

Challenges of Implementing M-Learning in Science Education in Higher Institutions

Ikwuanusi, Eucharia Nndidi Ph.D¹, Nwoke, Bright Ihechukwu Ph.D² and
Nwoga, Anayochi Nwakaego Ph.D³

¹Integrated Science Department

²Mathematics Departments

³Psychology Department

^{1,2,3}Alvan Ikoku Federal College of Education Owerri

Abstract: *The study investigated the challenges of m-learning implementation in science education in higher institutions. The descriptive survey research design was adopted in carrying out the study using a sample of one hundred and twenty five academic staff of School of Science, Alvan Ikoku Federal College of Education, Owerri. Data required for the study was collected using researchers made 15 items likert 4-point type of questionnaire titled “Challenges of implementation of m-learning in science education (CIMSE)”. It had reliability coefficient of 0.79 determined using Cronbach’s alpha method. The data generated was analyzed using mean and standard deviation to answer research questions while t-test statistical tool was used to test hypothesis at 0.05 level of significance. The result of the study revealed the challenges to include among others; lack of funding, lack of educators knowledge of mobile technologies, lack of wifi facilities, fear of examination malpractice. Based on the result, it was recommended that science educators should improve their knowledge of technology application in teaching.*

Keyword: *Challenges, M-learning, Science Education*

I. Introduction

The recent generation of technologies has revolutionized the education sector. The application of technologies in education has improved the transmission of knowledge at the higher education level and recently, mobile learning is gradually creeping into the pedagogical process to support students and teachers and expand their knowledge. According to Stead (2005) mobile learning (m-learning) has moved from being a theory explored by academic and technology enthusiasts into a real and valuable contribution to learning.

Traxler (2005) states that mobile learning (or m-learning) refers to any provision where the sole or dominant technology is a hand held or palmtop device. McConatha, Praul and Lynch (2008) indicated that m-learning is learning accomplished with the use of small portable computing devices. These computing devices may involve; smart phones, personal digital assistants (PDAs) and similar handheld devices. Harriman (2007) stated that the term “m-learning” or “mobile learning” refers to the use of handheld devices such as PDAs, mobile phones, laptops and other handheld information technology devices that may be used in teaching and learning. M-learning is the exploitation of ubiquitous handheld technologies, together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of teaching and learning (Vanikalloo and Permanand, 2012). This implies that m-learning is the application of handheld electronic technologies in their different forms in teaching and learning process. This is an indication that, the handheld technologies are not only useful for social purposes alone. The need for more access to learning in science education calls for adoption of m-learning in the pedagogical process. Amon, Mahmood, Abidin & Rahman (2006) opined that, since the use of mobile phones and handheld devices among students has dramatically increased, implementation of m-learning in academic institutions becomes an interesting and urgent need. M-learning offers enormous potential as a tool to be used in situations where learners are geographically dispersed, to promote collaborative learning, to engage learners with contact, as an alternative to books or computers, as an alternative to attending campus lectures and for ‘just-in-time’ delivery of information (Taleb, Ahmadi and Musaki, 2014). The application of m-learning in science education can allow students to indulge in personalized learning, have improved motivation, access to course content and deep understanding of the course content as well as practice and test conjectures. According to Saleh and Alias (2012) educational application for mobile devices motivate the students and engage their attention while focusing on solving problems improving their memory, their reading and writing skills.

M-learning allows the students to study at any point and distance provided there is access to the internet and it increases the interest of the learner and builds confidence in the learner. Faisal and Abdelmuhi (2010) indicated that m-learning has the ability to provide rich mobile experiences that are accessible, rich in content, efficient, flexible, secure, reliable and interactive. M-learning is expected to offer possible solutions

that address the shortcomings of the traditional classroom-based education and it can provide important opportunities for learning and collaborative interaction (Amin et al 2006 and Sung, 2005). Considering the nature of science learning which requires that pictures and models be presented to the learners, the m-learning devices resolves this level of difficulty by providing access to these learning materials whenever and wherever they are required. M-learning allows for distance learning and communication between learners. Vishwakarma (2015) noted that students today learn really and immediately, everywhere, in anytime, while they are walking, traveling, doing their routine actions and above all in “in motion”. Warschaver (2011) enumerates some advantages of using mobile devices in education namely easy reading, fast switching ability among applications; tough screen interface which provides friendly users interactivity, easy mobility and affordable application development. valk, Rashid and Elder (2010) examined the extent to which the use of mobile phones can assist to improve access to educational resources and promote acquisition of new knowledge, it was concluded that mobile phones had a huge impact in the facilitation of increasing access to education, Pegrum, Oakley and Saulkner (2013) found that, when students learn with personal mobile devices embedded in their own contents, that there is significant and greater scope for individualized learning and customization. Zameni and Kardau (2011) performed a study entitled “the effect of using information and communication technology on learning mathematics and concluded that utilization of the information and communication technology is effective on changing the attitude and stability of subject matters, reasoning and creativity and finally active learning of mathematics. Maxfield and Romano (2013) stated that the implementation of mobile devices will “aid in the shift in pedagogy from a teacher-led classroom to a student-centered one”. Mduckie (2010) showed that using mobile devices increases motivation and retention of subject matters. These are indications of the effectiveness in learning through mobile device-which will also lead to improved learning in science education in higher education.

II. Statement of the Problem

Research evidences are bound to demonstrate the effectiveness of m-learning as applied in higher education. However, teacher educators only apply online tools to retrieve information, social activities and research rather than to communicate and collaborate in learning situations. This approach limits students to access to science education materials outside the classroom and this has been blamed on several reasons. This study was therefore carried out to determine the challenges facing implementation of m-learning in science teacher education at higher education level.

Purpose of the Study

The basic purpose of this study was to determine the challenges facing the implementation of m-learning in science education in higher education. Specifically the study will determine.

- The challenges inhibiting implementation of m-learning in teaching and learning of science education in higher education.
- The difference between male and female educators response on challenges inhibiting implementation of m-learning in teaching and learning science education at higher education level.

Research Question

The following research questions were raised for the study:

1. What are the challenges of the implementation of m-learning in science education in higher institutions?
2. What is the difference between male and female science teacher science teacher educators’ responses on the challenges of implementing m-learning in science education in higher institutions?

Hypothesis

The following hypothesis was formulated to guide the study:

H₀₁: There is no significant difference between male and female science educators’ mean responses on challenges of implementing m-learning in higher education.

III. Methodology

The descriptive survey research design was adopted in determining the challenges of implementation of m-learning in science education in higher institution. The population of the study consists of all one hundred and twenty five academic staff of the school of science of Alvan Ikoku Federal College of Education, Owerri, Imo State. Due to the size of the population, census sampling technique was adopted in carrying out the study which implies that all the 125 academic staff were used for the study. The instrument for data collection was a 15 item modified likert 4-point type of questionnaire titled “Challenges of Implementation of M-learning in Science Education (CIMSE)” drawn by the researcher. It ranged from Strongly Agree (SA) = 4 points to Strongly Disagree (SD) = 1 point. The instrument was divided into two parts, part A dealt with respondents demographic variables while part B dealt with items relevant to the objectives of the study. The face and content validity of

the instrument was determined by a measurement and evaluation expert, computer technologist and science educator, their inputs gave credence to reconstruction of the instrument. To determine the reliability of the instrument, it was administered to 25 educators of similar characteristics with the study sample. Their responses were analyzed using Cronbach's Alpha (α) method, this gives a reliability coefficient (r) of 0.79 which was acceptable for the study. The instrument was administered to the respondents on face to face basis by the researcher after explaining the objectives of the study. They were assured of the confidentiality of their information as regards the study and were allowed to return the instrument a day after, however those that were filled out on the spot were collected. All the distributed instruments were recovered. The collected data was analyzed using mean and standard deviation to answer the research questions while the hypothesis was tested using t-test statistical tool at 0.05 level of significance.

IV. Results

RQ1: What are the challenges of the implementation of m-learning in science education in higher institutions?

Table1: summary of educators' responses

S/N	Item	Mean (X)	SD	Decision
1.	Lack of educators knowledge of mobile technologies	3.21	0.68	Accept
2.	Lack of funding	2.15	0.81	„
3.	Lack of steady power supply	3.20	0.72	„
4.	Inadequate security	3.01	0.71	„
5.	Lack of technical supports	3.05	0.75	„
6.	Lack of implementation of m-learning in curriculum	2.78	1.02	„
7.	Lack of wifi facilities	2.81	1.11	„
8.	Fear of examination malpractice	2.62	1.02	„
9.	Attitude of educators towards implementation of m-learning	2.93	0.98	„
10.	Traditional approach of teaching	3.03	1.00	„
11.	Use of m-learning may lead to truancy among students	2.83	1.34	„
12.	m-learning may lead to uncoordinated learning	2.60	1.06	„
13.	High cost of m-learning devices	3.15	0.78	„
14.	High cost of connectivity	2.95	1.21	„
15.	Students inability to cope with the trend	2.06	1.56	Reject
	Grand mean X 2.72			

Table 1 above shows item 1 – 14 were accepted as they had response mean greater than instrument scale mean of 2.50. This indicates that they are part of the challenges hindering the implementation of m-learning in science education in higher institutions. However, item 15 was rejected as it had mean response lower than the scale mean outline. This indicates that it's not a challenge hindering the implementation of m-learning in higher institutions.

RQ2: What is the difference between male and female science teacher educators' responses on the challenges of implementation of m-learning in science education in higher institutions?

Table 2: Summary of male and female educators' responses

Group	N	Mean (X)	SD	Difference in Mean
Male	58	2.74	0.96	0.05
Female	67	2.69	1.00	

Table 2 above shows that male educators had response mean of 2.74 while their female counterparts had 2.69 this gave a difference of 0.05 which is very minor.

H₀₁: There is no significant difference between male and female science educators' responses on challenges inhibiting implementation of m-learning in higher education.

Table 3: Summary of t-test analysis on educators' responses

Group	N	Mean (X)	SD	t-0.05	t-cal	Decision
Male	58	2.74	0.96			
Female	67	2.69	1.00	1.96	0.250	accept null

Table 3 shows that the t-test calculated value 0.250 is less than the table value 1.96 at 0.05 level of significance. Based on the result, the null hypothesis is accepted at 0.05 level of significance.

V. Discussion of Findings

The result of the study revealed a positive response among science educator on the outlined factors inhibiting implementation of m-learning in science education in institutions of higher learning. The table indicated that all items were accepted as they all had mean response greater than the instrument, scale mean and

the grand mean was also above the scale mean indicating a positive response among the educators. These includes among others, educators attitude, lack of knowledge, wifi, security, lack of technical support, m-learning curriculum implementation. This result is in agreement with Osang, Ngole and Tsuma (2013) who listed similar barriers to the implementation of mobile learning in Nigeria to include social abuse, ease of examination malpractice, low computer literacy among others. The result of the study also revealed that male and female science educators are of the same opinion about challenges inhibiting the implementation of m-learning in science education and the result of the analysis showed no significance difference between the mean responses of male and female science educators on the challenges inhibiting implementation of m-learning in science education. This result is consistent with Nwoke, Ikwuanusi and Ugo, (2016) which showed no significant difference between male and female students perception towards application of technology in science education.

VI. Conclusion

The result of the study revealed the challenges that are inhibiting the application of m-learning in science education in higher institutions, as these include educators attitude, lack of knowledge, wifi, security, lack of technical support, m-learning curriculum implementation and many of these challenges cut across the opinions of male and female science educators.

VII. Recommendations

Based on the findings of this study, the following recommendations are made:

1. Science educators should improve their knowledge of technology applications in teaching.
2. Technical support for m-learning facilities should be available in institutions of higher learning.
3. The government should extend finding in education to m-learning facilities so they can be provided in our institutions.
4. The government, news and private organizations should aid institutions of higher learning through provision of generating sets as to have alternative power support and enable use of m-learning facilities.
5. Wifi teaching should be installed in institutions of higher learning especially teacher training institutions to enable them apply m-learning in teaching their students

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