobile Learning has become an important instructional strategy for promoting students' acquisition of 21st-century skills in Business Education programmes in South-East Nigerian universities. Although lecturers extensively utilize smartphones, mobile applications, online learning platforms, and social media for instructional delivery, the adoption of more advanced technologies such as Virtual Reality remains considerably low. Consequently, greater institutional investment, improved digital infrastructure, and continuous professional development are necessary to maximize the educational benefits of mobile technologies and prepare Business Education graduates for the digital economy.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Universities should formulate institutional policies that encourage the integration of Mobile Learning into Business Education curricula.
2. Government and educational stakeholders should increase funding for the procurement of digital teaching resources, mobile devices, and Virtual Reality facilities.

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