

DEVELOPMENT AND EVALUATION OF MOBILE LEARNING-APP ON SELECTED BASIC TECHNOLOGY CONCEPTS IN ILORIN METROLIS

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Abstract

The Integration of mobile technologies into instruction has a great potential to stimulate learning, engage students and improve classroom and outdoor teaching. In spite of the enormous benefits of mobile devices for instruction, mobile devices have not yet been deployed for learning in Nigeria secondary school, thus the objective of this study was to develop and evaluate mobile learning-App on selected Basic Technology Concepts in Ilorin Metropolis. This study is a research design and development of the Model type. Five (5) Educational Technology experts, five (5) Basic Technology experts and three (3) computer science expert were randomly selected for the study. Basic technology Learning-App, Educational Technology expert rating guide, basic technology expert rating guide computer science expert rating guide were employed. Mean rating and standard deviation were used to answer the research questions. The results of the findings indicated that ;(i) Educational technology experts rate the developed basic technology mobile learning-App as suitable for instruction with mean value $3.42 > 2.5$ (ii) Basic technology experts rate the developed basic technology mobile learning-App suitable for instruction with mean value $3.43 > 2.5$ among others. The study concluded that the developed basic technology learning App is suitable for teaching and learning basic technology. The implication of these findings is that the learning App will create an effective teaching and learning experience of basic technology in upper basic secondary school. It was therefore recommended that; secondary school teachers should be trained on how to develop learning Apps irrespective of their area of specialization.

Key words: Mobile Technology, ICT, Gender

Introduction

The field of education has been affected by Information and Communication Technologies which have undoubtedly affected teaching, learning and research (Yusuf, 2005). Therefore, a better education system will also allow Nigerian youth to take advantage of economic opportunities and also become active players in their own economy and reduce the rate of unemployment in the country (World Bank, 2010). Learning societies constantly change, giving room for dynamics in its educational system. Having recognized the role self-employment can play in the high rate of unemployment, Nigeria is making serious efforts to establish and systematically improve the teaching of technical and vocational education and training (FRN, 2014), Basic technology as a subject is very important for the scientific and technological advancement of any nation as its usefulness cuts across all fields of human endeavor (Onasanya, Fakomogbon, Shehu & Soetan, 2010. Uwaifo (2011), asserted that the aim of the basic technology is to develop in children the aptitude for things that are technical and not necessarily making them technicians.

Instructional resources give room for acquisition of skills, knowledge and development of self- confidence and self-actualization. (Ali, Haolader & Muhammad, 2013) referred to instructional resources as objects or devices, which help the teacher to make a lesson much clearer to the learner. The integration of instructional media in education to facilitate teaching and learning is one that brings about effective impartation of knowledge on the students. Instructional resources are the different teaching resources which a classroom teacher employs to facilitate teaching for the achievement of the stated objective.

Abdul-Raheem (2016) defined instructional resources as essential and significant tools needed for teaching and learning of school subjects to promote teachers' efficiency and improve students' performance. Instructional resources are those resources and equipment that support the instructional program to allow varying achievement levels, free choice, reading interest and teaching-learning styles. They are those resources and equipment used by the teacher during teaching and to improve student's knowledge, ability and skills to monitor their assimilation of information and to contribute to their overall development and upbringing (Onasanya, 2011). The use of new technologies in the classroom is indispensable for providing opportunities for learners to learn new ideas, skills and to operate in this digital era.

Traditional educational setting seems not to be suitable for preparing learners to function well and become productive in the current working society. In this 21st century proliferation of digital technology, any organization that does not integrate new technologies in institutions cannot seriously claim to prepare students for life in the 21st century (Ali, Haolader & Muhammad, 2013). The use of as an instructional resource speed up the rate of change in this domain. ICTs by their very nature are tools that encourage and support independent learning. ICTs greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems. The use of ICT is making major differences in the learning of students and teaching approaches. ICT provides opportunities for students to communicate with one another through e-mail, mailing lists, chat rooms, and so on. It also provides quicker and easier access to more extensive and current information, and it can be used to do complex mathematical and statistical calculations.

Angel (2008), affirmed that the world is gradually being saturated with information. Information and Communication Technology as tools within the school environment include use for school administration and management, teaching and learning of ICT related skills for enhancing the presentation of classroom work, teaching/learning intellectual, thinking and problem-solving skills, stimulating creativity and imagination, for research by teachers and students and as communication tool by teachers and students (Derbyshire, 2003; cited by Abdul-Salam, 2016).

According to Kirschner and Woperies, (2003) the potentials of ICT to facilitate students' learning, improve teaching and enhance institutional administration. The knowledge of ICT has brought forward a well-structured knowledge with a pace of learning, this is not only use various teaching and learning resources in the pursuit of learning but also requires the students to construct their own knowledge, learn more independently and in that process acquired the habit of individualize learning which could upgrade the teaching and learning resources which include the use of computer, compact Disk, Digital Video Disk (DVDs), internet and other media. The use of ICT as a tool for enhancing students' learning, teacher's instruction and as a catalyst for improving access to quality education in formal and non-formal settings has become a necessity. (Yusuf, 2005) observed that the field of education has been affected by the penetrating influence of information and communication technology. The author stressed that, ICT has impacted on the quality and quantity of teaching, learning, and research in traditional and distance education institutions.

More so, mobile technology is one of the current ICTs versatile tools for teaching and learning process (Hartnell & hey, 2008). This is for the fact that teaching and learning process is shifting from traditional method to technology integrated learning. The effective integration of mobile technology into educational settings has poses a challenge to instructors and school administrators (Mcconatha, Praul, & Lynch, 2008). The innovations that mobile technology has brought into teaching and learning process have made a great change. Studies maintain that a mobile technology has the power to change the ways students learn and teachers teach and it is also suggested that mobile technology can transform the teaching-learning process (Narayanansamy & Ismail, 2011; Sarrab, Elgamel, & Aldabbas, 2012). This implies that mobile technology

is a catalyst for transforming; transforming the process of exchanging information, teaching methods, learning styles, scientific research, and in accessing information.

Mobile technology is of more relevance to education due to the advancement of technologies equipped in majority of the mobile phones which makes the devices become more capable of supporting the learning and teaching activities (Hujainah, Dahlan, & Al-hami, 2016). Mobile learning (m-learning) is a learning tool which can be run on mobile devices. It is considered to be an enhancement to the electronic learning (e-learning). M-learning overcomes several limitations of e-learning especially in terms of mobility. It provides more independent way of learning whereby learners can use the application to do learning activities at any time and place. However, as with other learning and teaching applications to be developed for mobile learning must also be developed based on certain learning theories and guidelines in order to be effective as well as usable (Khadage & Latteman, 2013). It is true that mobile phones are mainly used for completely communication purposes, but fortunately some people have begun to regard them as a core pedagogical activity in higher educational institutions, (El-Hussein & Cronje 2010)

Most students have started overcoming their difficulties regarding the place and time of lectures via the effective exploitation of their mobile phones or what has been so called "Mobile Learning". Teachers, look for possible innovative ways of providing their students with the teaching materials and activities through their mobile phones. Nowadays, Mobile Learning has been widely accepted by learners. In other words, learning via mobile devices is widely accepted by the learner community because of its application as well as its philosophy and standards, (Lan, Huang, 2012 & Little, 2012).

Khanghah and Halili, (2015) posited that mobile learning applications help students to learn by themselves without restriction of time, place and target audience age which are the students. Using mobile learning applications to learn encourages students to learn on their own and retain greater interest. Mobile learning application assists in delivering contents that attract learners' attentions and help to understand learning content. Mobile learning-app has become pervasive, as many higher institutions of learning have initiated a number of mobile learning initiatives to support their conventional method of learning (Shiyadeh, Rad, & Jooybari, 2013). This infers that mobile learning-app have been developed and adopted globally due to its effectiveness in teaching and learning process.

Mobile learning is emerging as one of the solutions to the challenges faced by education. With a variety of tools and resources always available, mobile learning provide increased options for the personalization of learning-mobile learning in classrooms often has students working interdependently, in groups, or individually to solve problems, to work on projects, to meet individual needs, and to allow students learn at convenient place and times (Ally, 2009).

Statement of the Problem

The integration of instructional media such as mobile application into teaching and learning has improved both the students and teachers in the educational sector. The advent of mobile technologies has created opportunities for delivery of learning via devices such as PDAs, mobile phones, laptops, and PC tablets (laptops designed with a handwriting interface). Collectively, this type of delivery is called m-learning. (Akpan, Usoro & Akpa, 2010), suggested that pupils are supposed to acquire skills in basic technology to makes them fit into the society as on completion of the learning activity students cannot carry out simple daily maintenance on technological appliances.

Students and teachers use their device for non-academic activities like financial transaction and chatting, downloading app that does not have relevance to education. Lack of educational application such as basic technology application for teaching and learning basic technology in upper basic secondary school undermines the use of mobile technology for teaching and learning. To this end, opportunities presented through mobile technology are rapidly expanding and the focus on how it can be incorporated to support learning is increasing everyday (Botha, Cronje, & Ford, 2007), this study brings about the need to develop

mobile-learning app for teaching and learning basic technology. Hence this study will develop and validate basic technology Learning-App for upper basic secondary school students in Ilorin metropolis.

Objective of Study

The study examined the processes involved in the development of basic technology learning app for teaching and learning basic technology, rated educational technology experts on the developed learning App in teaching and learning basic technology, basic technology experts on the developed learning-App in teaching and learning basic technology, and computer science experts on the developed learning-App in teaching and learning basic technology.

Research Questions

1. What are the processes involved in the development of basic technology learning app for teaching and learning basic technology?
2. What are the ratings of educational technology experts on the developed learning-App in teaching and learning basic technology?
3. What are the ratings of basic technology experts on the developed learning-App in teaching and learning basic technology?
4. What are the ratings of computer science experts on the developed learning-App in teaching and learning basic technology?

Methodology

This study is a Research design and development of Model type. The research deals with the development and validation of the existing or newly constructed development model process or techniques. The population of this study were all basic technology, educational technology and computer science experts in Ilorin metropolis. 5 (five) basic technology teachers, 5 (five) Educational Technology experts and 3 (three) computer science experts were randomly selected for the study from selected secondary school and University of Ilorin.

Basic technology Learning-App (TECH-APP), Educational Technology Expert Rating Guide, Basic Technology Expert Rating Guide and Computer Science Expert Rating Guide were the instrument used for data collection and they were validated by Educational Technology Expert, Basic Technology Expert and Computer Science Expert for scrutiny and expertise assessment in order to ensure content and construct validity. Their comments, suggestions and corrections were used to produce a final draft of the instrument. The collected data were analyzed using weighted mean, percentage and frequency descriptive and inferential statistics with the aid of statistical package for social science (SPSS) version 20.0.

Results

Research Question One: What are the processes involved in the development of basic technology learning app for teaching and learning basic technology?

The basic technology mobile learning App was design and developed based on the ADDIE model. The ADDIE Model is a fundamental and simplified instructional system design model. Most of the instructional design models are based on this generic ADDIE Model (Kruse, 2011). The model consists of five different

but interrelated phases: analysis, design, development, implementation and evaluation phase. The details of the five phases were elaborated further in the development phases below.

Analysis phase

It was decided that the instructional platform design was to be a mobile learning App on basic technology and the topics to be design are woodwork machines and metal work machines.

Design stage

The design phase involved the process of transferring the ideas and concepts into something that is tangible and visual. Thus, the basic technology learning App was developed based on the three aspects of learning App design which are interactional, informational and representation. The details of each aspect were as follows:

Interaction Design: involves the process of designing the software using MOBIRISE App inventor and using WEB TO APK BUILDER software to convert the software into an application. Also determining how the users gain control of the software.

Informational Stage: deciding on how the information is to be presented to the users.

Table 1:
Course content of Basic Technology Learning App

Week	Contents	Objectives
1	Wood work machines	(i)Define wood work (ii)Identify the various types of woodwork machines. (iii)State the uses of machines. (iv)Carry out simple operations (cutting and boring) with the machines.
2	Metal work machines	(i)Define metal works. (ii)Identify the various types of metalwork machines (iii)State the uses of the machines. (iv)Explain simple machine operations (cutting, drilling, grinding, milling etc.) (v)State basic care and maintenance techniques of metalwork machines.

Representation Design: planning the layout of the learning App with regards to three elements: color, scheme, font and graphic. At this stage, the entire framework and architecture of the basic technology learning App is constructed and designed.

Development Phase

This third phase of development of the basic technology learning App involves the actual process of writing and preparing the teaching materials for the learning App. The main includes target audience which is upper basic secondary school II and the instructional content. The instructional content includes woodwork machines as sub menu and metal work machine. Wood work has section such as instructional objectives, introduction, types and uses of woodwork machines, summary and essay questions and metal work machines also has section such as instructional objectives, introduction, types and uses of metal work machines, summary and essay questions.

Implementation Phase

Implementation phase involves the process of making the basic technology learning App available to experts for validation. The basic technology learning App was validated by different types of experts which includes computer science experts, basic technology experts and educational technology experts.

Evaluation Phase

To determine the validity of the instructional learning App, responses were obtained via questionnaire conducted on the various experts. For the basic technology learning App the validation was done by three different types of experts which includes three computer science experts, five basic technology experts and five educational technology experts. The questionnaire was specifically designed to obtain feedback on the various experts in the various field.

Research Questions 2: What are the ratings of educational technology experts on the developed learning-App in teaching and learning basic technology?

Table 2:

Educational technology experts rating of the developed basic technology mobile learning-App for upper basic secondary school.

Items	Mean
1. The use of text follows the principles readability	3.40
2. The numbers of color in each screen is not more than six	3.80
3. The design uses proper fonts in terms of style and size	3.60
4. The TECH APP is structured in a clear and understandable manner.	3.20
5. The presentation of information can captivate learner's attention	3.00
6. A high contrast between graphics and background is retained.	3.00
7. The presentation of information can stimulate recall	3.40
8. The package allows learner to work on their own pace	4.00
9. The introduction of TECH APP facilitates learning by doing	3.60
10. The TECH APP is structured to allow learner to move around freely in different units	3.20
Grand Mean	3.42

From the data gather from table 2, a grand mean of 3.42 is obtained. Since the grand mean was greater than the bench mark which is 2.5, this shows that basic technology learning App is suitable for instruction.

Research Questions 3: What are the ratings of basic technology experts on the developed learning-App in teaching and learning basic technology?

Table 3:

Basic technology experts rating of the developed basic technology mobile learning-App for upper basic secondary school.

Items	Mean
1. The content TECH APP is sufficient to achieve the stated objectives for the selected topics in basic technology.	3.20
2. The content in TECH APP is in line with the basic technology curriculum.	3.80
3. The sub-topics have been sequentially and coherently arranged.	3.40
4. The language used in the TECH-APP is simple and easy for both teachers and students.	4.00
5. The diagrams in TECH APP are clear enough.	4.00
6. The TECH APP help make learning effective and efficient.	4.00
7. The content in TECH APP can facilitate easy achievement of expected behavioral outcome.	3.60
8. The evaluation questions for each lesson are relevant for the attainment of the lesson objectives.	3.60
9. The content of TECH APP is in line with the target audience.	3.40
10. The assignments are relevant to the topics treated.	3.80
Grand Mean	3.43

From the data gather from table 3, a grand mean of 3.43 was obtained. Since the grand mean was greater than the bench mark 2.5, this shows that basic technology learning App is suitable for instruction.

Research Questions 4: What are the ratings of computer science experts on the developed learning-App in teaching and learning basic technology?

Table 4:

Computer science experts rating of the developed basic technology mobile learning-App for upper basic secondary school.

Items	Mean
The structure of the package permits learner to advance, review, see examples, repeat units, or escape to explore another unit	3.00
The TECH APP has ease of navigation	3.20
FAVICON for returning to the main menu	3.00
Key for access previous unit	3.20
The presentation of information can stimulate recall	3.40
The TECH APP screen is designed in a clear and understandable manner.	3.00
The quality of the text, images, and graphics is good	3.40
The content can be update and/ or modified with new knowledge that will appear soon after the development of package	3.40
The package can be used in different platform	3.00
The package provides opportunity for interaction at least over three or four screen frames	3.60
Grand Mean	3.22

From the data gather from table 4, a grand mean of 3.22 was obtained. Since the grand mean is greater than the bench mark 2.5, the basic technology mobile learning App was suitable for instruction.

Discussion

This study developed and validated basic technology learning App for upper basic secondary school students in Ilorin metropolis. Result of the findings from this study based the processes involved in the development of basic technology learning app for teaching and learning basic technology. This involves

the use mobile App developing software known as mobirise to create the basic technology learning App for upper basic secondary school in Ilorin metropolis. ADDIE model was used to design and develop the learning App. This study agrees with Reiser and Dempsey (2007), which states that ADDIE model is the most basic and applicable, generic and systematic instructional systems design mode for development of instructional material.

It was revealed in the study that educational technology experts rated the basic technology learning App as suitable for the purpose it is intended for. The grand mean obtained revealed that the basic technology learning App have been developed to be in line with educational technology principle of design and can be utilized for teaching and learning, if integrated appropriately as Naimie, Siraj, Ahmed, Abuzaid, and Shagholi, (2010) asserted that the integration of technology into instruction creates new opportunities for learning activities which increases students' engagement of different learning styles.

The grand mean obtained revealed that the basic technology learning App content is suitable for the target audience and can achieve the objective of basic technology in Nigerian curriculum as stated by (Fakomogbon et al., 2012), that the objectives of teaching Basic Technology subject in Nigerian junior secondary school schools are to, provide pre-vocational orientation for further training in technology, providing basic technology literacy for everyday living which is the second objective and lastly to stimulate creativity.

Research Question three sought to know the ratings of computer science experts on the developed Learning-App in teaching and learning basic technology. The grand mean obtained revealed that the basic technology learning App have been well structured and suitable for the purpose it is intended for as Khanghah & Halili (2015) posited that mobile learning applications encourage individualistic learning without restriction of time, place and the age of the target audience. Using mobile learning applications to learn encourages students to learn on their own and retain greater interest. In addition, learners' performance will be enhanced as long as there is some interaction between learners and the mobile applications (Hamdan & Ben, 2012).

Conclusion

The result obtained from data gathered and analyzed in this study indicated that the developed basic technology learning App for upper basic secondary school in Ilorin metropolis is suitable for teaching and learning basic technology in upper basic secondary school if well deployed into instructional process.

Recommendations

The study recommended that secondary school teachers should be trained on how to develop learning Apps irrespective of their area of specialization and developers should develop educational apps to ease instructional delivery.

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