Effects of Mobile Technology on Adult Learners' Achievement in Literacy Programmes in Ibadan

Dr. Omobola ADELORE and Morakinyo AKINTOLU
Department of Adult Education, University of Ibadan, Ibadan Nigeria
omobola.adelore@yahoo.com and akintolumorakinyo@yahoo.com

ABSTRACT

This paper examined the effects of mobile technology on adult learners' achievement and benefits derived from its use in literacy programmes. Promoting literacy in Nigeria faces a number of challenges. One of the reasons for low literacy is due to the fact that new literates relapse into illiteracy several months after the basic literacy course. This is usually due to the difficulty of sustaining their interest in reading. As a strategy to sustain their interest in literacy, the study therefore resorted to the use of mobile phone given its affordances in bridging learning in and outside of the classroom.

The study employed quasi-experimental research design. The population comprised 20 adult learners in advanced literacy class of the University of Ibadan model literacy center. The research instrument used were a Mobile platform, Social Studies content, Observation and Questionnaire developed to investigate to what extent mobile technology had affected instruction and literacy skills.

The data collected were analysed using simple percentage, inferential statistics (t.test) and analysis of Covariance (ANCOVA) to determine the main and interaction effects with pre-test and post-test scores as covariates. The experimental group, that participant exposed to mobile technology had higher achievement mean score ($\bar{x}=41.18$) than those in the conventional classroom ($\bar{x}=33.62$). From the study, it was observed that mobile phones had a positive impact on adult learners' achievement in literacy programme.

This study recommended the use of mobile technology among adult learners as it motivates and increases their interest in learning.

Keywords: Mobile technology, Literacy, Adult learners, Literacy programme, Achievement.

Introduction

Literacy of any citizen is one of the concerns of many countries and the world at large. The literacy level of any country is one of the indices of its national development. According to UNESCO (2008), literacy is an essential component of all aspects of learning programmes but must now move beyond the acquisition of basic literacy skills to become a means for engaging with diverse forms of knowledge, understanding and communication. Literacy is fundamental to information dissemination, socio-economic development and poverty alleviation among other things (National Bureau of Statistics (NBS), 2011). Literacy is the ability to read and write at a specific age. Adult literacy rate is the percentage of people aged 15 years and above who can with understanding read and write a short simple statement on their everyday life (Indexmundi, 2012). Literacy is taken for granted by the literate but remains a seemingly unattainable goal for many. UNESCO, in its Global Literacy Challenge also reported that about one in five from this age bracket in today's world – 774 million men and women – has no access to written communication through literacy, 75 million children remain out of school and millions more young people leave school without a level of literacy adequate for productive participation in their societies. However, these 774 million are believed to be an underestimation as there exist many more adults in so-called 'developed' and 'developing countries' who do not have an adequate level of literacy to meet the demands of their work and social networks.

There are over 35 million adult illiterates in Nigeria, (UNESCO, 2013). According to the Central Intelligence Agency, World Fact Book and corroborated by UNESCO Institute of Statistics (2012), extremely low literacy rates are focused in three regions: South Asia, West Asia and Sub-Saharan Africa with countries like Pakistan, India, Bangladesh, Egypt, Brazil, Ethiopia, Mali, Haiti, Guinea, Niger, Chad, Burkina Faso, with very low rates of literacy. The reasons for the prevailing situation in Nigeria are complex. Main reasons are the difficulty of retaining literacy skills of the new literates, cultural and belief of individuals in some parts of the country among others. Graduating the basic literacy courses, new literates easily slip into a non-literate environment and it is extremely difficult to keep them motivated to make a conscious effort by themselves to keep up with their newly acquired literacy skills.

In the absence of a strong political commitment to literacy and given the lack of organizational structure and budget allocation, Nigeria is one of the least literate countries in Sub Sahara Africa. Its adult literacy rate is 71.6 %. Non-literate population of adults constitutes 7 % of that of the world. It was estimated that by 2015 the country's non-literate adult population will have become more than 36 million. (National Bureau of Statistics, 2011)

Promoting literacy in Nigeria faces a number of challenges. One of the main reasons for low literacy is that many new literates relapse into illiteracy several months after the basic literacy course. This is because of the difficulty to retain their interest in reading. In general, available reading materials are not well adapted to their daily lives in terms of content and interest. Even when they are available and adapted, they are too difficult and not interesting for them to enjoy reading. Reading is simply the only way to retain acquired literacy skills. As a strategy to sustain their interest in literacy, this study resorted to the idea that mobile phones are becoming an indispensable means of communication among adult everywhere in the world including Nigeria. Wagner, Castillo, Murphy, Crofton and Zahra (2014) observed that the new technologies are of growing importance around the world, and in many facets of everyday lives and livelihoods. These information and communications technologies (ICTs), especially mobile devices, may have special benefits for learning, both in and out of schools. On this premise the study aims at finding the effects of mobile devices on adult learners' achievement in Ibadan.

The use of mobile technology to facilitate adult literacy programme is also based on the fact that adult learners require flexibility and autonomy. Lieb (1991) suggests that adult learners have barrier against participating in learning. Adult learners can conveniently carry their mobile device with them, meaning that they can learn wherever they are. Moreso, mobile phone penetration in Africa is high, and mobile devices such as phones and PDAs (personal digital assistants, that is palmtop computers) are available at much lower prices than desktop computers and therefore offer a less expensive means of communication.

As an emerging paradigm in a long tradition of technology-mediated learning, mobile learning is seen as the acquisition of any knowledge and skill through the use of mobile technology, anywhere, anytime that results in an alteration in behaviour (Geddes 2004). Indeed the concept has been legitimatized by the educational sector and is colloquially referred to as mlearning. MLearning is defined as any educational service that supplies a learner with general electronic information and educational content that aids their acquisition of knowledge, regardless of location or time (Aderinoye, Ojokheta & Olojede, 2007). This represents a true shift in instructional style, as mobile education is highly individualized and student-centered. It makes education a process of construction rather than instruction, and removes both the time and space constraints associated with customary classroom-based education. Currently, mobile learning has emerged as a promising market for education industry. On one hand, from a technology perspective the tipping point for mobile learning is coming closer as technology improves and standards emerge (Quinn 2008). On the other hand, the number of potential users of mobile learning keeps increasing, as a wide-scale proliferation of mobile devices in fact extends the reach of education industry to all social-economic levels covering all age groups from toddlers to seniors.

With the effective use of mobile phone adult learner would ensure that course contents are thoroughly read and practised whereby bridging learning in and outside the classroom through mobile technology. Currently, mobile phones are highly used not only as a means of accessing communication services but also as a reliable source of knowledge through its ability to access internet. Mobile phone is one of the Information and Communication Technology (ICT) tools which improve access to information for learning and teaching (Aguero, 2009). In Peru, efforts have been made to enhance the use of mobile phones in formal education because they have proved to be a reliable way of accessing information as they have helped to improve other sectors such as agriculture and marketing business (Aguero, 2009). The usage of mobile phones in India has improved fishing business and wholesale merchants as a result of low cost of using mobile phones (Jensen, 2007). With the use of mobile phones, consumers and traders welfare have improved due to reduced cost of using mobile phone across the market (Aker, 2008). Successful use of mobile phones in agriculture, trade, fishery and consumer sectors, have forced research to be done to integrate and extend its use to formal education sector. Most successful pre-service teachers use mobile phones as video recording devices or as digital camera capturing episodes of their lessons that illustrate the impact of their teaching on students' learning (Ferry, 2008). This helps teachers to reflect on and improve their teaching sessions by learning from their own recorded lessons.

In some markets, mobile learning has already experienced a rapid development. In United Kingdom, Cambridge Training and Development Ltd (CTAD) has already developed a series of learning materials and software, such as driving theory test practices questions, to be commercially available products accessible via mobile phone (Stead 2005). In China, millions of educational electronic handheld devices exclusively designed for mobile learning have already been sold and used by students since 2006 (SINO 2006). On the other hand, mobile learning posits unprecedented opportunities for both education institutions and governments as well. In the context of education institutions, many higher education managers have seen mobile learning as a way of extending the reach and hence increasing revenues (Murphy 2006).

As for government, mobile learning has been projected to extend learning opportunities to mass learners, in particular to those previously hard-to-reach via traditional education approaches. In light of the fact that many learners might never be able to afford a personal computer or enroll into formal education again, the application of mobile learning appears to be especially important. With regard to learners, mobile learning has already proved its capability to help improve literacy and numeracy skills; encourage independent and collaborative learning experiences; identify areas where learners need assistance and support; mitigate resistance using ICTs; engage reluctant learners; enable learners to remain more focused for longer periods and promote self-esteem and self-confidence (Attewell, 2005).

Whilst there is a growing interest from both academic and business communities, the issues regarding how to promote the usage and integration of mobile technology in adult literacy programme in Nigeria is becoming more interesting. For instance, according to Corbeil and Valdes-Corbeil (2007), the availability of various mobile devices for students does not guarantee their use for educational purpose. Arrigo and Cipri (2010), opined that mobile phones add new educational opportunities because they are personal, portable and permit new forms of interactions among all that is involved in the learning process and their perspective surrounding environment. Also, present day mobile phones are complete multimedia centers that combine the capabilities of a still camera, a video camera, a personal organizer and a web browser in one device (Marriott, 2005).

Csete, Wong and Vugel (2004), emphasized the possibilities of introducing mobile phone as a learning tool. They stated that the learning curve of the mobile phone is very short and therefore it is easier to begin to use mobile phones and Personal Digital Assistant (PDAs) rather than laptop computers. They equally pointed out that the mobile phones menus are designed with icons and text descriptions that help anyone to identify the functions easily.

Studies on the use of mobile phones for tutorial delivery in distance education, such as (Salmon, 2000; Young, 2002; Adedoja and Oyekola, 2008; and Adedoja, Omotunde and Adelore, 2010) observed that many claims have been made about the potential and benefits of mobile learning (M-learning) to make learning possible anywhere, anytime, in any way and by any means. Improving our understanding of the ways mobile phones can be used to support education is therefore crucial. A growing body of evidence (Green, 2002; Campbell, 2004 and 2006; Hooper, Fitzpatrick and Weal, 2009) demonstrates that currently available hardware such as PDAs and mobile phones can indeed help to increase communication and interaction and enhance the quality of learning, particularly in distance education. Hooper, Fitzpatrick and Weal (2009), argue that mobile technologies are increasingly being used to create innovative mobile learning experiences for learners, with a key benefit being learners' ability to collaborate through the use of the PDAs and mobile phones.

In the view of constructivists, learning is a constructive process in which the learner is building an internal illustration of knowledge, a personal interpretation of experience.It is the belief that students can guide their own learning through collaboration with others with similar ability and experiences. This directly relates to technology because learning goals can be accomplished through the technology. Technology allows for collaborations amongst a variety of people through a variety of sources, such as video conferencing, web based and mobile learning strategy. Learning is a spiral effect in which technology contributes to the mastery of concepts by overlapping and building upon the student's prior knowledge. Constructivist

learning requires students to utilize their prior knowledge and experiences to formulate new, related and or adaptive concepts in learning. Constructivist believe that one learns by problem solving and incorporating real life experiences into newly acquired knowledge. The role of teacher then becomes that of facilitator of knowledge (Northwestern Regional Educational Library, 2004).

The study also premised on the constructivist theory of learning which focuses on learners' ability to mentally construct meaning out of their autonomy and to create their own through participation. According to Kirschener (2006), constructivism is a psychological theory of knowledge which argues that humans generate knowledge and meaning from their experiences. The most compelling examples of the implementation of constructivist principles with mobile technologies come from a brand of learning experience, termed "where the learners themselves act out key parts in an immersive recreation of a dynamic systems". Brunner, a principal contributor theorized that learning was an active process in which the learners construct new ideas or concepts based on their current and past knowledge. (Brunner, 1996).

According to the constructivist, effective learning involves action and active participation of the learners. John Dewey, one of the constructivists stressed that, the learner needs to do something. Learning should not be passive acceptance of knowledge, but learning involves the learners engaging in the process (Forester and Jantzie, 2005)

Adult learners believe in autonomy and also have barriers against participation in classroom learning. It is observed that adult learners have the problem of constraints associated with formal teaching and learning situation. More so, it has been observed that adult learners find literacy centers distant from their various houses. Effort must be made to promote increased enrolment and persistence which can be made possible through the use of mobile phones.

On this background this study examines the effects of mobile learning in adult learners' literacy programmes.

The objectives of the study on the effects of mobile technology on adult learners' achievement in literacy programme in Ibadan are:

   a) To ascertain the benefits of mobile technology on academic achievement of adult learners in literacy programme.
   b) To ascertain if mobile technology can be used effectively in improving adult learners' academic achievement in literacy programmes.

Research Questions

1. What are the benefits of Mobile Technology to Adult literacy programmes?

Hypotheses

H_{01}: There is no significant difference between adult learners' achievement exposed to mobile learning (experimental group) and conventional (control group) in the benefits derived from mobile technology.

H_{02}: There is no significant main effect of treatment (mobile learning platform) on academic achievement of Adult learners in literacy programme.

Methodology

The study adopted the pretest – posttest, control group of quasi-experimental design in determining the effectiveness of mobile technology on adult learners' achievement in literacy programme in Ibadan. The population of the study comprises 150 Adult learners at the beginner, intermediate and advance in literacy center of the Extra Mural study in the University of Ibadan. The adult learners was purposefully selected for the study, with twenty (20) adult literacy learners involved in the experiment. These were all learners at the advanced literacy level. Ten adult learners (10) for control group and ten (10) adult learners for the experimental group.

The criteria for selection of respondents in the experimental group were:

i.   Those willing and ready to participate in the study without any coercion
ii. Adult learners who had internet enabled mobile phones

The research instrument used for the study were Mobile Learning Platform, Social Studies Content, Achievement Test and Self Structured Questionnaire.

Findings and Discussion

Research Question 1: What are the benefits of using Mobile Technology for Adult literacy programmes?

Table 1: Benefits of Mobile Technology to Adult learners in literacy programmes

S/N	Items	SA	A	D	SD	mean	Std Dev
1	Mobile phones allow learners to learn autonomously	10 (50.0)	8 (40.0)	1 (5.0)	1 (5.0)	3.85	1.79
2	Helps to plan my personal studies	12 (60.0)	8 (40.0)	- (0.0)	- (0.0)	3.60	.50

3	Learners get immediate feedback on their responses	13 (65.0)	5 (25.0)	2 (10.0)	- (0.0)	3.55	.69
4	Doing homework on it is easier	13 (65.0)	6 (30.0)	- (0.0)	1 (5.0)	3.50	.95
5	Skills learnt can be transferred to other people	9 (45.0)	7 (35.0)	3 (15.0)	1 (5.0)	3.00	1.30
6	Mobile devices require less technical support than computers and laptops	7 (35.0)	13 (65.0)	- (0.0)	- (0.0)	3.35	.49
7	It helps in submitting home work as and when due	7 (35.0)	9 (45.0)	4 (20.0)	- (0.0)	3.15	.75
	Weighted Average					4.00	

Table 1 shows that the respondent strongly agreed with the following: that mobile phones allow learners to learn autonomously (mean=3.85); helps them to plan their studies (mean=3.60); also learners get immediate feedback on their responses (mean=3.55) and doing homework on it is easier (mean=3.50). They also agreed with the following: that skills learnt can be transfer to other people (mean=3.00); that mobile devices require less technical support than computer and laptops (mean=3.35) and it helps in submitting home work at when due (mean=3.15).

The weighted average is (4.00) which is an indication that the participants derived so much benefits in using mobile technology for learning. Thus from the results, the participants agreed that so much benefits were derived in using mobile technology for literacy programme. This finding is in agreement with (Vavoula 2005) that mobile learning increases access for those who are mobile or cannot physically attend learning institutions – those who would not otherwise be able to follow courses in a traditional educational setting due to the constraints of work, household activities, or other competing demands on their time. Mobile Learning makes education more accessible in that it enables learners to pursue their studies according to their own schedule. The portability of mobile technology means that mobile learning is not bound by fixed class times; mobile learning enables learning at all times and in all places, during breaks, before or after shifts, at home, or on the go. Interestingly, however, while mobile learning is portable, it is not necessarily associated with physical movement. Also according to the study conducted by Vavoula, few people actually utilize the time spent in transit to learn. (Sharples, Taylor, &Vavoula, 2005).

The larger percentage of the participants agreed that skills learnt can be transferred, supporting (Motlik, 2008) Thus, mobile learning provides a potential way forward for the expansion of education programs to larger segments of the population rather than via the electronic learning model that has been adopted in

much of the developed world. Mobile Learning allows a method of educational delivery that could be more cost-effective than electronic learning methods, not to mention that the ubiquity of mobile phones means that many people are already familiar with mobile phone applications. Sharples, Taylor & Vavoula (2007), also posited that mobile learning is also beneficial in that it provide immediate feedback and thus provide continued motivation for those who are not motivated by traditional educational settings. Moreover, mobile learning presents an appeal simply because the use of mobile technology in-class and out-of-class gives a sense of novelty excitement for a great array of learners, (OVAE, 2003).

Hypotheses

H_{01}: There is no significant difference between adult learners exposed to mobile learning (experimental group) and conventional (control group) in the benefits derived from mobile technology.

Table 2 Summary of t-test Analysis showing difference between Experimental and Control groups in the benefits of Mobile Technology to Adult literacy programme?

Variable	N	mean	Std.D	t	df	Sig	Remark
Benefit of Mobile Technology Control Group	10	24.30	2.41	.316	18	.756	Not Sig
Experimental Group	10	23.70	5.50				

Table 2 reveals that there is no significant difference between participant in control and those in experimental group in the benefits of Mobile Technology to Adult literacy programme (t=.316; df=18; p>0.05). Therefore, H_{02} is not rejected.

The first hypothesis tested in this study revealed that there is no significant difference between participant in control and those in experimental group in the benefits of mobile technology to Adult literacy programme. This implies that mobile technology also has benefits that the conventional method can provide. Corroborating this finding, Brown (2003) affirmed as a facilitator of new learning that mobile learning goes beyond an emphasis on the possession of information to enabling learners to find, identify, manipulate, and evaluate existing information. Likewise Geddes (2004) asserted that mobile technology is beneficial in that it can provide immediate feedback and thus provide continued motivation for those who are not motivated by traditional educational settings. Also, Katz (2005) found out that learners with mobile phones that can access internet, use them to search definition of concept and references; also extract materials relating to their study. Similarly, Leu, O'Byrne, Zawilinski, McVerry, and Everett-Cacopardo (2009) discovered that students' continuous interaction with web-based literacy activities is having a significant impact on reading skills themselves. Moreover, mobile learning presents an appeal simply

because the use of mobile technology in and of itself presents something new and exciting for a great array of learners. Bridging learning in and outside the classroom through mobile technology was very effective and encouraging for learners, who were able to see immediate progress and feedback on their developing literacy skills.

However, there is a magnitude of difference between participants in experimental group to that of control group.

Table 3: shows magnitude of performance across the groups.

Variable	Mean	Std.Error
Intercept		
Pre score	20.60	-
Post score	37.40	.90
Treatment Group		
Control Group	33.62	1.32
Experimental Group	41.18	1.32

Participant exposed to mobile technology had a higher achievement mean score (mean=41.18) than those in the conventional method (mean=33.62).

This means that mobile technology also has an effect on adult learning. Supporting this finding, Sharples, Taylor and Vavoula (2007) found that mobile phones theoretically make learner-centered learning possible by enabling students to customize the transfer of and access to information in order to build on their skills and knowledge and to meet their own educational goals. Also, mobile learning thus exerts a democratizing effect on the learning experience as learners take a greater responsibility for the learning process instead of being passively fed information by an instructor. This corroborated the works of Paulo Freire. Similarly, Dela Pena-Bandalaria (2007) reported that in traditional models of education the goal is the transfer of knowledge from teacher to student, mobile Learning empowers students to actively participate in the learning process to make it a process of construction and not mere instruction that helps the adult learners involve actively in exhibiting their previous knowledge. Likewise, Traxler (2007) affirmed that Mobile Learning thus represents learning that is not 'just-in-case,' education for the sake of producing a bank of knowledge, but rather represents learning that is 'just-in-time,' 'just enough,' or 'just-for-me'.

H0$_2$: There is no significant main effect of treatment on academic achievement of Adult learners' in literacy programme.

Table 4: Summary of ANCOVA showing the difference between the pre test and the post test.

ANCOVA Table

Source	Type III Sum of Square	Df	Mean Square	F	Sig	Partial Eta Squared
Corrected Model	327.277[a]	2	163.639	10.097	.001	.543
Intercept	3264.162	1	3264.162	201.402	.000	.922
Prescore	7.277	1	7.277	.449	.512	.026
Treatment group	252.008	1	252.008	15.549	.001	.478
Error	275.523	17	16.207			
Total	28578.000	20				
Corrected Total	602.800	19				

a. RSquared = .543 (Adjusted R Squared = .489)

There is a significant main effect of treatment on academic achievement of adult learners ($F_{(1, 17)}$ = 15.55; $p<0.05$). Therefore, the hypothesis is rejected.

In the second hypothesis tested in this study, it was observed that mobile phones have positive impact on participants' literacy skills. The learning model was designed around the context of curriculum being offered by adult learners, linking learning to livelihood and leveraging their interest on the use of mobile devices. It was also observed that after the end of the experiment, achievement mean score were still higher in participants exposed to mobile technology (experimental group) than the participant in conventional method (control group).Success can be attributed to the effectiveness of mobile phones as a motivational and educational tool: the evaluation found that learners in experimental group used mobile phones in more active ways and showed a higher interest in study than their counterparts using conventional method. Corroborating this finding Aguero (2009) admitted that mobile phones are highly used not only as a means of accessing communication services but also as a reliable source of knowledge through its ability to access internet. He concluded that mobile phone is one of the Information and Communication Technology (ICT) tools which are potential for improving access to information for learning and teaching.

Supporting the findings of Kinshuk (2003) which suggested that mobile learning systems should be capable of delivering educational content to learners anytime and anywhere they need it. Restrictions of time, space and place have been lifted. In the same vain Sharples, Taylor and Vavoula (2007) asserted that mobile therefore, impact educational outcomes by altering the character of education and learning because the nature of mobile technology converges with and facilitates new learning. The new learning is personalized, learner-centered, situated, collaborative, ubiquitous and lifelong. He said likewise, mobile technology is

increasingly personal, user-centered, mobile, networked, ubiquitous, and durable. The study indicates that the benefits afforded by this convergence has exert a positive impact on educational outcomes.

Conclusion

From the study, it was observed that mobile phones have provided benefits and had a positive impact on adult learners' achievement. The content was designed around the context of curriculum being offered by adult learners. It was also observed that after the end of the experiment, achievement mean score were still higher in participant exposed to mobile technology (experimental group) than the participant in conventional method (control group).Success can be attributed to the effectiveness of mobile phones as a motivational and educational tool: the evaluation found that learners in experimental group used mobile phones in more active ways and showed a higher interest in study than their counterparts using conventional method.

Use of mobile technology among adult learners can make useful contribution in enhancing teaching and learning. Mobile technology helps to sustain their interest and learn at their own pace, giving unimpeded access to instructional content and resources without necessarily being present in the classroom.

Recommendations

Based on the findings above, it is therefore recommended that:

1. Mobile technology should be formally introduced into adult literacy programme due to the advantages it provides learners; this includes the ability to learn anywhere, anytime. Also it provides learners unlimited access to content so long as their devices are internet enabled. Adult learners need to be encourage in order to further engage themselves in this kind of research.
2. There is need to create more awareness about the advantages of the ubiquitous devices among adults in literacy programmes.
3. Government, Non-Governmental Organizations and corporate institutions must endeavour to provide grants in order to expand knowledge on technology use for adult learning. Studies in the area of literacy and technology is still at the foetal stage in Nigeria compared to their African nations who are actively using these devices to make literate environments in cheap and affordable ways.

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