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EFFECT OF FLIPPED CLASSROOM PACKAGE ON STUDENTS' ACADEMIC PERFORMANCE IN GEOGRAPHY IN OGBOMOSO NORTH, OYO STATE

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Abstract

The study examined the effect of flipped class room instructional package on Secondary school students' academic performance in Geography in Ogbomoso north local government area of Oyo State. The study adopted pretest-posttest control group quasi experimental research design.The sample population consisted of 120 participants randomly selected from six secondary schools in the local government area. Intact classes were used in all the selected schools. The participants were divided into two groups (experimental and control). The experimental groups were taught with Flipped Class Room Instructional Package (FCIP). While the control groups were taught with Conventional Teaching Method (CTM).Two instruments were used in the study, they are; Geography Students' Performance Test (GSPT) and Flipped Class Room Instructional Package (FCIP). Three research hypotheses were formulated and tested in the study.The results revealed that students taught with FCIP performed significantly better than their counterparts taught with the conventional teaching method. The study also shows that there was no significant difference between the academic performance of male and female students taught with FCIP. The findings further revealed that there was significant difference between urban and rural Geography students' academic performance taught with FCIP. The study recommends that the use of FCIP should be encouraged in secondary schools, both male and female teachers should be motivated further to use FCIP in secondary schools and all facilities that can facilitate the use of FCIP in rural secondary schools should be provided by the government.

Keywords: Flipped classroom instructional package, conventional teaching method, secondary school, Geography

Introduction

Geography as a school subject is a discipline that seeks to understand the world in its physical andhuman features through an understanding of place and location. Geography combines both physical and human geography and looks at the interactions between the human and environment. According to Adhikari (2003) geography bridges the widening gap between the changing physical and biological phenomena on one hand, and the changing human phenomena on the other. Geography should be understood as a science that enquiries how this knowledge can be more useful for people by making it not just entails mere

memorization ofknowledge of the names and sizes of the mountain, river and lake. At present, geography is commonly referred to as the study of the environment and human's changing relationship. Subedi and Joshi (1997) stated that like most other socialscience disciplines, it is dynamic and over the last few decades changes have takenplace in both the nature and scope of the discipline.Geographical knowledge is very important for teachers, educationists, planners andpolicy makers of the country owing to geographical diversity of the country. In suchcontext, effective geography teaching and learning is necessary in our society.

However, despite the importance and relevance of geography in the school curriculum, it has been observed that the teaching of the subject has been characterized with the use of conventional teaching method where the teacher alone does the talking while the learners remain passive. This has failed to deal effectively with the problem of individual differences and also lead to poor attitude and academicachievement of learners in the subject. There is therefore, the need to search for more innovative and computer basedinstructional strategies that are likely to improve learning outcomes of students in secondary schools.One of such innovative strategies that can enhance effective teaching and learning of the subject and also improve academic achievement of learners in the subject is flipped class room.

Flipped classroom is a pedagogical strategy of teaching where home works are done at school and school works done at home (Charles-Ogan & Willaims 2015).Similarly, Alvarez (2012) further described flipped classroom as a method in which students assess instructional video prepared by the instructor prior to the classroom sessions and use class time to participate in meaningful learning activities, instructor guided problem solving and discussions (Bergmann, Overmyer, & Wilie 2013). Flipped classroom is an educational approach in which learners view pre-recorded lectures using technological devices at home, library environment or any place where the materials for instruction are made accessible (Alvarez, 2012). The students are expected to come to the following class after they have viewed the prepared instructional materials to have an interactive class discussion with their peers and teacher based on the viewed lecture/material. At this juncture, they must have worked on all the difficult concepts with regards to the content already viewed. The teacher would require the students to have completed the assigned works, prepare for discussions and explanations of the concepts they have studied in preparation for the next lesson. In effect, what the students have normally done at home is now becoming what they do in class. The conventional class works and assigned works at home are flipped. The above definitions indicate the fact that flipped classroom is a novel teaching strategy in Nigerian educational system which emphasizes student- centeredness as against teacher-centered approach to teaching and learning.

Experts such as Charles-Ogan & Willaims (2015) identified the relevance of flipped class room as one of the innovative methods of instruction that increases students' engagement in class activities. Alvarez, (2012), also claims that flipped class room allows personal guidance of the students and makes the

environment for learning to be very flexible so that students can meet their academic needs. Sedig (2008), wasof the opinion that flipped classroom has the potential to arouse students' interest in learning.

One of the learning characteristics that can influence students' learning outcome in Geography is school location. In related studies, Aderele and Abidoye (2022), contend that urban students had better performances than their rural counterparts in concepts attainment in Geography. The availability of learning facilities and the relatively better school buildings in the urban centres, perhaps contributes experience complex socio-economic interaction. This seems to assist them to have more concept attainment of Geography concepts. This limits their participation in Geography classes and it has negative effect on their attitude towards the subject. Owoeye & Yara (2011) also report that school location in favour of urban centres has significant effect on students' attitude to Mathematics and Chemistry and any other school subject. They further added that urban students' positive attitude towards science and any other school subject may be due to the fact that more opportunities are given to them in life, compared to students in rural schools

Gender is another factor that affects the use of technology in teaching and learning process. Aderele & Abidoye (2022), described gender as the socially constructed characteristics of women and men – such as norms, roles and relationships of and between groups of men (male) and women (female). Okeke (2008),also refers to gender as the socially and culturally constructed characteristics and roles which are ascribed to males and females in any society. Hefurther explained that the male attributes as bold, aggressive, tactful, and efficient in the use of words while the females are fearful, shy, gentle, dull, submissive and effusive. In the same vein, Umoh (2003) stated that more complex works are usually set aside for male, while the females are considered womanly in a natural setting. Kurt (2017) concludedthat there was a significant effect of gender on students' academics self-concept in favour of the female students than their male counterparts. Therefore, gender neutrality,friendliness or otherwise of the school subject such as Geography is worth investigating especially at the secondary school level.

Statement of Problem

Literatures had revealed that teacher centered approach has dominated the teaching of Geography particularly secondary schools in Nigeria. This method according to Aderele & Abidoye (2022) is one of the major factors impeding the teaching of Geography because it does not give room for active participation of the learners in the teaching and learning process. The method is more of teachers centered in nature. Therefore, there is need to employ an innovative teaching approach which may have the capability of spurring the interest of students and enhance the academicachievement ofstudents in geography. This study therefore, examines the effect offlipped classroom strategy on students' academic achievement in geography in Ogbomoso north local government area of Oyo State.

Research Hypotheses

Three research hypotheses were formulated and tested in these study;

Ho_1: There is no significant difference between the academic achievement of Geography student taught with flipped classroom and their counterparts taught with conventional method of teaching.

Ho_2: These is no significant difference between the academic achievements of male and female Geography students taught with flipped classroom.

Ho_3: There is no significant difference between rural and urban Geography students' academic achievement taught with Flipped Classroom.

Methodology

The study adopted pre-test post-test control group quasi experimental research design.The population of the study consisted of all Geography students in secondary schools in Ogbomoso south Local Government Area of Oyo State. While the sample population consisted of one hundred and twenty SS 2 Geographystudents randomly selected from six secondary schools (three schools each from both rural and urban locations) in the Local Government. Intact classes were used in all the selected schools for the study. The total of 120 participants were sampled for the study. The sampled students were further stratified along two groups (experimental and control groups). The experimental group comprised of 60 students (taught with Flipped class room instructional package) while the control group consisted of 60 students (taught with conventional teaching method).Two instruments were used in the study, they are; (i) Geography Students' Performance Test (GSPT) and (ii) Flipped Class room Instructional Package (FCIP).Geography Students' Performance Test (GSPT); This is a response instrument developed by the researcher. It consists of 20 test items. The instrument was developed based on SS II Geography curriculum. It has option of A-D.

The instrument was validated by two test experts in the department of Educational foundation and counselling, Adeyemi Federal University of Education Ondo. One seasoned and experienced secondary teachers also went through the instruments. Based on their comment and observations, some question items were modified while some were completely eliminated. The instrument was later administered on 20 SSII Geography students from another secondary school which was not part of the study. The reliability coefficient of 0.84 was obtained using cronbach alpha. This was considered to be relatively high enough for the instrument to be used for the study. Flipped Class room Instructional Package (FCIP); this is a stimulus instrument developed by the researcher. It contains the video clips of geography contents in SSII. The instrument was validated by two ICT experts and a lecturer in Educational Technology. The comments of experts were used to improve on the instrument.

Results

Hypothesis 1: There is no significant difference between the academic achievement of Geography students taught with flipped classroom and their counterparts taught with conventional teaching method.

Table 1: Summary of T-test showing Difference in Academic Achievement of Geography students

Grouping Variable (Treatment)	N	Mean	Std. D	Df	T	Sig.	Remark
Flipped Classroom	50	30.94	5.55	118	7.844	.000	Significant
Conventional Method	70	23.22	4.97				

Table 1, shows the difference in the academic achievement of Geography students taught with Flipped Classroom and their counterpart taught with convention teaching method. The table shows that the mean score for students in Flipped Classroom is 30.94 while that of students in conventional teaching method is 23.22. The values of the mean scores revealed an appreciable difference. Therefore, there is significant difference between the academic achievement of Geography students taught with flipped class roominstructional package and their counterparts taught with conventional teaching method ($df = 118$; $t = 7.844$; $p < 0.05$). Hence, hypothesis 1 is not accepted.

Hypothesis 2: There is no significant difference between the academic achievements of male and Geography students taught with flipped classroom.

Table 2: Summary of T-test showing Difference in the Academic Achievement of Geography Students Taught with Flipped Classroom Based on Gender

Grouping Variable (Gender)	N	Mean	Std. D	Df	T	Sig.	Remark
Male	51	27.14	6.65	118	-.847	.399	Not Significant
Female	69	28.15	6.45				

Table 2: shows the difference between male and female Geography students' academic achievement exposed to Flipped Classroom. The table shows that the mean score for male students is 27.14 while that of female students is 28.15. The values of the mean scores do not reveal an appreciable difference. Therefore, there is no significant difference between the academic achievements of male and female Business Studies students taught with flipped classroom ($df = 118$; $t = -.847$; $p > 0.05$). Hence, hypothesis 2 is not rejected.

Hypothesis 3: There is no significant difference between rural and urban Geography students' academic achievement taught with Flipped Classroom.

Table 3: Summary of T-test showing Difference in the Academic Achievement of Geography Students Taught with Flipped Classroom Based on School Location

Grouping Variable (School Location)	N	Mean	Std. D	Df	T	Sig.	Remark
Urban	60	30.03	6.09				
				118	4.124	.000	Significant
Rural	60	25.41	6.17				

Table 3, shows the difference between urban and rural students' academic achievement exposed to Flipped Classroom. The table reveals that the mean score for students in urban location is 30.03 while that of students in rural location is 25.41. The values of the mean scores revealed an appreciable difference. Therefore, there is significant difference between urban and rural Geography students' academic achievement taught with Flipped Classroom ($df = 118$; $t = 4.124$; $p < 0.05$). Hence, hypothesis 3 is not accepted.

Discussion of Findings

The finding of this study revealed that there is significant difference between the academic performance of Geography students taught with flipped classroom and their counterparts taught with conventional method of teaching. This could be because students get the most out of class time by spending it on practical application, not on inactive lecture. Also, that in flipped learning, students have a more active role and ultimate responsibility for their learning, such an environment causes an increase in students' awareness of metacognition and their conceptual understanding. This finding is consistent with several studies, for example, it is reported that, in a flipped learning environment, students take more responsibility (Kurt, 2017), learn at their own pace and style (Fulton, 2012), participate in interactive and problem-solving activities as active learners (Strayer, 2007 2015), and show higher level of motivation and performance score when exposed evaluation (Almuaither and Alqahtani, 2014).

It was also revealed from this study that there was no significant difference between male and female students' academic performance taught with flipped classroom. This implies that students whether males or females are similar in using modern technological methods because of the availability of modern technological devices as a result of the huge scientific and technological development and the easiness to access such modern technologies. This is in line with the finding of Elian and Hamaidi (2018) who revealed

that there are no differences in male and female academic performance when taught with mobile phone instructional package.

Findings on the effect of school location on the academic performance of students taught with flipped class room revealed that students from urban schools had better and higher scores than their counterparts in rural schools. This could be as a result of exposure of students and provision of adequate ICT resources and facilities for smooth and uninterrupted application of flipped classroom instructional package which was not adequately provided in the rural schools. This is in line with the findings of Mouza (2008) that schools from civilised and urban environment performed consistently higher than the students in the rural schools.

Conclusion

The study focused on the need to improve the teaching and learning of Geography in secondary schools through the use of flipped class room instructional package. The findings of the study revealed the superiority of flipped class room instructional package to conventional teaching method of teaching Geography in the sense that it has led to significant difference in the students' academic achievement in Geography even though it did not lead to a major change in attitude of the learners.

Recommendation

Based on the findings of this study, the following recommendations were made;

i. Secondary school teachers especially geography teachers should be educated through seminars, workshops, and training on the instructional benefits of flipped class room instructional package and been courage to optimized these benefits for total instructional delivery.
ii. Government is advised to supply adequate technological facilities that will sustain flipped classroom integration strategy in all secondary schools in Nigeria.

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DEVELOPMENT AND EVALUATION OF DIGITAL SUBJECT MATERIAL FOR TEACHING COMPUTER STUDIES IN NIGERIA

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Abstract

Digital Subject Materials (DSM) are electronic files that can be viewed on a laptop or mobile devices either online or offline. The ultimate reason for developing a Digital Subject Material is because teaching with a whiteboard, chalk and markers are now a thing of the past. Therefore, if DSM is adequately deployed into teaching and learning, it can enhance learning ability including student's performance and encourages them to learn on their own. The objectives of the study were to: (i) develop DSM for teaching computer studies in Ilorin; (ii) determine educational technology expert rating of the developed DSM on computer studies in Ilorin; (iii) determine computer science expert rating of the developed DSM on computer studies in Ilorin; and (iv)determine the cost of developing DSM. This study utilizes a design and development research of model type. The population for the study consists of all Educational Technology experts and Computer Science experts in Ilorin.The target population comprised of all Educational Technology experts from Educational Technology Department in Faculty of Education, University of Ilorin and all Computer Science experts in University of Ilorin. Specifically, five Educational Technology experts and five Computer Science experts was used for the study. The research instrument used for the study are; DSM for teaching Computer studies, Educational Technology experts rating guide and Computer science experts rating guide. The findings of the study were that: i. ADDIE Model was used for the development of DSM;ii. the grand mean from the rating of educational technology experts on the developed DSM based on the structure, screen design and evaluation were greater than 3.0; iii.he grand mean from the rating of computer science experts on the developed DSM based on the structure, screen designwere greater than 3.0 while the grand mean for evaluation was 2.58; and iv. the estimate for the developed DSM was for thousand, four hundred and fifty naira (N4,45). The study concluded that DSM brings about effective management, teaching and learning. Based on the findings, the study recommended that students should help themselves by making use of information on the internet for learning and shifting their focus from using it for fun and entertainment only.

Keywords: Development, Digital Subject Material, Evaluation

Introduction

The use of technology in everyday lives is becoming increasingly obvious in different settings and affecting many aspects of our social and economic lives. Information and Communication Technology (ICT) has transformed people's daily activities (Kean, Kean &Blicblau, 2016). Technologies are a driving force behind much of the development and innovation in both developed and developing countries as the current knowledge economy and its function depend heavily on ICT use (Deng & Tavares, 2015; Russel, Malfroy, Gosper, & McKenzie, 2014).Higher education (HE) institutions have adopted ICT as a means of enabling students to access the knowledge and skills required to meet the demands of the ever-changing global environment (Altbach, Reisberg, &Rumbley, 2009). It also adds value to the processes of learning and to the organization and management of learning institutions (OECD, 2012) and its use in instruction is essential to the growth and development of teachers and students (Khan, Butt, & Baba, 2013).

Over the years, several efforts have been underway to develop methodologies to measure the educational uses of ICT, surpassing the narrower definition, that is, restricted to the utilization of hardware and software. Although the conceptual understanding of a broader meaning of ICT extends to embody other components (Keane et al., 2016), less is known about how to assess the dimensionality of integrated ICT literacy and measure and its resultant effects using a structural equation modelling (SEM) approach (Lau & Yuen, 2014). The use of ICT has become a major use in many countries, the understanding and mastering of the basic skills in ICT is now been regarded as a cone of educational programs along with reading, writing and numerically (Mayer, 2015).

The adoption and use of various E-learning systems such as Moodle, Sakai and Blackboard to enhance teaching and learning are gaining popularity in Higher Education. In recent years, reference to "digital technology in the classroom" (DTC) can be taken to mean digital processing systems that encourage active learning, knowledge construction, inquiry and exploration on the part of the learners, and which allow for remote communication as well as data sharing to take place between teachers and or learners in different physical classroom locations (CAIE, 2017).

Digital Subject Materials are electronic files that can be viewed on a laptop or mobile device either online or offline. Our current digital materials include pdfs, word documents and excel files. The file format is determined by its content and intended use. The term "digital learning resources" is used here to refer to materials included in the context of a subject that is support the learner's achievement of the described

learning goals. These materials consist of a wide variety of digitally formatted resources including graphics, images or photos, audio and video, simulations, animations, prepared or programmed learning modules (CAIE, 2017).

Statement of the Problem

Population explosion and increasing admission request into schools in every region of the world brought greater constraints on the resources of several schools. For instance, there is problem of inadequate number of human and material resources to cater for the education of the large population. The population of school age citizen in most places has grown tremendously to the extent that only a small percentage can be offered admission. A new learning environment needs to be created which will provide autonomy and flexibility, establish contacts and easy communication between centres of culture and knowledge, and facilitate easy access for all citizens of a knowledge-based society (Charles and Babatunde, 2016).

Therefore, if digital subject materials are adequately deployed into teaching and learning, it can enhance learning ability including student's performance and encourages them to learn on their own. Hence, this study developed and evaluates digital subject materials for teaching computer studies in Ilorin metropolis.

Research Questions

The following research questions were raised and answered in this study

1. What is the process involved in the development of digital subject materialfor teaching computer studies in Ilorin?
2. What is the educational technology expert rating the developed digital subject materials on computer studies in Ilorin?
3. What is the computer science expert rating of the developed digital subject materials on computer studies in Ilorin?
4. What is the cost of developing digital subject materials?

Methodology

This chapter presents the methodology adopted in the study. They include: research design, population, sampling and sampling techniques, instrumentation, procedure for data collection, data analysis techniques.

Population, Sample and Sampling Techniques

The population for this study comprises of all Educational Technology experts and Computer Science experts in Ilorin. The target population comprises of all Educational Technology experts from Educational Technology Department in Faculty of Education, University of Ilorin and all Computer Science experts in

University of Ilorin.Specifically, five Educational Technology experts and five Computer Science experts were used for the study.

Research Instrument

Three research instruments were adopted for this study, they are

1- Digital Subject Materials for Teaching Computer Studies
2- Educational Technology Experts Rating Guide
3- Computer Science Experts Rating Guide

Digital Subject Materials for Teaching Computer Studies

The Digital Subject material was designed to teach a concept in computer studies. The digital material was divided into five chapters; introduction to Operating System, types of operating system, deadlock, introduction to computer software and introduction to programming language.

Educational Technology Experts Rating Guide

The education technology experts rating guide was divided into two sections. Section A elicited information on the respondents such as respondent's highest qualification: Section B contains the various criteria for rating the developed Digital Subject Materials using response mode of Strongly Agree (4), Agree (3), Disagree (2), Strongly Disagree (1).

Computer Science Experts Rating Guide

Computer science experts rating guide was divided into two sections. Section A elicits information on the respondents such as respondent's highest qualification: Section B contains the various criteria for rating the developed Digital Subject Materials using response mode of Strongly Agree (4), Agree (3) Disagree (2), Strongly Disagree (1).

Data Analysis Techniques

Data collected were analyzed using descriptive statistics. Mean and standard deviation were used to answer the research question with the aid of Statistical Package for the Social Sciences (SPSS).

Data Analysis and Results

Research Question One: What is the process involved in the development of digital subject material for teaching computer studies in Ilorin

The design of the instructional content for the development of digital subject material for teaching computer studies in Ilorin was based on the processes of ADDIE model. ADDIE is an acronym for analysis, design, development, implementation and evaluation. The stage in ADDIE instructional design model is adopted in this study. The activities carried out under ADDIE model is outlined as follows:

Analysis: This is the stage where needs assessment, audience assessment, content/objectives specification, selection of authoring/delivery systems and planning of evaluation strategies were determined by the researcher. The need assessment was based on the fact that teaching is enhanced with the use of technology, hence it was concluded by the researcher that instructional content should be designed for usingdigital subject material for teaching computer studies in Ilorin. The content selection is computer studies and the objective is to provide an alternative platform for instructional delivery other than the classroom medium of teaching and learning. The authoring tools for the design of the digital subject material for teaching computer studies in Ilorinare Microsoft PowerPoint (2010).

Design: This is the stage where treatment specification was created on how the instructional content was delivered to the selected samples. A digital subject material was designed to ascertain its operation on devices on an Androids phones in term of aesthetic and balancing of text and video. The script for development stage was then writing and screens were formatted based on the medium to be used.

Development: The design process above was developed through the prototype approach, so that the instructional content for the computers study instruction can be subjected to evaluation through implementation. The development of the instructional content was done by the utilization of Microsoft PowerPoint (2010), and PHP for the back end and the navigation page.

Implementation: With the completion of the design and development of the instructional content for digital subject materials. At this stage, students were given a copy of the CD containing the numeracy instruction. Computer science experts and Educational Technology Experts rates the quality, technicality and suitability of the package for teaching.

Evaluation: At this stage, the effectiveness and efficiency of the digital subject materials was determined.Evaluation was carried out at each stage of the procedures.

Research Question Two: What is the educational technology expert rating of the developed digital subject materials on computer studies in Ilorin?

Table 1, a grand mean of 3.42 for structure, screen design has a grand mean of 3.49, evaluation has a mean gain of 3.34. This confirms the suitability and the quality of the developed digital subject materials for teaching computer studies in Ilorin

Table 1: Educational Technology Expert Rating the Developed Digital Subject Materials

S/N	RATING ITEMS	Mean Rating
A	STRUCTURE	
1	The content is structured in a clear and understandable manner	4.10
2	The structure allows learners to move around freely in different units	3.16
3	The structure of the package permits learners to advance, review, see examples and repeat the unit or explore another unit.	3.00
	Grand Mean	3.42
	SCREEN DESIGN	
1	Screens are designed in a clear and understandable manner	3.10
2	The presentation of information can captivate the attention of the students	4.11
3	The quality of text, images and graphics are good	3.26
	Grand Mean	3.49
	EVALUATION	
1	The package allows learners to learn at their own pace	3.43
2	The package allows learner to discover information through active exploration	3.21
3	The package content is relevant to the selected educational technology concept	3.13
4	The materials are well organized and presented	3.61
	Grand Mean	3.34

Research Question Three: What is the computer science expert rating of the developed digital subject materials on computer studies in Ilorin?

Table 2 revealed a grand mean of 3.22 for structure, screen design has a grand mean of 3.18, evaluation has a mean gain of 2.85. This confirms the suitability and the quality of the developed digital subject materials for teaching computer studies in Ilorin.

Table 2 : Computer Science Expert Rating of the Developed Digital Subject Materials on Computer Studies In Ilorin

S/N	RATING ITEMS	Mean Rating
A	STRUCTURE	
1	The content of the subject material you have been given to go through conforms to standard	3.24
2	The content is sufficient to achieve the obtained objectives for the selected topics in Computer Studies	3.54
3	The subtopics have been sequentially and coherently arranged	3.00
4	The language used is simple and easy for both teachers and learners	3.10
	Grand Mean	3.22

B	SCREEN DESIGN	
5	Screens are designed in a clear and understandable manner	3.32
6	The quality of text, images and graphics are good	3.00
7	The diagram in the package are clear and capture attention	3.23
	Grand Mean	3.18
C	EVALUATION	
	The package allows learners to learn at their own pace	2.22
	The package promotes collaboration	3.32
	The evaluation questions for all lesson are relevant for the attainment of the lesson objectives	3.00
	Grand Mean	2.85

Research Question four
What is the cost of developing digital subject materials?

Table 3 indicates that the total sum of four thousand, four hundred and fifty naira (N4,450) only was the cost estimate for the development of the digital subject materials . The benefits of the digital subject materials are unquantifiable and incomparable with the cost.

Table 3: Cost Implication of Digital Subjects Materials for teaching a selected computer studies

S/N	Activities	Rate	Amount
1.	Internet connectivity data for downloading computer studies images, materials, images from google.com	N600/ Per Gigabyte	N1000
2.	Editing of downloaded images	N20/Per Instrument	N700
3.	Uploading and Synchronizing of images to produce a digital subject materials	N20/ Per Slide	N750
4.	Miscellaneous		N2000
	Total		N4450

Discussion

The study revealed that ADDIE Model was used for the development of the digital subject material. The model was used because having stages clearly defined and facilitates implementation of effective Digital Subject Material. The content selection was computer studies and the objective was to provide an alternative platform for instructional delivery other than the classroom medium of teaching and learning.

The study also found out that the subtopics have been sequentially and coherently arranged and the language used is simple and easy for both teachers and learners with grand mean greater than 3.0. The development of the instructionalcontent was done by the utilization of Microsoft PowerPoint (2010) and PHP for the back end and the navigation page.The study showed that both the Educational Technology and Computer Science experts rated the developed Digital Subject Material based on the structure, screen design and evaluation with grand mean greater the benchmark mean of 2.5. This implies the instructional content, sustainability and quality of the Digital Subject Material was affirmed to conform to the standard.

Conclusion

The results obtained from the data gathered and analyzed in the study indicated that the developed Digital Subject Material satisfied the standard required when evaluated after being exposed to experts. The results also showed that the developed Digital Subject Material covered the required selected Instructional content. Experts also noted that the platform has proper content planning and state the objectives properly. Digital Subject Material therefore, brings about effective Management, teaching and learning. This is an indication that it is an interesting and engaging alternative for conventional teaching and learning. The Teachers were able to manage teaching and class activities and students were able to learn at their own pace upon complete adaptation of the developed system. It is hoped that the full utilization of the developed Digital Subject Material will aid better teaching and better learning activities and improve general school and educational performance in Nigeria.

Recommendations

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

1. Government should organize enlightenment programs to educate the teachers and students on the advantage of using Digital Subject Material and other similar technologies in education.
2. Provision of necessary technological facilities should be made by the Government and private owners to schools in order to be able to implement and promote further use of technology in education.
3. More technology-based courses and programs should be included in the school curriculum for effective usage of technology for assessment.
4. Students should help themselves by making use of information on the internet for learning and shifting their focus from using it for fun and entertainments only.

Suggestions for Further Studies

The following are suggestions for further researches in this area;

1. Further research is recommended in other disciplines to ascertain the effect of Digital Subject Material
2. Digital Subject Material can also be designed for Basic and Nursery education.
3. Future research can be helpful to investigate why students act as a passive learners rather than active learners. Also, it could be beneficial to investigate how technical issues can affect the learning and the teaching experience.
4. Similar study should be carried out in other areas of the states as well as other states of the federation with a larger sample.

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DEVELOPMENT AND EVALUATION OF MOBILE LEARNING APPLICATION FOR TEACHING SELECTED COMPUTER CONCEPTS IN SECONDARY SCHOOLS IN ILORIN METROPOLIS

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Abstract

Mobile devices are instrument that students use with little or no technical know-how been required before hand to operate. The overall advantages provided by mobile learning are that it is characterized by more flexible, accessible and personalized learning activities. Despite the enormous mobile devises at the disposal of teachers and learners, the lack of learning App to be install for learning purposes has rendered the application of mobile devices for instructional resources ineffective. Thus, this study developed and evaluated computer science mobile learning App for senior secondary school in Ilorin metropolis. The objective of this study is to: Develop mobile learning app for teaching and learning computer science in senior secondary school; Determine how educational technology experts rate the developed computer science mobile learning app; Determine how computer science experts rate the developed computer science mobile learning app and to determine the cost of producing the computer science mobile learning App. This study is a research design and development of Model type. Data were collected using the following instruments: Computer Science Learning-App (COM-APP), five (5) Educational Technology expert rating guide from University of Ilorin and five (5) computer science expert rating guide. Mean rating and standard deviation were used to answer the research questions. The findings of this study were summarized as follows: Computer science mobile learning App is developed with ADDIE model with the use of MOBIRISE and web to APK builder. Educational technology experts rate the developed computer science mobile learning-App as suitable for instruction with grand mean value 3.42> benchmark 2.5; Computer science experts rate developed computer science mobile learning-App as suitable for instruction with grand mean value 3.22 >benchmark 2.5; and Computer science Basic technology learning App is cost effective compared to the academic benefit of the learning App. The study concludes that the developed computer science learning App for senior secondary school in Ilorin metropolis is suitable for teaching and learning computer science in senior secondary school. The implication of this findings is that, the learning App will create an effective teaching and learning experience of computer science in senior secondary school in

Ilorin metropolis. It was therefore recommended that; secondary school teachers should be trained on how to develop learning Apps irrespective of their area of specialization. This will enhance effective teaching in classroom

Introduction

Education have gone through a lot of evolvement over the century from the Stone Age to the age of information and communication technology. Education is regarded as a core instrument for national development. It is stated in the National Economic Empowerment and Development Strategy (NEEDS, 2005) that education is used to empower the people. The education system is becoming more diverse and unique by the passing of each day. The ethnic and cultural makeup of the Nigerian education system changes constantly and likewise that of our classroom (Garguilo, 2008). Educators are gaining a better understanding of different learning styles, several ways of introducing material and the values of thinking critically. Education have incorporated a lot of instrument in it which comes along with the different ages and centuries. The 21st century which we are dwelling in, is the age of technology. A lot of technologies have been incorporated into the field of education such as iPad, tablet, laptop, desktop and mobile phones etc., which have helped in facilitating teaching and learning activities both in the school realm and outside the school environment.

According to Wambui (2013), availability and adequacy of Instructional Media contribute in improving students' participation as it exposes learners to the real world of learning as well as building understanding and retention because when things are seen, they are more remembered than when they are simply heard. The use of various instructional media makes the learning process more effective because it builds greater understanding, reinforcement and retention of the subject matter (Ngussa, 2015). In the same perspective, Wambui, (2013) argued that the use of instructional material not only makes discovered facts glue firmly in the memory of learners but also makes learners enjoy participating in lessons and motivate them to repeat the activity during their free time.

Chinyere (2009) also argued that learners' ability to understand any learning concept is increased when teachers use various instructional media. Wambura (2017) in his study stated that computer has many benefits in education including enhancing academic works, improving lesson and students understanding and influencing independent learning. Makewa ,Role, and Ngussa (2012) argue that adequacy of instructional resources can help learners to understand a particular lesson more deeply. In order to ensure efficiency and effectiveness in teaching and learning, teachers another stakeholder must think of integrating latest technological innovations into the education system. The rapid development of technology has touched almost all aspects of life including education, it is almost

impossible to think of education without thinking of the many different kinds of technology used to support education (Spector, 2012).

The evolution of ICT and in particular of mobile technologies has revolutionized the world as we know it, and devices, such as tablets, have gained popularity so quickly in the general public and in various age groups in such a way that it is impossible not to try to imagine what such devices can lead to when used in education (Schnackenberg, 2013). The integration of ICT into education has been seen as the tool to help realize the potential of the new technological tools to revolutionize an outmoded educational system (Albrini, 2006). ICT also offers the potential to meet the learning needs of individual students, to promote equal opportunity, to offer learning material, and also promote interdependence of learning among learners (Cavas & Cavas, 2009). ICT allows generating and disseminating of information, thus playing an active role in the process of interaction between professionals, learners, policy makers, peers (Leach, Ahmed, Makalima & Power, 2005).

ICT developments and especially mobile technology have revolutionized the world as we know it, and devices such as tablets and smartphones have, gained a great popularity among the public and in various age groups (Schnackenberg, 2013). ICT encompass a range of technologies and application systems of microprocessors that have had profound impact on the society and its way of life. The revolution of information and communication technology (ICT) is drastically influencing the nature of learning and the production of knowledge, hence transforming the globe in unprecedented trend (Holloway, 2003). This has facilitated the paradigm shift from the traditional instructional material or traditional pedagogical methods to a more modern and innovative technological based teaching and learning methods. ICT provides opportunities for collaboration with peers and professional scientists (Mistler & Songer, 2000).

Tomei (2005) noted that the rapid growth in Information Communication and Technologies (ICT) nowadays has brought amazing changes to various fields, including education. Integration of information and communication technology (ICT) in education refers to the use of computer based communication that incorporates into daily classroom instructional process, in conjunction with preparing students for the current digital era, teachers are seen as key players in using ICT in their daily classroom activities, this is due to the capability of ICT in providing dynamic and pro-active teaching and learning environment (Arnseth & Hatlevik, 2012). Salawu (2011) asserted that information and communication technology is an emerging field of learning that has been defined by various experts. It is the application of modern electronic technologies like computer, internet, and digital camera in order to bring about effective and efficient instruction in schools, Information and communication technologies (ICTs) are technological tools and resources which are employed to communicate, create, disseminate and manage information (Nordin, Hamzah, Yunus & Embi, 2010).

There has been a tremendous transformation in the education sector as a result of rapid advances in Information and Communication Technology (ICT). Aduwa and Iyamu (2005) affirm that the role of technology in teaching and learning is rapidly becoming one of the most important and widely discussed issues in contemporary education policy. ICT assist students to be more effective in their learning, in fact, it aids the teachers in doing the administrative works efficiently (Chang, 2009). Information and Communication Technology (ICT) is becoming increasing widespread, influencing many aspects of our social and work lives, as well as many of our leisure (Abedalaziz, Jamaluddin & Chin, 2013).

ICT provides more creative solutions to different types of learning inquiries. Brush, Glazewski and Hew (2008) stated that ICT is used as a tool for students to discover learning topics, solve problems, and provide solutions to the problems in the learning process. ICT makes knowledge acquisition more accessible, and concepts in learning are as are understood while engaging students in the application of ICT. ICT develops students' new understanding in their areas of learning (Chai, Koh & Tsai 2010). ICT provides more creative solutions to different types of learning inquiries. ICT is a tool which if used effectively, can show learners that education is something which they can do for themselves and Development of ICT has provided new opportunities for delivering instruction in schools in innovative ways (Rathnabai & Viswanathappa 2013). ICT encourages learning; it motivates the individual and at the same time gives him (or her) the capability to do certain activities. Besides that, its presence betters the learning environment and enriches the learning experience (Punie, 2007).

The emergence of revolutionary technologies has had a significant impact on educational technology. It has increased the potential of e-learning as a mode of delivery in education. By definition, mobile learning (or "m-learning") is learning by means of wireless technological devices that can be pocketed and utilized wherever the learner's device is able to receive unbroken transmission signals (Attewell & Savill-Smith, 2005). Traxler (2007) an advocate of mobile learning define mobile learning as wireless and digital devices and technologies, generally produced for the public, used by a learner as he or she participates in higher education.

Mobile learning is the delivery of educational materials and leaning contents through mobile technologies (Sitthiworachart & Joy 2008). It can be made to support modern classroom learning tools as well as distance learning and e-learning, as a result of which lectures can be delivered in remote areas for the benefit of people across countries and continents (Sitthiworachart & Joy 2008). Kukulska, Sharples, Milrad, Arnedillo, and Vavoula (2009) stated that mobile learning is one of the developing areas in teaching and learning, and it is getting more accepted with the improved accessibility and major enhancement in the capabilities of handheld devices in terms of processing speed, screen sizes, memory capacity, storage volume and network connectivity.

Uden, (2007) observes that mobile technologies offer new opportunities for students' educational activities in that they can be used across different locations and times. Therefore, learners who use mobile technologies for learning are not only far away from their lecturers and tutors, but they are also in full control by having access to information on their mobile devices, thereby giving them a certain amount of liberty, freedom and independence in their course of learning. Furthermore, an m-learning device can be used as a tool to evaluate students learning activities as an assessment tool. Above all, m-learning devices can be used to ease learning ICT modules, particularly in game programming (Oyelere, Suhonen &Sutinen, 2016).

Khanghah and Halili, (2015) posited that mobile learning applications help students to learning 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.

Attewell (2005) previous studies found out that mobile technologies make a useful contribution to attracting young people to learning, maintaining their interest and supporting their learning and development. Guralnich (2008) suggests that the designer of mobile learning would be better served if the designer considered the entire context in which learners will use particular in m-learning programme. Cobcroft, Towers, Smith and Axel (2006) claim that mobile technologies within the education context can allow students the opportunity to undertake 'user-led education,' constructing knowledge, and collaborating with peers and learning communities within and beyond the classroom or computer center.

UNESCO, (2000) stated that one of the greatest ways to improve education is to facilitate informal learning to complement formal schooling by the use of mobile devices. Features of mobile devices used are different among age and gender in students. Gender differences exist in use of social and web based media, consumption patterns, attitudes and affinity toward technology (UNESCO, 2000). Research on the use of media and digital devices, attitudes and understanding of children's and young people (5 - 15 years) point to some gender differences, "Boys like digital games and girls like talking", (Ofcom, 2013). In higher education males show higher positive attitudes toward using technology for learning than females (You & Cheng, 2012; Kahveci, 2010; Li & Kirkup, 2007). The mobile phone gender gap among students is observed as a symptom of broader gender inequalities, apparent in education as well as in the general use and ownership of ICTs (UNESCO, 2013)

Statement of Problem

Mobile devices are instrument that students use with little or no technical know-how been required before hand to operate. Ting (2005) makes the following remarks about the advantages of mobile learning: "The overall advantages provided by mobile learning are that it is characterized by more flexible, accessible and personalized learning activities. Such advantages keep the learners engaged in the ongoing learning activities and enhance their productivity and effectiveness".

of the integration of computer in our day to day learning activities, the absence of mobile application to be installed in the mobile devices for learning computer will make less efficient the use of mobile devices for learning and will reduce the flexibility, accessibility personalization of learning computer science in secondary school.

As a result, the need or urgency to develop mobile application to be employed to teach computer science in secondary school which can be installed on mobile devices arise. Hence this research provides a solution by develop mobile learning applications that can be used in teaching and learning computer science concepts in secondary schools.

Research Questions

The study will provide answers to the following research questions. (i) What are the processes involved in the development of computer science mobile application? (ii) What are the ratings of educational technology experts on the developed mobile application in teaching selected computer concepts? (iii) What are the ratings of computer science experts on the developed mobile application in teaching and selected computer concepts? (iv) What is the cost of developing computer science mobile application?

Methodology

This chapter is concerned with the research methods and technique that was adopted in carrying out this study. The methodology was presented under the following sub headings: research design, sample and sample techniques, research instrument, validation of research instrument, procedure for data collection and data analysis techniques.

Research Design

This study is a Research design and development of Model type. The research deals with the development and evaluation of the existing or newly constructed development model process or techniques. Procedure for the development of the Learning-App on computer science learning application: was designed and developed by the researcher to enhance teaching and learning of computer science concepts.

The subject content manual for computer science courses include: memory and internet and was developed to conform to computer science course content.

Sample and Sampling Technique

The population of this study consist of all computer science, educational technology experts in the University of Ilorin. Specifically, 5 (five) Educational Technology experts and 5 (five) computer science experts were randomly selected for the study from the University of Ilorin.

Research Instrument

The following research instruments were used for data collection in the study, namely:

i. Computer Science Learning-App
ii. Educational Technology Expert Rating Guide
iii. Computer Science Expert Rating Guide

Computer Science Learning-App: This is an application which was designed to help facilitate the learning. The application was designed based on some selected concepts in computer science in senior secondary school curriculum such as internet and memory. The target audience which are Senior Secondary Schools students were clearly stated in the App. The design and development of the learning application was done by the researcher using computer science content adapted from Online with Computer for Senior Secondary Schools.

Educational Technology Expert Rating Guide: The educational technology rating guide was used to elicit response from Educational Technology experts in University of Ilorin to evaluate the mobile Learning-App. Questions were asked based on the navigation of the app, graphical user interface, ease of the use of app, functionality of the app.

Computer Science Expert Rating Guide: The computer science rating guide was used for computer science experts to elicit response to evaluate the computer science Learning-App. Questions were asked based on the screen design, navigation.

Validation of the Research Instruments

Computer Science Learning-App: The experts that participated in the quality evaluation of the developed Computer Science Leaning-App for facilitating learning of Computer Science concepts comprised lecturers from the department of Educational Technology, Computer Science lectures from the department of computer science. Both face validity and content validity, design format and style were assessed by the experts. The APP was evaluated in three stages. The first stage was done by researcher's supervisor and four other lecturers from Educational Technology department who assessed the programming and Graphical User Interface (GUI) of the Learning-App and the Learning-App was validated at this level. Corrections and suggestions were used at each stage to improve the Learning-App.

The second expert were subject experts who also double as the computer science experts and looked at the content of the Learning-App, the ease and the usability of the Learning-App and corrections was made to improve the Learning-App. The experts were selected using purposive non-probability sampling technique to assess the content of the Learning-App functionality, usability and effectiveness toward the use of computer science Learning-App.

Procedure for data collection

The researcher sought the permission of the Head of Department of Educational Technology, University of Ilorin, Ilorin to carry out the study. Also, the consent of the Head of Department from where the respondents are to be sample was soughed for before administering the instrument by collecting authorization letter from the department. The experts went through the Learning-App and thereafter the copies of the questionnaires were administered to the experts in order to elicit their responses about the effectiveness of the package for instructional purposes via the Experts' Response Questionnaire. Based on research ethics and to ensure high standards of professionalism, lecturers' consent was sought for through research consent forms that was presented to them. The experts participated voluntarily in the study and there was no coercion of any sorts. Also, confidentiality of the participants was not compromised in preventing insecurity that could be felt by any participant.

Data Analysis Technique

The data obtained from the questionnaire was analyzed using descriptive statistics, frequency percentage and mean was used to answer the research question with the aid of Statistical Package for Social Science (SPSS) 23.0 version for windows.

Data Analysis and Results

As shown in Table 1, revealed the gender of educational technology experts, it shows that 5 out of the total respondents are male which represent a total of 100% while none of the educational technology expert that participated were female

Table 1: demographic information of Educational Technology Experts based on gender.

Gender	Frequency	%
Male	5	100
Female	0	0.0
Total	5	100

Table 2, revealed the gender of computer science experts, it shows that 4 out of the total respondents were male which represent a total of 80% while there was 1 female respondent which represents (20.0%).

Table 2: Demographic information of Computer Science Experts based on Gender.

Gender	Frequency	%
Male	4	80%
Female	1	20%
Total	5	100%

Results and Analysis of Research Questions

The results are presented based on research questions

Research Questions 1: What are the processes involved in the development of computer science learning app for teaching and learning computer science?

The computer science 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 computer science and the topics to be design are internets and computer memory.

Design stage

The design phase involves the process of transferring the ideas and concepts into something that is tangible and visual. Thus, the computer science 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.

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 computer learning App involves the actual process of writing and preparing the teaching materials for the learning App. The main includes target audience which is senior secondary school II and the instructional content. The instructional content includes internets as sub menu and computer memory. Internet has section such as instructional objectives, introduction, types and uses of internet, summary and essay questions and so on also has section such as instructional objectives, introduction, types and uses of computer memory, 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 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 Educational technology learning App the validation was done by three different types of experts which includes three computer science 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 3: Educational technology experts rating of the developed computer science mobile learning-App for 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 COM 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 COM APP facilitates learning by doing	3.60

10. The COM 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 3, a grand mean of 3.42 is obtained. Since the grand mean is greater than the bench mark which is 2.5, this shows that Educational technology learning App is suitable for instruction.

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

Table 4: computer science experts rating of the developed computer science mobile learning-App for senior 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 COM 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 COM 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 is obtained. Since the grand mean is greater than the bench mark 2.5, the computer science mobile learning App is suitable for instruction.

Research Question 4: What is the cost of developing computer science learning App?

Table 5: cost implication of the mobile learning App

S/N	Activities	Rate	Amount
1	Application developer soft wares	-	N5000
2	Program Development	-	N4000
3	WEB to APK converter	-	N1000
4	Miscellaneous	-	N500
Total			N10500

Discussion of Research Findings

This study developed and evaluated computer science learning App for senior secondary school students in Ilorin metropolis. Result of the findings from this study based the processes involved in the

development of computer science learning app for teaching and learning computer science. This involves the use mobile App developing software known as mobirise to create the computer science learning App for senior 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 computer science learning App as suitable for the purpose it is intended for. The grand mean obtained revealed that the computer science learning App have been developed to be in line with educational technology principle of design and can be utilized, if integrated appropriately, to make learning easier as Wu & Lai, (2009) asserted that the ways that mobile technologies have been integrated to support teaching and learning are, for example: individual study, group work, data collection, recording reflections/diaries, skills practice, feedback/questions to teacher, peer-to-peer communication/support, reviewing knowledge, warm up/cool down exercises.

Research Question three sought to know the ratings of computer science experts on the developed Learning-App in teaching and learning computer science. The grand mean obtained revealed that the computer science learning App have been well structured and suitable for the purpose it is intended for as Yuen & Wang, (2004) posited that Mobile devices allow students to review, listen and practice speaking, and provide services such as phrase translation, quizzes and live coaching. 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).

Conclusions

The result obtained from data acquired and analyzed in this study indicated that the developed computer science learning App for senior secondary school in Ilorin metropolis is suitable for teaching and learning computer science in senior secondary school.

Recommendations

In view of the findings of this study, the following recommendations were made:

1. Seminars and workshops should be organized for instructors on how to utilize the learning applications
2. Mobile devices should be made available at learning centers for the learning Apps to be installed on to facilitate learning.

3. Other studies should be researched on for the development of other subject content that can be installed on mobile gadgets to facilitate learning.
4. Computer science learning App should be developed for other class.

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STUDENTS' TEST ANXIETY, STUDY HABIT AND GENDER AS DETERMINANTS OF MATHEMATICS ACHIEVEMENT AMONG SECONDARY SCHOOL STUDENTS IN KATSINA METROPOLIS

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Abstract

This study investigated students' test anxiety, study habit and gender as determinants of academic achievement among secondary school students in Katsina metropolis. Student's academic achievement facing much deterioration due to students' high level of anxiety, poor study habit, lack concentration, inability to compose self before, during and after examination. The study adopted an ex post-facto research design method. The sample size of this study comprised three hundred (300) students. The purposive sampling technique was used to select six senior secondary schools, this consist one hundred and seventy-eight (178) male and one hundred and twenty-two (122) female students for this study. The instrument used is questionnaire which following sections: section "A" contained personal data of respondents; section "B" contains adopted Spielberger Trait Anxiety Inventory (TAI). Section "C" contained self designed questionnaire on Study Habit Questionnaire (SHQ). Students' Mathematics Achievement Test (SMAT), a 50-item multiple-choice was used to obtain students' record with a reliability coefficient of 0.87, 0.69 and 0.65 for TAI, SHQ and SMAT respectively. Five research hypotheses were generated and tested using multiple regression, Pearson Product Moment Correlation Co-efficient and t-test at 0.05 level of significance. Result of the study showed the relative importance of each of the predictor variables (students' test anxiety, study habit and gender) to the prediction of Mathematics achievement with R=.107, .107 and .64, which is equivalent to 10.7%, 10.7% and 64% respectively. This indicates a good level of prediction. R^2 =.011, .011and 0.004 which is equivalent to 11%, 11% and 4% indicating the level of shared variance between the dependent variable and the independent variables ($F_{c=296}$,1.143,1.706 & 0.618 ;< 0.05). The study recommended that Mathematics teachers should make mathematics classes' very interesting and engage students in gradual explanation and systematic procedure in solving problem. By so doing, anxiety and fear for the subject will be reduced. Conferences, Seminars, workshops and in-service training should be given priority for the mathematics teachers.

Keyword: Students' Test Anxiety, Study Habit, Gender, Mathematics Achievement, Senior Secondary School Students.

Introduction

Mathematics is the foundation for any meaningful scientific endeavour and for any nation that aspires to be great scientifically and technologically, teaching and learning of mathematics is vital. All sciences and technologies are anchored on the proficiency and achievement in mathematics. Mathematics is an important and vital tool in the present society of science, technology, engineering and innovation age (Olutola, Olatoye, & Owolabi, 2018). Students in secondary school experience different kinds of negative factors that affect their academic achievement in mathematics ranging from anxiety, depression, bullying, stress among others. One among of these is anxiety is a emotional conditions of an individuals' state that manifests itself in life endeavours in form of worry and restlessness of nervous that expressed as a result of discomfort or unbalanced physiological health status.

In relation to test or examination which can be used interchangeably, test anxiety has been a subject of discussion in academics for the past decades. Test anxiety is described as a combination of cognitive imbalance, physiological disturbances and emotional instability that affect students before or during examination (Ibrahim, 2018). Test anxiety is the unpleasant psychological and emotional state of mind of students experienced as a result of fear or failure to prepare for the test or examination. It is a serious psychological disorder faced by students in their academic activities. The psychological symptoms of test anxiety that are built up in students before the test or examination include restlessness, unusual body movement, difficult in concentration, insomnia, fatigue, muscle contraction, abdominal pain and tremors, all these symptoms have negatives consequences on students' academics live and professional growth (Ferreira, Almondes, Braga, Mata, Lemos, & Maia, 2009). Mathematical anxiety is the fear established by students' about the phobia of mathematics as that is difficult and cumbersome to understand in all stage of learning. Some students fail because of fear and doubt in the ability to perform well, fear and doubt make their reasoning shaky and unstable (Kekere, 2010).

Another factor that predisposes individuals to negative or positive academic performance is the perception of one's study habit which can help to reduce student's test anxiety. This can be done by encouraging students and guiding them on systematic and robust ways of handling academics work and material well in the test. Study habits typically denotes the degree to which the students' engages in regular acts of studying that are characterized by appropriate studying routines occurring in an environment that is conducive to studying (Credé & Kuncel, 2008). Good study habit is a good asset to learners because good habit assists students to attain mastery in areas of specialization and consequent excellent performance, while opposite constitutes constraints to learning and achievement leading to failure (Maruff & Muhideen, 2017). There are seven major aspect of study habit such as: listening/note taking, memory/remembering, concentration/attention, test/examination taking, managing/organizing time, motivation, study/reading

textbooks. Amadu and Duna, (2018) maintained that good study habits include different skills among which are learning style, time management, self-discipline, concentration, memorization, organization and efforts. Learning has tendencies that enable students work privately and associated with favourable attitude toward learning in generality of academic works. Study habits of students could be positive and yielding high level of cognition while their negative attitudes can be distorting, repulsive and consequently lead to poor performance as well as affecting the impact on students' acquisition of reasoning skills (Musa & Adamu, 2019).

In relation to gender which refers to the socially and biologically determined ideas and practices of what it is to be female or male individual (Ukoh & Okeke, 2017). Hassan and Ravi (2022) found that generally, more girls than boys develop anxiety disorders and symptoms and adolescent girls report a greater number of worries, more separation anxiety, and higher levels of generalized anxiety than their boy's. Academic achievement indicates the degree of achievement or success recorded and attained learner in some general or specific area of academic work for a period of time. Students' academic achievement is influenced by a multitude of factors like the teachers, school environment, school administration, culture, family socio-economic background, education funding, study habit and student's personality. Kajuru, (2008) found that males performed better than females in mathematics. Students' intellectual development depends upon both environmental and biological factors. Since the academic achievement is a strong indicator of students successful in academic career, and determined the level of students' competencies and it is best understood from an individual perspective through the acquisition of deep and meaningful understanding as well as content-specific critical inquiry abilities, skills and dispositions in learning.

Ibrahim (2018) conducted a study relationship among stress, test anxiety and academics performance in mathematics among senior secondary school in Katsina metropolis. Findings show that strong negative correlation exists between test anxiety and academic performance. It indicates that whenever anxiety level increase, the academic performance decreases and vice versa. Olatoye (2009) investigated the relative and combined influences of test anxiety and motivation for examinations on science achievement of selected Junior Secondary School students in Ogun State. The result shows a negative significant relationship between test anxiety and science achievement. Musa and Adamu (2019) examined the attitude to mathematics, study habit and academic performance of selected secondary schools in Makurdi. The result indicates that study habit has a positive significant effect on student performance. A good study habit skills like note taking, having regular time to study, having time for homework, self-study on mathematical problems and organizing for a test and examination, while removing the distraction that comes from phone call at home can lead to good academic performance. Test-anxiety as a psychological

problem associated with decreases in attention span, memory and concentration and then resulted to students' low academic performance in school. The students with high test-anxiety in a test or examination had a poor academic performance. Therefore, test anxiety contributed to academic achievement because of vulnerability to distraction and interference experienced by the secondary school students.

Statement of the Problem

Students' academic achievement has been affected by many factors, prominent among them are anxiety and study habit which are psychologically have a lot of negative influences and challenges on students performance during and after test or examination. Academic achievement in secondary school is facing much deterioration due to students' inability to maximize the study habit and time, lack concentration, inability to compose them before, during and after examination. Several stakeholders in the education sector seem to be of the belief that text-anxiety consume academic time unnecessarily, while others have pointed to the positive effects of text-anxiety on academic success. These inconsistent findings necessitated the need to re-examine the relationship between text-anxiety and students' study habits. There are urgent needs on how to improve the teaching and learning of mathematics in our various schools by adequate provision of conducive learning environment against poor students' study habits. These problems may lead to poor academic achievement; also there might be wastages in the education system as a result of drop outs and repletion which can be linked to students' high level of anxiety in test or examination, as a result students' emotional instability during test or examination. This is therefore necessary to find out the influence of test anxiety and study habit on students' mathematics achievement as this can help in proffering solution to the problem of under achievement in mathematics. This study therefore investigated the relative and combined influences of test anxiety and study habit on mathematics achievement among selected Senior Secondary School students in Katsina metropolis, Katsina State, Nigeria.

Objectives of the Study

The objectives of the study are specifically:

1. To investigate the combined influence of students' test anxiety, study-habit and gender on students' mathematics achievement among senior secondary school students in Katsina metropolis.
2. To examines the influence of students' test anxiety on students' mathematics achievement of senior secondary school students in Katsina metropolis.
3. To investigate the influence of study habit on students' mathematics achievement of senior secondary school students in Katsina metropolis.
4. To find out the relationships among students' test anxiety, study-habit and students' mathematics achievement of senior secondary school students in Katsina metropolis.

5. To find out if there any significant difference between the gender of students in senior secondary school in Katsina metropolis: (i) Test anxiety; (ii) Study-habit; (iii) Students' mathematics achievement.

Research Questions

The following research questions were formulated to guides the study:

1. What is the combined influence of students' test anxiety, study-habit and gender on students' mathematics achievement among senior secondary school students in Katsina metropolis?
2. What is the influence of students' test anxiety on students' mathematics achievement?
3. What is the influence of study-habit on students' mathematics achievement?
4. What are the relationship among students' test anxiety, study-habit and students' mathematics achievement?
5. Is there any significant difference between the gender of student's in senior secondary school in Katsina metropolis?: (i) Test anxiety; (ii) Study-habit; (iii) Students' mathematics achievement

Research Hypothesis

The following research hypotheses were formulated to guide the study:

HO_1: There is no significant relationship among students' test anxiety, study-habit, gender and students' Mathematics achievement.

HO_2: There is no significant relationship among students' test anxiety, gender and students' Mathematics achievement.

HO_3: There is no significant relationship among study-habit, gender and students' Mathematics achievement.

HO_4: There is no significant relationship among students' test anxiety, study-habit and students' Mathematics achievement

HO_5: There is no significant difference between male and female students': (i) Test anxiety; (ii) Study-habit; (iii) Students' Mathematics achievement.

Methodology

The researchers' adopted ex post-facto research design. The population of this study comprised all twelve (12) public senior secondary school students in Katsina metropolis while the target population is made up of all senior secondary school two (SSS II) mathematics students in Katsina metropolis. Out of these schools, six (6) senior secondary schools were selected through purposive sampling techniques. A simple random sampling technique was used to select three hundred (300) senior secondary students (SSS 2) from the six selected sampled schools in Katsina metropolis for the study. The sample size of each selected schools vary due to the populations of each schools. Therefore, the sample consists one hundred and seventy-eight (178) male and one hundred and twenty-two (122) female respondents.

The instrument used to collect data is questionnaire, this questionnaire was divided into three sections; Section A contained students' information such as class, gender and age, while Section B: contained adapted a version of Trait Anxiety Inventory (TAI), developed by Spielberger (1980). Test Anxiety Inventory was designed to measure the test anxiety of school students. It is a 20-item with modified 4-point Likert type scale and the students have to respond to the four options: (1) Never True (NT), (2) Sometimes true (ST), (3) Often true (OT) and (4) Always true (AT). The reliability values of alpha coefficient for original version of Test Anxiety Inventory was 0.93, it is used to measure the relatively stable tendency of an individual to respond anxiously, stressful situation. Section C: contained self designed Study Habit Questionnaire (SHQ), it is a 30-item four Likert type scales ranging from 1= Strongly Disagree (SD), 2 = Disagree (D), 3 = Agree (A), 4 = Strongly Agree (SA). The questionnaire was structured by researcher in line with review of literature. It used to measure how relatively students used their available time to study for academic achievement. Students' Mathematics Achievement Test (SMAT), it is a 50-item multiple-choice objective test with four options for an item was used to obtain students' record. Each score was awarded 2-points, maximum scores is 100 marks. The items covered topics in the Senior Secondary School Mathematics Syllabus, which was extracted from WAEC and NECO exanimation past questions.

The initial versions of the instruments were given to experts Measurement and Evaluation Department of Federal University Dutsin-ma, Katsina State, for suggestions and comments before coming up with the final versions. The instrument was face and content validated by experts in Educational Psychology department. The instrument was considered to be valid and used for data collection. To establish the reliability of the instrument, test-retest method of reliability was employed. It was administered on a representative sample of twenty (20) respondents twice at an interval of four weeks. The two set of scores were correlated using Cronbach alpha reliability coefficient of 0.78,0.69 and 0.65 was obtained for Trait Anxiety Inventory (TAI), Study Habit Questionnaire (SHQ) and Students' Mathematics Achievement Test (SMAT) respectively, which shows that the instrument were reliable for the study. The researcher employed descriptive statistics of frequency counts for analysis students' demographic data. Multiple Regression Analysis was used on hypotheses 1 – 3, Pearson Product-Moment Correlation on hypotheses4

and t-test for hypotheses 5, all the collected data was analyzed. All hypotheses were answered at 0.05 level of confidence using a two-tailed test. These data packages enabled the researcher to predict the level of relationship existing between the variables in the study.

Results

HO_1: There is no significant relationship among students' test anxiety, study-habit, gender and students' Mathematics achievement

Table 1. Combined correlation of students' test anxiety, study-habit, gender and students' Mathematics achievement.

Model	R	R Square	Adjusted R Square	Standard Error
1	0.107[a]	0.011	0.001	11.58758

Analysis of variance

Model		Sum of Squares	Df.	Mean Square	F	p	Remark
1	Regression	460.412	3	153.471	1.143	0.332	Sign.
	Residual	39744.505	296	134.272			
	Total	40204.917	299				

a. Dependent Variables: Students' test anxiety and Study habit

b. Predictors: Gender and Students' Mathematics achievement

Table 1, the result of the statistical significance of the model is presented, the F- ratio in the ANOVA table above tests whether the overall regression model is a good fit for the data. The table shows that the independent variables statistically significantly predicts the dependent variable F = 1.143, p =0.332.The combined influence of students' test anxiety, study habit and gender accounted for 10.7% of the total variance in students' Mathematics achievement (R Square = 0.11, $p < 0.05$). This percentage is significant. These three independent variables are therefore important predictors of students' Mathematics achievement. The percentage also implies that there are other factors not included in this study that can also influence students' Mathematics achievement.

HO_2: There is no significant relationship among students' test anxiety, gender and students' Mathematics achievement.

Table 2: Student's test anxiety and gender as predictors of students' Mathematics achievement.

Model	R	R Square	Adjusted R Square	Standard Error
1	0.107[a]	0.011	0.005	11.56860

Analysis of variance

Model		Sum of Squares	Df.	Mean Square	F	p	Remark
1	Regression	456.694	2	228.347	1.706	0.183	Sign
	Residual	39748.223	297	133.832			
	Total	40204.917	299				

a. Dependent Variables: Students' test anxiety

b. Predictors: Gender and Students' Mathematics achievement

In Table 2,the result of the statistical significance of the model is presented, the F- ratio in the ANOVA table above shows that the independent variables statistically significantly predicts the dependent variable F = 1.706,p =0.183. Students' test anxiety and gender accounted for 10.7% of the total variance in science achievement (R square = 0.011,p < 0.05). This percentage though low is also statistically significant. Thus, students' test anxiety and gender is important predictor of students' Mathematics achievement.

HO_3: There is no significant relationship among study-habit, gender and students' Mathematics achievement

Table 3: Study habit and gender as predictors of students' Mathematics achievement.

Model	R	R Square	Adjusted R Square	Standard Error
1	0.64[a]	0.004	-0.003	11.61072

Analysis of variance

Model		Sum of Squares	Df.	Mean Square	F	p	Remark
1	Regression	166.718	2	83.359	0.618	0.540	Sign
	Residual	40038.199	297	134.809			
	Total	40204.917	299				

a. Dependent Variables: Study habit

b. Predictors: Gender and Students' Mathematics achievement

In Table 3, the result of the statistical significance of the model is presented, the F- ratio in the ANOVA table above shows that the independent variables statistically significantly predicts the dependent variable and closely related F = 0.618,p =0.540. Study habit and gender accounted for 64% of the total variance in students' Mathematics achievement (R square = 0.004, p < 0.05). This percentage is also statistically significant. Thus, study habit and gender is an important predictor of students' Mathematics achievement. Study habit and gender is however a better predictor of students' Mathematics achievement than students' test anxiety.

HO_4:There is no significant relationship among students' test anxiety, study-habit and students' Mathematics achievement.

Table 4: Correlation matrix showing relationships among variables; students' test anxiety, study-habit and students' Mathematics achievement.

	Test anxiety	Study habit	Students' achievement	Gender
Test anxiety	1.000			
Study habit	0.065	1.000		
Gender	-0.094	-0.022	1.000	
Math. Achievement	0.135*	0.139*	-0.063	1.000

* Significant (p < 0.05), N = 300.

In Table 4, show that there is low positive but significant relationship between students' test anxiety and study habit ($r = 0.065$, $p < 0.05$). There is low negative but significant relationship between students' test anxiety, study habit, gender and students' Mathematics achievement ($r = -0.094$, $r = -0.022$, $r = -0.063$ $p < 0.05$) respectively. Thus the higher the student test anxiety, the lower the students' Mathematics achievement, the lower the student test anxiety, the higher the achievement in mathematics. There is also positive significant relationship between students' test anxiety, study habit and gender ($r = 0.135$, 0.139 $p < 0.05$) respectively. There is negative significant relationship between students' Mathematics achievement and gender ($r = -0.063$, $p < 0.05$). The more students study hard, the higher the achievement in mathematics. Therefore, gender has a strong influence on students' achievement in mathematics.

HO_5: There is no significant difference between male and female students': (i) Test anxiety; (ii) Study-habit; (iii) Students' Mathematics achievement.

Table 5: Comparison of male and female students' test anxiety, study habit and students Mathematics achievement.

Variable	Gender	N	Mean	Std. dev.	Std. error	df	t	p	Remark
Test Anxiety	Male	178	48.557	11.669	0.874	298	2.347	0.007	NS
	Female	122	45.557	9.759	0.884				
Study habit	Male	178	83.360	16.217	1.216	298	2.432	0.438	NS
	Female	122	78.656	16.806	1.522				
Math. Achievement	Male	178	57.713	12.090	0.906	298	-1.089	0.258	NS
	Female	122	59.197	10.822	0.979				

NS = Not significant ($p > 0.05$).

In Table 5, there is no significant difference between male and female students' test anxiety, study habit and students' Mathematics achievement. It should be noted, that students' average performance in mathematics is still below average. The mean achievements scores of male and female students are 57.713and 59.197respectively; it is a little as above average because the maximum obtainable score in the mathematics test administered is 100.

Discussion

The finding of this study revealed that student's test anxiety and study habit are significantly predicting students' mathematics achievement. This finding is in support of Rizwan and Nasir, (2010) concluded that test anxiety is one of the factors which are responsible for students' underachievement and low performance but it can be managed by appropriate training of students in dealing with factors causing test anxiety. The feeling student experience on or before the text also make him/her anxious. As students have reported that they feel uneasy, upset, nervous, tense and panic. Students can be trained to minimize affective test anxiety by providing opportunities to handle unforeseen problem situations and letting them

experience test situation more often. Rizwan, and Nasir, (2010) also concluded that we live in a test-taking society and that when students are anxious before and during tests, test anxiety has a significant and effective impact on their performance. The findings revealed that students who possess lower test anxiety and good study habits performed significantly better than students with highly test anxiety and poor study habits in terms of Mathematics achievement in secondary schools, test anxiety can be reduced by student involve in good study habit. Gender has significant influence on students' mathematics achievement.

The finding of the study with respect to research questions of the study answered, and revealed that study habit is significantly predicting student's mathematics achievement. The findings of this study also agree with Umoh and Emmanuel, (2018) shows that there is a significant relationship between students' study habits and students' achievement in Mathematics. They are on opinion that for an excellent performance, there is the need for the student to form good reading and study habits. Khadija, (2014) found that there is a significance relationship between study habits and academic performance among students. This means those students who possess good study habits are likely to improve their academic performance. The finding is contrary with finding of Musa and Adamu (2019) implies that Study habit has no significant effect on the performance in selected secondary schools in Makurdi Metropolis. A good study habits is essential to educational success; as it contribute to a successful academic future.

The findings on students' mathematics achievement revealed student with low anxiety and good study habit perform better due to available learning materials and good learning condition. The findings of Musa and Adamu (2019) supported that students' performance in mathematics varies across different nations due to the difference in the adopted teaching strategy as well as students study habits. Adeninyi (2011) agreed that good study habits allow students to study independently at home and aspire for higher educational career, the formation of good study habits in secondary school level further serves as the basis for students' performance in external examinations such as WAEC, NECO and JAMB. Study habits have significant effect in determine the academic performance of students (Ogunyemi & Hassan, 2011).In the view of Agba (2013) posited that unserious students do study anyhow without specific techniques and he submits that such students are most likely to perform below average. Thus, he concludes that good study habits help students to- attend classes very often and do so on time. It also helps them to submit their assignment on time, read or prepare very well for tests and exams, take down notes and develop the points independently, ask relevant questions in class; thereby having good grades at the end of the term. Oli, Hossain and Rashid, (2019) results suggested that study habits significantly correlated with students' academic achievement. The finding revealed that gender has significant influence on student's test anxiety and study habit on students' mathematic achievement. The study of Hassan and Ravi (2022) there is a significant difference between the perceptions of male and female category students and female category

students expressed high perceptions with respect to test anxiety of secondary school students than that of male students.

Generally, girls have high tendency than boys in developing anxiety disorders and symptoms. However, Olatoye and Afuwape (2003) reported significant difference between male and female students' anxiety. Female students are more anxious than the male counterparts. The study also found that female students have greater test anxiety and as such are in greater need of help than the male students in overcoming test anxiety. Alam and Mahmood (2013) noticed that, boys have least test anxiety, better self-esteem and better academic performance than girls. Umohand Emmanuel, (2018) revealed that, there was no significant difference between male and female students' achievement in mathematics that possess good study habits. In contrary, the study of Olatoye (2009) revealed that there is no significant difference between male and female student test anxiety, motivation for examinations and science achievement.

Conclusion

Based on the findings of this study, it's concluded that students who possess lower test anxiety and good study habits performed significantly better than students with highly test anxiety and poor study habits in terms of mathematics achievement in secondary schools, test anxiety can be reduced by student involve in good study habit. It's also concluded that male and female posses relatively anxiety in test and examinations and good study habits in mathematics achievement slightly differ and significantly in mathematics achievement, students who possess good study habits are likely to improve their academic performance.

Recommendations

Based on the analysis and finding presented in this study, the recommendations are:

1. Mathematics teachers should make Mathematics classes very interesting and engaging students in explains gradually and systematically the procedure step by step of solving problem being treated. By so doing, anxiety, fear for the subject will be reduced, good study habits will enhanced and performances of the students in Mathematics will be also improved.
2. Conferences, Seminars, workshops and in-service training should be give priority for the mathematics teachers so as to expose them to the new methods and techniques in teaching.
3. Government, School administrators, school counsellors, mathematics teachers, and parents should create a conducive atmosphere for learning, so as to reduce anxiety and help the students to develop good study habit in learning mathematics.

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EASY USAGE OF MOBILE DEVICES FOR TEACHING UNDERGRADUATES AS PERCEIVED BY LECTURERS IN KWARA STATE, NIGERIA

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Abstract

This study examined the perceptions of lecturers on integrating mobile devices for teaching undergraduates in Kwara state. Moderating influence of gender on the ease of use of mobile devices for teaching was also examined. Data were collected from 356 university lecturers from four Universities in Kwara State including Al-hikmah University, Kwara State University, Landmark University and University of Ilorin using a random sampling technique. Data were gathered using a researcher designed questionnaire tagged Ease of Use of mobile devices for teaching questionnaire and the data were analysed using mean to answer research questions and t-test was used to test the null hypothesis formulated. Findings were that lecturers perceived mobile devices easy to use for teaching with Grand Mean of (2.47). Also there was no significant difference between male and female lecturers' perceived ease of use of mobile devices for teaching with t value of (354) and significant value of 1.07, $p > 0.05$ alpha level of significance. The implication is that mobile devices were found easy to use for teaching by lecturers, irrespective of gender. Therefore, lecturers should be encouraged to attend trainings, conferences and capacity building workshops in order to acquire skills on the use of Mobile Devices and other ICT tools for teaching.

Keywords: Perceived ease of use, ICT, Mobile devices, Mobile Learning

Introduction

Mobile Learning (m-learning) is a form of learning that involves the use of wireless devices wherever the learner is with unbroken transmission signals. These wireless devices include mobile devices such as smart phones, tablet computers, laptops and personal digital aids (PDAs). The definition of m-learning contains three key components which are mobility of technology, mobility

of learners and mobility of learning processes. Mobility of technology refers to the mobile nature of installed hardware and software that enable constant wireless internet connection. Mobility of learners is no longer attached to one or several learning site, and they can be mobile and learn at the same as long as the mobile devices are around. Mobility of learning is the result of mobility of both the technology and learners (El-Hussein & Cronje, 2010).

Mobile learning is also defined as the exploitation of ubiquitous hand-held technologies, together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of teaching and learning. However, it has been widely recognized that mobile learning is not just about the use of portable devices but also about learning across contexts (Walker, 2006). Pea and Maldonado (2006) used the term wireless interactive learning devices (WILD), an acronym created at SRI International's Centre for Technology in Learning, to define technology that made it possible for learners to work at unique activities in ways that were previously impossible. Mobile learning can occur in the classroom, during an online course or anywhere. The learner does not even have to be at a predetermined location. It is not about the device, but about the connectivity, capabilities and experience. Access through mobile devices should be a choice and a part of the total learning environment (Brown, 2005).

Corbeil and Corbeil (2007) predicted that mobile learning would one day provide learning that was truly independent of time and place, facilitated by portable computer capable of providing rich interactivity, total connectivity and powerful processing. Keegan (2002) anticipated that mobile learning is a harbinger of the future of learning. The applications of mobile learning can be employed widely in high schools, colleges, universities and corporate learning as well as distance learning settings. Instructional designers and teachers need a solid theoretical foundation for mobile learning in the context of distance education and more guidance about how to utilize emerging mobile technologies and integrate them into their teaching.

Goh and Kinshuk (2006) summated that utilizing mobile devices in education is mainly considered as enhanced tools which can be categorized into six as; games and competition in learning, classroom learning, laboratory learning, field trip learning, distance learning and informal learning. Games and competition learning implies the use of phone-based games to improve students (especially primary and secondary schools) their spelling, reading and mathematics skills. Classroom learning enhances the use of mobile devices in the laboratory environment to support individual learning as well as collaborative learning". One example of classroom learning would

be using mobile devices like smartphone to brainstorm, take quiz, and vote. Laboratory learning is similar to classroom learning but has data acquisition as extra function.

Distance learning uses mobile devices to support synchronous and asynchronous learning. An example is using videophone to deliver home education for students with severe physical impairment. Informal learning is enabled with context aware technologies. The setting of informal learning can include gallery, garden, aquarium, museum, and so on.

The difference between m-learning and traditional classroom learning cannot be over emphasized. M-learning is learner-centered as opposed to classroom lecture-form of learning which is teacher-centered. The traditional forms of learning require learners to be present at a fixed location. Conventional e-learning enables learners from a distance with personal computer (PC) and internet connection to learn and interact with others online. However, the size and weight of PCs and internet availability is a limitation because learning process is tied to computers' location and internet access. Mobile devices solve this problem and promote learning anytime and anywhere (El-Hussein & Cronje, 2010). If m-learning could be achieved via the use of mobile devices in university campuses, students would most probably see it as a great advantage. Another advantage of m- learning technologies over conventional e- learning is the ability to incorporate context-awareness. Context-awareness involves having sensors in mobile devices such as smartphones, tablet computers among others that are capable of detecting the student learning behaviours in the real world and then stimulates more adaptive learning activities (Hwang, Wu & Chen, 2007).

Wenger and Snyder (2000) stated that there are two categories of mobile learning, which are also referred to as primary delivery strategies. Mobile learning can be in form of performance support system, which means using mobile devices to deliver performance support (PSS) or as communication that creates knowledge such as teaching through communication. M-learning performance support systems (PSS) are similar to traditional performance support services (PSS). M-Learning solutions integrate mobile devices to help users perform tasks such as providing information, guidance and learning experiences when and where they are needed. When users implore the cell phone to find a phone number, check the date and time or calculate, they experience m-learning as performance support.

On the other hand, when users call using a cell phone while travelling to ask expert's advice or send e-mails via Blackberry smartphones, iPods, tablet computers, among others during a class

meeting or asking for definitions or examples, they experience m-learning as communication that creates knowledge.

Perceptions on the ease of use play key roles in human functioning because it affects behaviour not only directly, but by its impact on other determinants such as goals and aspirations, outcome expectations, affective proclivities, and perception of impediments and opportunities in the social environment (Bandura, 1995, 1997). Cazares (2010) opined that users with low level of confidence are less likely to use technology and will typically believe that technology is difficult to use. Therefore, perceptions on the ease of use of technology of these set of people could be low. However, Claggett and Goodhue (2011) believed that the issue of confidence in respect to self-efficacy is quite different from skills and abilities individual have acquired to perform ICT related activities. Self-efficacy is a key determinant to one's perception and any kind of activity individual engages in, effort put in ensuring success in the activity and abilities possessed to face challenges when the need arises (Downey & McMurtrey, 2007). Fear of failure and lack of ICT knowledge formed some of the attitudes that led to the reasons why lecturers lack confidence of adopting and integrating ICT into their teaching (Balanskat, Blamire & Kefala, 2007).

Mudi (2013) investigated teachers' perceptions towards integrating mobile phones into teaching in public senior secondary schools in Federal Capital Territory, Abuja. 682 teachers were sampled using stratified random sampling techniques to generate information on their perception. The findings revealed that secondary school teachers have perceptions towards integrating mobile phone for teaching; there is no significant difference between male and female teachers on their perception; less, moderate and high experienced teachers have similar perceptions toward integrating mobile phones into Nigerian schools. However, there was significant difference in the perception of teachers with NCE, Bachelor degree and masters' degree holders with bachelor and masters degree teachers have high perception towards integrating mobile phone into school system.

Bamidele and Olayinka (2012) investigated teachers' perception of integrating the use of mobile phones into teaching in public senior secondary schools of Oyo and Lagos state, Nigeria. Four hundred and twenty-one teachers (220 in Oyo state and 201 in Lagos state) teaching in public senior secondary schools of Lagos ad Oyo states were used as population sample. The findings showed that teachers use mobile phones for personal use but not willing to use for teaching. Also,

teachers do not agree that, they may have phobia or anxieties if using mobile phones for teaching, reason being that they are already used to the device. If using mobile phones, performance of teachers could be commented on through feedback mode, also, students will never miss class as they have the lesson modules to download any day, anytime.

Oyinlola (2012) reported that a number of mobile devices were available for use by the students in the selected Universities, these include laptop, cell phone, MP3 and MP4 a lot of others. 94.6% of the students attested to the availability of laptop computers while 100% of the students owned and used a cell phone. 87.8% of the students confirmed that they have internet access through WIFI connection on their mobile phones.

Ayinde (2011) investigated the computer self-efficacy among teachers in primary, secondary and tertiary institutions in Niger State, Nigeria. Three hundred and twenty one (321) teachers were asked to indicate their experience and level of proficiency in the use of computer, The findings showed that, male and female teachers in secondary school have similar competence in the use of computer. Male primary school teachers were more proficient in the use of computer than their female counterparts. The female lecturers were more proficient in the use of computer than the male lecturers. This is contrary to Chukwuemeka (2010) findings which showed that the female teaches having inadequate proficiency skills in using internet for teaching and learning process.

Gambari, Gbodi and Yaki (2008) investigated lecturers' Internet level of competency in Nigeria Universities (A case study of Federal University of Technology (FUT) Minna, Niger state). One hundred lecturers, (50 male and 50 female) from FUT, Minna, Niger state participated in the study. Data were collected for the study through the administration of 10-item questionnaire. The data were analyzed using mean, standard deviation, t-test ad one-way ANOVA in testing the hypotheses. The findings showed that male lecturers are more competent in using Internet than their female counterparts. Also, less experienced lecturers are more exposed to the use of internet than moderately and highly experienced lecturers. It was recommended among other things, that lecturers should be encouraged to acquire Internet skills; computers and Internet connectivity should be made available to lecturers; and old lecturers should be encouraged to develop and follow the new trends of technology in order to be relevant in this computer age.

Lecturers' attributes are also factors that contribute to the integration of mobile devices in education. Amongst these attributes is gender, teaching experience and area of specialization.

Gender is likely to have major implications for education and ICT in the future and in order to ensure good communication between lecturers and students, it is vital to have an understanding of how different groups may approach the use of ICT. Gender has been identified as one of the factors influencing lecturers' perception. Perceptions on integrating of mobile devices for teaching are issue to gender analysis and when observing communication habits, it is important to be aware of the different ways in which male and females view the mobile devices. Some studies have shown very significant differences in the use of ICT with regard to gender.

Leung and Wei (2000) revealed that men tend to use mobile devices as an instrument to do business (teaching included) while women tend to make social calls. In addition, Kolb (2008) also discovered that women have more attachment to their mobile devices like cell phones than men, especially to text messaging. Michaud (2009) identified that, there is a gender difference in technology adoption practices, there is also a gender difference in technology preferences. Females have a lower rate of use for audio and video creation and multi-user gaming than males, to the extent that two times as many males as females use video creation and multi-user gaming. However, Oyinlola (2012) revealed that, there is no significant difference in the perceptions of students based on their gender. This study therefore investigated easy usage of mobile devices for teaching undergraduates as perceived by lecturers in Kwara state, Nigeria. The major question raised in the study is: what is the perception of lecturers on the ease of use of mobile devices for teaching in Kwara State.

The following null hypotheses were also formulated to establish empirical evidence on the study.

H_{01}: There is no significant difference between male and female lecturers in their perception on the ease of use of mobile devices for teaching

Methods

The descriptive design of survey method was used in this study. The population for the study consisted of all lecturers of universities in Kwara state The universities sampled comprised University of Ilorin, Al-Hikmah University, Kwara State University Malete and Land mark University Omuaran.. Convenient sampling was used to select 356 lecturers from the four universities without preference for size or institution type. The instrument used for this study is a researcher's designed questionnaire entitled "Ease of Use of Mobile Device Questionnaire (EUMDQ)". The instrument consists of two sections. Section "A" elicits Bio-data information from the participants such as gender, and name of school. Section "B" elicits information on the

““Ease of Use of Mobile Device by Lecturers” and it has twenty (20) items. Patterned after a Four-Point Likert Type scale format of: Strong Agree, Agree, Disagree and Strongly Disagree.

The instrument was validated by experts in Education Technology Department and Counsellor Education Departments in University of Ilorin. The reliability of the instrument was ascertained through test re-test method and the two set of scores obtained were correlated using the Pearson Product Moment Correlation Co-efficient (r) at 0.05 alpha level. The co-efficient (r) of 0.61 was obtained. This was considered high enough to make the instrument reliable.

In section “A” descriptive statistics was used to identify the percentage of participant in the study based on gender and schools while section “B” was scored using Four Point Likert Type scale which was quantified as follows: Very Often (VO) = 4 points Often (O) =3 points Not Often (NO) =2 points Not at All (NAA) =1 point. In determining the perception of lecturers on easy usage of mobile devices for teaching the responses of the lecturers were subjected to mean rating. That is, the average score any respondents can obtain is 4+3+2+1= 10/4 = 2.5. This means that mean scores from 2.5 and above indicated high perception, while scores less than 2.50 were considered as low perception. Percentage, mean rating and t-test were used to analyze the data collected. All hypotheses were tested at 0.05 significance level.

Results

Table 1: Distribution of Respondents (Lecturers) by Universities

Universities	Lecturers	%
Al-hikmah University, Ilorin	54	15.2
Kwara State, University, Melete	83	23.3
Landmark University, Omu-Aran	62	17.4
University of Ilorin, Ilorin	157	44.1
Total	356	100

The distribution of the lecturers according to the Universities shows that 44.1% of them were from the University of Ilorin, 15.27% were from the Al-hikmah University, Ilorin, 23.3% were from Kwara State, University, Melete while 27.2% were from Landmark University, Omu-Aran

Table 2: Distribution of Respondents (Lecturers) by Gender

Name of University	Gender				
	Male	%	Female	%	Total
Al-hikmah University,	37	68.5	17	31.5	54
Kwara State, University	46	55.4	37	44.6	83
Landmark University	21	33.9	41	66.1	62
University of Ilorin	89	56.7	68	43.3	157
Total	193	54.2	163	45.8	356

The distribution of lecturers involved in this study based on gender shows that there was a difference in the distribution along gender lines. The results in table 5 show that (193) 54.2% were males in all the universities while (163) 45.8% of the lecturers were females. The results in the table also show that the University of Ilorin has 56.7% of the lecturers as males and 43.3% of the lecturers as females; Al-hikmah University has 68.5% of the lecturers as males and 31.5% of the lecturers as females, Kwara State, University has 55.4% of the lecturers as males and 44.6% of the lecturers as females, while Landmark University has 33.9% of the lecturers as males and 66.1% of the lecturers as females.

Research Question 1: What is the perception of lecturers on the ease of use of mobile devices for teaching?

Table 3: Perceptions of Lecturers on the Ease of Use of Mobile Devices for Teaching

S/N	Items	Mean
1	The flexibility of mobile devices will ensure easy dissemination of knowledge and information to students	2.64
2	It would be easier to remember how to perform teaching tasks using mobile devices	2.27
3	Mobile devices will be easier to use because it is internet enabled	2.64
4	Using mobile devices make learning clearer and understandable	2.56
5	It is easy for me to become skillful at using mobile devices for teaching	2.40
6	It is easy to remember how to perform tasks using mobile devices	2.16
7	Using mobile devices for instruction would requires a lot of skills and effort to ensure learning takes place	2.70
8	Assessment and other modes of evaluation will be made easier with mobile devices	2.75
9	It is easy to customize mobile devices for educational uses	1.92

10	It will demand a lot of training and re-training to become skillful in using mobile devices for teaching	1.96
11	It will not demand a lot of effort to become skillful in using mobile devices for instructional process	2.97
12	It takes a lot of effort to become skillful in using mobile devices for instructional process	2.48
13	The application of mobile devices for teaching is relatively easy for me	2.61
	Grand Mean	2.47

Table 3 shows the mean rating of the respondent perception on the ease of use of mobile devices in teaching. The result showed that item 11 which stated that mobile devices will not demand a lot of effort to become skillful in using mobile devices for instructional process has the highest mean score of 2.97. This was followed by items 8 and 7 which stated that assessment and other modes of evaluation will be made easier with mobile devices and that using mobile devices for instruction would requires a lot of skills and effort to ensure learning takes place has mean scores of 2.75 and 2.70 respectively. This was followed closely by items 3 and 1 which stated that mobile devices will be easier to use because it is internet enabled and the flexibility of mobile devices will ensure easy dissemination of knowledge and information to students both have a mean score of 2.64.The lowest mean score was item 9 which stated that it is easy to customize mobile devices for educational uses has a mean score of 1.92. The grand mean score of the perception of lecturers on the ease of use of mobile devices for teaching was 2.47. This implies that lecturers perceived mobile devices to be easy to use for teaching.

Hypothesis Testing

Ho_1: There is no significant difference between male and female lecturers in their perception on the ease of use of mobile devices for teaching

Table 4: Mean, Standard Deviation Lecturers' Perception on the Ease of Use of Mobile Devices for Teaching based on Gender

Gender	N	X	SD	df	cal -t	Sig	Remark
Male	193	31.29	4.83				
				354	1.07	0.44	Accepted
Female	163	31.75	4.61				

From table 4, it can be deduced that there was no significant difference between male and female lecturers' perceived ease of use of mobile devices for teaching. This is reflected in the result: df (354) t= 1.07, p>0.05. Thus, the hypothesis is accepted. This means that the null hypothesis which states that there is no significant difference between male and female lecturers in their perception on the ease of use of mobile devices for teaching is accepted. The implication is that male and female lecturers perceived mobile devices for teaching to be easy to use.

Discussion

Perceptions of Lecturers on Ease of Use of Mobile Devices for Teaching

The result of this study revealed that lectures perception of use of mobile technology include; use of mobile devices for teaching did not demand a lot of effort to become skillful in using mobile devices for instructional process; it flexibility will ensure easy dissemination of knowledge and information to students; Mobile devices is easier to use because it is internet enabled; it use for instruction would requires a lot of skills and effort to ensure learning takes place, and assessment and other modes of evaluation will be made easier with mobile devices among others. This implies that lecturers perceived mobile devices easy for teaching.

The result of this study is line with Traxler (2007) who found that mobile devices are useful for mobility of learning in terms of learner's experiences of learning which support a wide variety of conceptions of teaching uniquely placed to support learning that is personalized, authentic and situated. Also, Ash (2013) reported that the proliferation of tablets, smartphones and other mobile devices has increased the number of games, apps, and software to help students learn and increase their literacy skills.

However, based on the usage by student, Labrow (2004) expressed concern on the with sending messages through the use of various apps for example "your" spelled as "ur", "problems" cut down to "probs" and students' ability of letter writing has fallen which has negatively affected the standard of education. Noble (2009) also stated that there are serious concerns about their misuses which include cheating on exams, cyber bullying or just being disruptive in class. This implies that if integrated into teaching, it would be a welcome idea by lecturers. Therefore, necessary efforts should be made on the training and retraining lecturers to become vast and highly proficient in the use of mobiles devices.

Gender Influence on the Perceptions of Lecturers on Ease of Use of Mobile Devices for Teaching

The null hypothesis which stated there is no significant difference in the perceptions of lecturers on the ease of use of mobile devices for teaching based on gender was accepted. The implication is that male and female lecturers perceived mobile devices easy to use for teaching. The result is in line with the findings of Yusuf and Balogun (2011) who also found no significant difference between male and female student-teachers' attitudes in the use of ICT. Ayinde (2011) investigated the computer self-efficacy among teachers in primary, secondary and tertiary institutions in Niger State, Nigeria and found that male and female teachers in secondary school have similar competence in the use of computer. Also, Bamidele and Olayinka (2012) found that male and female teachers in secondary school have similar competence in the use of computer. However, male primary school teachers were more proficient in the use of computer than their female counterparts. On the other hand, some other researchers found significant difference which is contrary to the finding of the study. For instance, Chukwuemeka (2010) found that female teachers having inadequate proficiency skills in using internet for teaching and learning process. Also, Gambari, Gbodi and Yaki (2008) also reported that male lecturers are more competent in using Internet than their female counterparts. The reason for the result of this study may be due to the fact that both male and female lecturers in the contemporary period have access to various mobile devices in which they use personally for their work, researches and daily activities. Therefore using it for teaching may not seem difficult for them to use.

Conclusion

Based on the findings of the study, the following conclusions were drawn:

- Lectures perception of the ease of use of mobile devices for teaching is positive.
- Mobile devices are easy to use for teaching because use of mobile devices for teaching did not demand a lot of effort to become skillful in using mobile devices for instructional process; it flexibility will ensure easy dissemination of knowledge and information to students; Mobile devices are easier to use because it is internet enabled; it use for instruction would requires a lot of skills and effort to ensure learning takes place, and assessment and other modes of evaluation will be made easier with mobile devices among others. This implies that lecturers perceived mobile devices easy for teaching.
- Male and female lecturer's perception of the ease of use of mobile devices for teaching is similar.

Recommendations

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

- Lecturers should be encouraged to attend trainings, conferences and capacity building workshops in order to acquire skills on the use of Mobile Devices and other ICT tools for teaching.
- Instructional designers and teachers should synergize and build solid theoretical foundation for mobile learning in the context of distance education and on how to utilize emerging mobile technologies and integrate them into their teaching.
- Awareness through seminar and workshop should be mounted for lecturers universities on how courses could be taught using mobile technologies to support learning and they should be taught the skills in using mobile devices for teaching and learning processes.

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SOCIAL MEDIA INFLUENCE ON ACADEMIC PERFORMANCE OF UNDERGRADUATE STUDENTS IN UNIVERSITIES IN ILORIN METROPOLIS

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Abstract

Social media, an online technology platform that connects people from different locations, has become an integral part of people's lives worldwide. It has a strong influence on how students learn and perform. This study investigated the social media influence on academic performance of undergraduate students in Universities in Ilorin and specifically found out the available and accessible social media sites to the students, ascertained the frequency of use of social media sites among undergraduate students and investigated its influence on their academic performance. A descriptive survey research design was adopted for this study from two Universities, a simple random sampling technique was used to select a sample of 60 students from each school and a researcher-designed questionnaire was used to elicit responses from the students. The findings of the study revealed that available social media sites are highly used by the students. Also, it was revealed that the influence of social media on academic performance of undergraduate students in Ilorin is high and that there is no significant difference in the influence of social media on academic performance of undergraduate students based on gender and age. It was recommended that more social media applications that enhances learning and students' optimal academic achievements should be encouraged, while the students endeavour to have a balanced view of the use of social media as well as the time spent on these sites. Also, trainings should be organized for lecturers in the use of the evolving social media sites/apps for effective virtual lecture delivery.

Keywords: Social Media, Influence, Academic Performance, Undergraduate Students

Introduction

In the twenty-first century, the world is witnessing remarkable advancements in communication technology, which have significantly expanded the scope of communication through Information and Communication Technologies (ICTs). Ufuophu and Ayobami (2012) have identified various components of ICTs, including the internet, satellite communication, cable data transmission, and computer-assisted equipment. Throughout history, people have developed diverse methods of communication, ranging from traditional methods like postal services, carrier pigeons, telegraphs, light signals, to the invention of the telephone. However, these methods often involved significant delays in receiving responses, sometimes spanning months or even years. Nevertheless, the pursuit of faster and more efficient means of communication has remained a constant endeavor.

The internet is the largest computer network in the world, connecting millions of computers. It can also be defined as the interconnection of millions of computers together through a network in order to send and receive resources (Kim & Byung-Keun, 2015). A network is a group of two or more computer systems

linked together. In the early days, most people just used the internet to search for information. The internet is a constantly evolving tool that not only contains an amazing variety of information, but also provides new ways of accessing, interacting and connecting with people and content. As a result, new terms are constantly appearing as new technologies are introduced.

The advent of the internet in the 1990s led to major developments in the world of communication hence the introduction of Social Networking Sites (SNSs). The coming into being of these sites revolutionized the world of communication and we celebrate its improvements ranging from education to entertainment. The evolution of the internet has led to its usage as the best medium of communication whereby more than two-third of the internet world 's population visit social networking sites (SNSs) thus serving as communication and connection tools (William, et. al., 2021). Advances in Internet technologies have spurred on compelling changes in how we interact, communicate, learn, and build knowledge. In general, worldwide Internet users have increased rapidly between 2005 and 2022. The Internet has taken a firm place in people's lives. It is difficult to imagine a young man who at least once a day did not check for updates in social networks and did not leaf through the news lines. The modern reality requires us to stay in touch and keep abreast of the latest news and trends.

Internet in Nigeria has always been an investment opportunity. Although Nigeria is not the country with the most internet user penetration in Africa but during 2016 regardless of the dense population there achieved a rise in the numbers of internet users in Nigeria. In 2017 according to Nigeria Communication Commission (NCC) reports, the number of internet users was released as about 91 million which decrease when compared to 2016 data. Nigeria's most internet traffic comes mainly from mobile and desktop computers most of which are served by Mobile ISPs (Internet Services Providers), Ethernet, wired and wireless. To make internet easily accessible, mobile internet service providers offer campus zone discount prepaid/postpaid internet service for students and school staffs. In 2018, there are about 103 million internet subscribers in Nigeria (Nigeria Internet Statistics, 2018).

Social media is an essential part of life for people around the world, social media are online technology platforms that help to connect people together far and near. It is used to build relationship among people (Social Media by Students, 2017). With their help, we can communicate with each other, even on different continents, listen to music, read books, look at photos and much more. Social media have greatly simplified our lives and tightly tied to ourselves (Shensa, et, al., 2015). According to Web Designer, Social networking was born in 1971, when the first email was sent, the message said "qwertyuiop". The first social networking sites was created called Geocities which allows the users to create and customize their web sites, grouping them into cities based on the site's content.

Social media sites according to Wikipedia include: Facebook, WhatsApp, QQ, WeChat, Instagram, Twitter, Skype, Viber, Snapchat, LinkedIn, Telegram, Badoo, Youtube, Flickr, Tiktok, Yahoo Messenger,

Messenger, Blackberry Messenger (BBM), Google talk, Google+ Messenger, and so on. These networking sites are used by most people to interact with old and new friends, physical or internet friends. According to Digital Report (2019), there are 3.48 billion social media users and there are 3.26 billion people use social media on mobile devices. Facebook is an online social networking service headquartered in Menlo Park, California. Its website was launched on February 4, 2004 by Mark Zuckerberg with his college roommates and fellow Harvard University students, Eduardo Saverin, Andrew McCollum, Dustin Moskovitz and Chris Hughes. The founders had initially limited the website's membership to Harvard students, but later expanded it to colleges in the Boston area, the Ivy League, and Stanford University (www.en.wikipedia.org/facebook). It gradually added support for students at various other universities and later to high-school students. Since 2006, anyone who is at least 13 years old is allowed to become a registered user of the website, though the age requirement may be higher depending on applicable local laws. The name 'Facebook' came from a colloquialism for the directory given to it by American universities students (www.en.wikipedia.org/facebook). Being part of the social network is simple. An individual would be required to register in order to have an account. After registering to use the site, users can create a user profile, add other users as "friend", exchange messages, post status updates and photos, share videos and receive notifications when others update their profiles. Facebook had over 1.18 billion monthly active users as of June 2015. As of February 2015, it reached a market capitalization of $212 Billion (www.en.wikipedia.org/facebook). Ethnographic sources revealed that Facebook is the most popular social networks used in Nigeria. as at the third quarter of 2018, there were over 2.2 billion monthly active facebook users, accounting for almost half of the internet users worldwide (Digital Report, 2018).

WhatsApp is a freeware, cross-platform messaging and voice over IP (VoIP) owned by Facebook, Inc (Metz, Cade, 2016). It was created by Brian Acton and Jan Koum, it was released January 2009. It allows users to send text messages and voice messages, make voice and video call and share images, documents, user locations and other media. WhatsApp's client application runs on mobile devices but it is also accessible from desktop computer, as long as the user's mobile devices remains connected to the internet while they use the desktop app. It is used by people in over 180 countries. Initially, WhatsApp was used by people to communicate with their family and friends. Gradually, people started communicating with business via WhatsApp(http://www.en.wikipedia.org/whatsapp). As at February 2017, it had over 1.2 billion users globally reaching 1.5 billion monthly active users by the end of 2017 (Statt, Nick, 2016: Josh).

Instagram is an online mobile photo/video sharing and social networking services thatenables its users to take pictures and videos, and share them on a variety of social networking platforms, such as Facebook, Twitter, Tumbler and Flicker (Systrom and Kreger, 2010). Its distinctive feature is that it confines photos to a square shape, similar to Kodak Instamatic and Polaroid images, in contrast to the 4:3 aspect ratio typically used by mobile device cameras. Users can also apply digital filters to their images

(Systrom and Kreger, 2010). Instagram was created by Kevin Systrom and Mike Krieger, and launched in October 2010 as a free mobile application (www.en.wikipedia.org/instagram). Instagram rapidly gained popularity, with over 100 million active users as of April 2012 and over 300 million in December 2014. The service was acquired by Facebook Inc. It is a powerful social media site that can drive amazing traffic to websites. A lot of powerful brands are using it successfully and they are reporting that it works better for them than Facebook and Twitter combined (Jonny, 2014).

Twitter is an online social networking service that enables users to send and read short (140characters) messages called "tweets". Registered users can read and post tweets, but unregistered users can only read them. Users access Twitter through the website interface, SMS, or mobile device application. Twitter Inc. is based in San Francisco and has more than 25 offices around the world (www.en.wikipedia.org/twitter). Twitter was created in March 2006 by Jack Dorsey, EvanWilliams, Biz Stone and Noah Glass and launched in July 2006. The service rapidly gained worldwide popularity, with more than 100 million users who in 2012 posted 340 million tweets per day. The service also handled 1.6 billion search queries per day. In 2013, Twitter was one of the ten most-visited websites, and has been described as the 'SMS of the Internet'. As of May 2015, Twitter has more than 500 million users, out of which more than 302 million are active users (www.en.wikipedia.org/twitter).

This has breached the gab that existed in communication where people had to rely solely on traditional methods such as letters and phone calls as a mode of getting in touch with friends and relatives. Communication is as easy as walking into a neighbor's residence to deliver a piece of information or vice versa through the use of social media. During the time spent discovering individuals for acquaintances, youngsters go into different connections and get the chance to speak with a relatively boundless number of individuals and premium gatherings, with a wide range of identities, take in a considerable measure of stories, have the opportunity to trade suppositions and talk about issues important to them. Therefore, users of social networks, in most cases, are a representative of the younger generation. It is not surprising that social media usage is one of the most common activities among children, adolescents, and emerging adults nowadays. It offers the youth a portal for entertainment and communication and it is becoming one of the main platforms for accessing information and news. The social media usage of American adults aged 18–29 years who represent the higher percentage of university students rose from 12 percent in 2005 to 90 percent in 2015 (Perrin, 2018). Saied, ElSabagh and El-Afandy, (2016) reported that this percentage has increased to 54.6% in 2015; more than 80 percent of them are young people specifically university students.

Academic excellence or achievement plays an important role in an individual placement, be it in the academic institutions or job placement. Due to this, many people are concerned with the ways they can enhance their academic achievement. The emphasis on academic excellence which is also prevalent worldwide has encouraged many studies about the conditions promoting it. Scholars agree that students'

academic achievement is a 'net result' of their cognitive and non-cognitive attributes (Lee & Stankov, 2016) as well as the socio cultural context in which the learning process takes place (Liem & Mclnerney, 2018, Liem & Tan, 2019).Academic performance, which is measured by the examination results, is one of the major goals of a school. Academic performance or achievement is the outcome of education, the extent to which a student, teacher or institution has achieved their educational goals. Academic performance is commonly measured by examinations or continuous assessment but there is no general agreement on how it is best tested or which aspects are most important, procedural knowledge such as skills or declarative knowledge such as facts (Annie, Howard & Mildred, 1996).

The social media craze has also hit university and post-secondary institutions, which cannot remain impartial to these rapidly changing technologies (Dumpit & Fernandez, 2017). Putting into consideration how social media became embedded within the young generation lifestyle, college student affairs professionals found a way to use social media as a method of communication between the college administration and the students (Junco, 2012). Furthermore, most of the universities nowadays have an official page or group on one of the social media networks where students, professors and staff can share resources and interact (Selwyn, 2009). Many universities have even established their own social media networks in order to help new students to socialize and connect with the faculty members, staff, and alumni and to establish a sense of connection with the institution. Using social media networks in such a way helps in facilitating the process of knowing more about campus facilities, activities and events especially for the freshman students, and ultimately adjusting to university life. Even though the majority of students are active users on social media networks, yet 70 percent of them do not use social media for academic purposes (Jones, et. al., 2010).

As we know, nothing interesting is ever completely one-sided, so it is for social media as it comes with both positive and negative effects. There is a correlation between social media usage and academic performance of students in universities. There have been various views and opinions which recognize four major advantages of social media use in higher education. These include; enhancing relationship, improving learning motivation, offering personalized course material, and developing collaborative abilities. The use of social media by students helps to have access to basic information as quick as possible (Social Media by Students, 2017). Tariq et al. (2012) are some of the researchers that emphasize that the affordances of technologies might have severe negative consequences on "social networks addicts." They, for example, fear that "social networks grab the total attention and concentration of the students and divert them towards non educational, unethical, and inappropriate actions such as useless chatting, time killing by random searching. According to scientists, social networks are especially dangerous for teenagers, as they form a false impression that love and friendship are easy to conquer and just as easy to destroy (East, S. 2016). They claim that the latter provide access to knowledge and help students exchange information quickly.

Others think that students' use social media primarily to communicate about everything except studies and that they only distract students from the learning process. Also, Liccardi et al (2007) argued that students are socially connected with one another and therefore share their daily learning experiences and do conversation on various topics through social media whereas Kuppuswamy and Shankar (2010),reviewed that social network websites grab students' attention and then diverts it towards non-educational and inappropriate actions including useless chatting.

Research has proven the heavy presence of social media usage among students. Wiley and Sisson (2006), for instance argue that previous studies have found that more than 90% percent of tertiary school students use social networks. It was also found out that, students use social networking sites (SNSs) approximately thirty (30) minutes throughout the day as part of their daily routine life (Nicole, Charles, and Cliff, 2007).This shows the level at which students are patronizing these sites and this may bring along both positive and negative effects on students as far as their academic performance is concerned. Many universities and schools around the world restrict the access to social networks within its buildings. They justify this by helping students concentrate on their studies. On the other hand, they deny students the opportunity to use the numerous materials available on these resources, such as scientific videos on YouTube (Kolan, Dzandza, 2018).

The influence of social media on learning and teaching is increasingly considered and debated among higher education scholars, administrators, and stakeholders. Lynn, Healy, Kilroy, Hunt, Werff, Venkatagiri and Morrison (2015) considered social media as one of the game-changers in the realm of learning and instruction. McLoughlin& Lee (2010) stated that using social media networks in the educational process could help educators to apply the inquiry-based approach and encourage the collaboration between the instructor and the students, thereby encourage engagement. Also important is the potential of these technologies for encouraging independent self-directed learning as well as encouraging students' as active producers of knowledge (Dumpit& Fernandez, 2017), which once again is commonly regarded as a positive affordance for media.

Social media addiction is defined as compulsive and excessive use of social media like Facebook, Twitter, Instagram, Snapchat etc. Social media addiction has been found to be associated with a host of emotional, relational, health, and performance problem of students (Marino, et. al., 2017; Marino, et. al., 2018) studies shown that the symptoms of social media can be manifested in mood, cognition, physical and emotional reaction, interpersonal and psychological problem (Blachino, et. al., 2017). One can get addicted to social media such as alcohol, tobacco, and injectable and non-injectable substances because of proffered rewards (Social Media Addiction, 2017). Undergraduate students viewing or checking their phone frequently or constantly form Facebook or WhatsApp notification and also feeling in a low mood when

they don't have access to social media and spending more time broadcasting their activities on their timeline as a result expired subscription is a sure sign of social media addiction.

Undergraduate students are usually more prone to develop social media addictive behavior because they tend to embrace social media sites much more than the older generation. Social media makes undergraduates students to participate in virtual conservations, answering messages even in inappropriate circumstances, and they get pathologically engaged in these activities, resulting in poor academic performance, insomnia, distress, anxiety, lack of focus, disrupted eating habits, excessive fatigue and diminished real-life social interaction. Undergraduate students prefer to share their problem or what they are going through on social media instead of sharing it with their parents; they often get cut off from the real world. The negative effects of social medias make undergraduates students to be exposed to unwanted contact, abusive messages, harassment, stalking, bullying, easy access to personal information and their time-consuming nature which leads to students performing poor in their academics. (Guedes, et. al., 2016; Davey & Davey, 2015).

Males and Females use social media at similar rates (Pew research center, 2017). However, according to Lim, Heinrichs and Lim, (2017) females perceive social media differently than males. Social media corporations found out that interest and curiosity are the main factors that affect the social media usage of females, whereas variety of contents is the main factor that affects the social media usage of males. Zheng, Yuan, Chang & Wu (2016) showed that females use to put seductive profile pictures more than males because they believe that the attractiveness of the profile picture influences the number of online followers or friends they have. This study also showed that females gave emphasis to emotional expression while using social media. On the contrary, males enjoy showing that they are having fun while using social media. Chan, Cheung, Na Shi & Lee (2015) showed that the majority of females use social media for socializing and connecting with their family members, whereas males are more focused on task- oriented actions and gaming.

Statement of Problem

The internet is the most important source of information and the growing dimensions of the use of social media by students cannot be underestimated. Instead of students studying their books, they spend their time chatting and making friends via social media and this might definitely have influence on their academic performance. It has been observed that students devote more attention and time to social media than they do to their studies and this has affected their studies negatively (Osharive, 2015). Also, the study conducted by Maya (2015), revealed that media use contributed to low academic performance, low self-perceptions and less interest in college-oriented work. Studies have also revealed that social media affects

students' use of English. They tend to use short- handwriting to chat with friends and get used to it thereby replicating the same errors during examinations. It is a common sight to see a student chatting in sensitive and highly organized places like church, mosque and lecture venues. Some are so carried away that even as they walk along the high way, they keep chatting (Obi, Bulus, Adamu and Sala'at,2012). In this 21st century, students at all levels especially tertiary level have been engaging in the use of social media for various purposes, thus, this research therefore seeks to investigate the social media influence on academic performance of undergraduate students in Universities in Ilorin Metropolis.

Purpose of the study

The purpose of this study is to examine the influence of social media on academic performance of undergraduate students in Universities in Ilorin. Specifically, found out the available social media sites to the students, determined the accessible Social Media sites among the undergraduate students, ascertained the frequency of use of social media sites among undergraduate Students an investigated the influence of social media on academic performance of the undergraduate students in Ilorin. This study sought to answer following research questions:

1. what are the available social medial sites among undergraduate students?
2. how frequent is the use of social media among Undergraduate Students?
3. what is the influence of social media on academic performance of undergraduate students?

Methodology

This study is a descriptive research design of the survey type. The population for this study consisted of all Universities in Ilorin, Kwara State, but purposive and simple random sampling techniques was used to select two universities which are both public and private universities. The sample of respondents used for the study is sixty (60) students each from both universities making a total of one hundred and twenty (120) respondents.

Research Instrument

A researcher-designed questionnaire titled "Social media Influence on academic performances of undergraduate students in Universities in Ilorin Metropolis" was the research instrument used to elicit response from the students. The questionnaire has five sections, the first section was for demographic information, the second section focused on available social media sites among undergraduate students in Universities in Ilorin Metropolis and the third section determined the frequency of use of social media among undergraduate students, while the fourth section investigated the influence of social media on academic performance of undergraduate students. The research instrument was validated by three ICT

specialists, while inter-rater/observer reliability method was used to ascertain the reliability of the instrument.

Data Analysis

In this study, the data collected from the respondents were analyzed using descriptive statistic. The Demographic data were analyzed using frequency and percentage while research question 1 was answered using mean rating, and research question 3 to 4 were answered using cumulative means. The formulated research hypotheses were subjected to the independent t-test statistic and tested at 0.05 level of significance using t-test and Analysis of Variance (ANOVA).

Table 1: Distribution of Respondents Based on Gender

Gender	Frequency	Percentage
Male	51	42.5
Female	69	57.5
Total	120	100.0

Table 1 indicates that 120 respondents participated in the study out of which 51 (42.5%) were males, while 69 (57.5%) of the respondents were females. This implies that there are more female respondents that participated in the study.

Table 2: Distribution of Respondents Based on Age

Age	Frequency	Percentage
15 – 20 years	12	10.0
21 – 25 years	76	63.3
26 years and above	32	26.7
Total	120	100.0

Table 2 indicates that 12 (10%) of the respondents are between 15 to 20 years, 76 (63.3%) of the respondents are between 21 to 25 years, while 32 (26.7%) of the respondents are between 26 years and above.

Table 3: Distribution of Respondents Based on Institution proprietorship

Institution	Frequency	Percentage
University A (Public)	70	58.3

University B (Private)	50	41.7
Total	120	100.0

Table 3 indicates that 120 respondents participated in the study out of which 70 (58.3%) were from University A (Public), while 50 (41.7%) of the respondents were from University B (Private). This implies that there are more respondents from University A (Public)that participated in the study.

Research Questions 1: What are the available social medial sites among undergraduate students?
Table 4: Distribution Showing Available Social Media Sites among Undergraduate Students

Items	Available	Non-Available
Facebook	112 (93.3%)	8 (6.7%)
WhatsApp	120 (100%)	-
Snapchat	97 (80.8%)	23 (19.2%)
Twitter	101 (84.2%)	19 (15.8%)
Telegram	103 (85.8%)	17 (14.2%
Instagram	108 (90%)	12 (10%)
Classmate	48 (40%)	72 (60%)
TikTok	67 (55.8%)	53 (44.2%)
Tumblr	19 (15.8%)	101 (84.2%)
LinkedIn	63 (52.5%)	57 (47.5%)

Table 4 indicates that the availability of social media sites among undergraduate students is high. Some of the social media sites available are WhatsApp 120 (100%), Facebook 112 (93.3%), Telegram 103 (85.8%), Twitter 101 (84.2%) and Snapchat 97 (80.8%). While the least social media site non-available among undergraduate students are Tumblr 101 (84.2%) and Classmate 72 (60%).

Research Questions 2: How frequent is the use of social media among Undergraduate Students?

Table 5: Mean and Rank Order on the Use of Social Media Sites among Undergraduate Students

Item N.	Items	Mean	Rank
10	I make use of social media to do my assignments/projects which are in forms of blogs/online presentations	2.77	1st
2	I can't do without visiting social media sites on daily basis	2.73	2nd
4	I make use of social media while eating	2.70	3rd

5	I use social media for making new friends and socializing more than I use it for academic purposes	2.68	4th
1	I spend more time on social media than on my studies	2.51	5th
7	I use social media for more than 8 hours daily	2.50	6th
9	I make use of social media while on the road	2.39	7th
3	Frequent use of social media has affected my communication skills	2.18	8th
6	Frequent use of social media has affected my grade negatively	1.89	9th
8	Social media regularly usage has negative effect on my writing skills	1.82	10th

Table 5 shows that Items 10, 2 and 4 which states that "I make use of social media to do my assignments/projects which are in forms of blogs/online presentations; I can't do without visiting social media sites on daily basis; and I make use of social media while eating" have mean scores of 2.77, 2.73 and 2.70 ranked 1st, 2nd and 3rd respectively. While Items 8 which states that "Social media regularly usage has negative effect on my writing skills" with a mean score of 1.56 rank 10th. Six out of the ten items have mean scores that are above the mid-mean score of 2.50, then it can be said that majority of the respondents affirmed to the stated items and the result thus shows that the use social media sites among undergraduate students is high.

Research Questions 3: What is the influence of social media addiction on academic performance of Undergraduate Students?

Item No.	Items	Mean	Rank
7	I make use of WhatsApp to disseminate information to my class mates	3.58	1st
5	I use social media to get knowledge and information relating to my studies	3.57	2nd
9	Visiting social media sites has contributed positively to my studying pattern and learning styles	3.46	3rd
4	Social media has improved my communication skills	3.34	4th
6	I use materials gotten from blogging sites to compliment what I have been taught in class	3.16	5th
8	There is no difference in my grade since I became engaged in social media	2.63	6th
3	I solely rely on information gotten from Wikipedia to do my assignment without consulting other sources.	2.56	7th
10	I am having difficulty in managing my time properly for effective study because of my engagement with social media	2.43	8th
2	Online social networks distract me from my studies	2.35	9th
1	Addiction to social media affects my academic life	1.92	10th

Table 6: Mean and Rank Order on Social Media Influence on Academic Performance of Undergraduate Students

Table 6 shows that Items 7, 5 and 9 which states that "I make use of WhatsApp to disseminate information to my class mates; I use social media to get knowledge and information relating to my studies; and Visiting social media sites has contributed positively to my studying pattern and learning styles" have mean scores of 3.58, 3.57 and 3.46 ranked 1st, 2nd and 3rd respectively. While Items 1 which states that "Addiction to social media affects my academic life" with a mean score of 1.92 rank 10th. Seven out of the ten items have mean scores that are above the mid-mean score of 2.50, then it can be said that majority of the respondents affirmed to the stated items and the result thus shows that the influence of social media on academic performance of undergraduate students is high.

Hypothesis One: There is no significant difference in the influence of social media on academic performance of undergraduate students based on gender

Table 7: t-test Showing the Social Media Influence on Academic Performance of undergraduate students based on Gender

Gender	N	Mean	SD	Df	Cal. t-value	Crit. t-value	p-value
Male	51	29.03	4.68	118	0.04	1.96	0.96
Female	69	29.00	4.28				

Table 7 shows a calculated t-value of 0.04, a critical t-value of 1.96 and a p-value of 0.96. The p-value calculated is higher than the alpha level at 0.05 then the hypothesis is accepted. Hence, there is no significant difference in the influence of social media on academic performance of undergraduate students based on gender.

Hypothesis Two: There is no significant difference in the influence of social media on academic performance of undergraduate students based on Age

Table 8: Analysis of Variance (ANOVA) showing the Social Media Influence on Academic Performance of undergraduate students based on Age

Source	df	SS	Mean Square	Cal. F-value	Crit. F-value	p-value
Between Groups	2	60.511	30.25	1.55	3.00	0.22
Within Groups	117	2283.456	19.51			
Total	19	2343.967				

Table 8 shows the F-value calculated of 1.55, a Critical value of 3.00 and a p-value of 0.22. The p-value calculated is greater than the alpha p-value at 0.05. The hypothesis is accepted. Hence, there is no significant difference in the influence of social media on academic performance of undergraduate students based on age.

Hypothesis Three: There is no significant difference in the influence of social media on academic performance of undergraduate students based on institution proprietorship

Table 9: t-test Showing Social Media Influence on Academic Performance of Undergraduate Students Based on Institution proprietorship

Institution		N	Mean	SD	df	Cal. t-value	Crit. t-value	p-value
University (Public)	A	70	45.56	13.74	178	1.26	1.96	0.61
University (Private)	B	50	44.02	10.55				

Table 9 shows a calculated t-value of 1.26, a critical t-value of 1.96 and a p-value of 0.61. The p-value calculated is higher than the alpha level at 0.05 then the hypothesis is accepted. Hence, there is no significant difference in the influence of social media on academic performance of undergraduate students based on institution proprietorship.

Discussion of Findings

The results of the finding of this study revealed that the use social media sites among undergraduate students is high with the majority of question items have mean scores that are above the mid-mean score of 2.50. The findings also showed that the influence of social media on academic performance of undergraduate students is high, as seven out of the ten question items on influence have mean scores that are above the mid-mean score of 2.50. The result of hypothesis one indicated that there was no significant difference in the influence of social media on academic performance of undergraduate students based on gender as the result shows a calculated t-value of 0.04, a critical t-value of 1.96 and a p-value of 0.96 hence the hypothesis was accepted. Hypothesis two stated that there was no significant difference in the influence of social media on academic performance of undergraduate students based on age. The result shows the F-value calculated of 1.55, a Critical value of 3.00 and a p-value of 0.22. where the p-value calculated is greater than the alpha p-value at 0.05 level of significance, hence the hypothesis is accepted.

Conclusion

The availability of social media sites among undergraduate students is high. Some of the social media sites available are WhatsApp, Facebook, Telegram, Twitter and Snapchat. The accessibility of social media sites among undergraduate students is high. Some of the social media sites more accessed among undergraduate students are WhatsApp, Facebook, Telegram, and Snapchat. The use of social media sites among undergraduate students is high. Hence, this implies that social media sites when implemented in teaching and learning can positively influence the performance of students but efforts should be made to

regulate the time spent on the social media, most especially by the undergraduate students to prevent addiction and negative influences.

Recommendations

1. Based on the findings of this study, it is recommended that more social media applications that could enhance learning and students' optimal achievements in their educational pursuits should be encouraged by stakeholders in the educational sector.
2. Students should endeavour to have a balanced view of the use of social media as well as their time spent on these sites. Spending too much time on the sites can lead to being addicted to the usage of social media giving rise to a host of problems such as emotional, health and academic performance problems of students.
3. Lecturers should also get themselves trained and vast with the use the social media sites/apps as these will give them ample opportunity to deliver their lectures as well as presentations to the students virtually.

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REVIEW OF A DEVELOPED VERSATILE GAMIFIED ALGORITHM TO TEACH A CONCEPT IN COMPUTER STUDIES IN ILORIN, KWARA STATE

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Abstract

With the arising innovation into training, students are getting more associated with the growing experience, being dynamic member of information creation. The review zeroed in on the turn of events and approval of a portable gamified calculation to show an idea in secondary schools in Ilorin, Kwara State, Nigeria. The review researched: (i) students' self-assessment of the developed versatile game for teaching algorithm concept in computer studies and (ii) the gender difference in the students' self-assessment of the developed versatile game for teaching algorithm. This study adopted a research and developmental model type. The sample size included three Educational Technology experts, five subject experts for validation and fifteen students in an intact class for the post-test. Descriptive and inferential statistics were employed to answer and test the formulated hypothesis at 0.05 level of significance. The discoveries of the review were that:
(i) reaction of the students to learning computer studies with the utilization of a portable gamified algorithm to teach computer studies was positive; and
(ii) there was no significant difference between male and female students' self-assessment of the developed versatile game for teaching algorithm (df (3), t=.000, p>0.05=1.000).
This study concluded that that positive approach to the use of versatile gamified applications be upheld which will help to improve the teaching and learning in computer studies. It was recommended that utilization of portable gamified applications be maintained for learning in computer concentrates as it tends to be utilized in the study hall for guidance regardless of the educator's presence.

Keywords: Versatile Game, Sorting Algorithm, Computer Studies, Emerging Technologies.

Introduction

Training change is happening all through the world and one of the precepts of the change is the presentation and mix of Information and Communication Technology (ICT) in the schooling system. The presentation of arising innovation into training obviously altered how schooling is directed. As such, students are getting more engaged with the growing experience, being dynamic member of information creation not simple beneficiaries of information. With the utilization of ICT devices in schooling, educating and learning has been simpler and more challenging.

Training has been differently characterized by researchers in the area of Computer Studies. Oyelekan (2015) characterized instruction as the method involved with teaching and learning, it is the securing of information, abilities, values, convictions and propensity. It is an educational experience for a

person to secure information and comprehension of the substance. Thus, learning is fragmented, assuming information is being moved without appropriate comprehension of the informative substance, and that implies the objective of instruction has not been accomplished. In this way, learning is the most common way of getting new or altering existing information, ways of behaving, abilities, values, or inclinations to produce a long-lasting change in conduct.

Instructive innovation as a field of concentrate in Education, centers around how learning can be worked with through the utilization of accessible innovation tools and devices. Instructive innovation is a field of study that made arrangements with the help of learning and further develop exhibitions of people or students for greater achievement. The Association for Educational Communications and Technology (AECT, 2011) characterized Educational Technology as the review and moral act of working with learning and further developing execution by making, utilizing and overseeing proper mechanical cycles and assets. The sole point of an instructive technologist is to proffer conceivable answer for the issue of learning in the field of training by making, using and overseeing applicable devices. The spaces of instructive innovation, for example, focusses on the students' comprehension of opportunities for greater performance. Instructive innovation gains and arranges all structures advancements to address instructive requirements and issues, with accentuation on the use of the most important present day devices.

In the 21st century school system, new techniques are being used as well as current strategies in using ICT devices. The presentation of arising innovation into instruction plainly had an impact on how training is directed (Oduma, 2013). In all, students are getting more engaged with the educational experience, being dynamic member of information creation not simple beneficiaries (aloof) of information. With the utilization of ICT apparatuses in training, students can discuss and connect with associates and educators utilizing present day advances. Hence, ICT has significantly imparted on schooling and instructive cycles everywhere. There is practically no angle in schooling that ICT has not affected. Essentially, it has aided the most common way of educating and learning, accordingly improving and upgrading all areas of interest and concentrate in the field of training. ICT has led to the inventive improvement of portable advances and Internet which has continuously directed versatile learning into the instructive design and turning into a current piece of the framework.

Cell phones as one of the moving ICT gadgets in this ongoing regulation have developed extensively throughout the course of the twenty first century. From the period of Java Operating System created by organizations like Motorola, Sagem, Nokia, Alcatel, and so on, to the current period of Android Operating System (IOS) and Mac Operating System produce by Infinix, Tecno, Huawei, and Apple organizations, and so on, this multitude of improvements are presently being utilized decidedly in instructive cycle through innovation coordination. Innovation reconciliation is alluded to as the utilization of innovation devices in everyday substance regions in schooling, to permit students to apply PC and

innovation abilities to mastering and critical thinking. For the most part, the educational plan guides and controls the utilization of innovation and not the other way round on the grounds that innovation reconciliation is the utilization of ICT tools to improve and upheld the schooling system. The combination of innovation in the homeroom additionally support study hall guidelines by giving open doors to students to understand content and endeavor practices on the PC or cell phones as opposed to utilizing customary pen and paper (Obioma, 2015).

Nail and Ammar (2017) established that emerging technologies for instruction in the last part of the 80s and during the 90s accelerate the handling force of handheld gadgets develop dramatically while turning out to be more reasonable and, surprisingly, omnipresent because of the interest for games, business correspondences, and in everyday the associated the way of life of the 21st century. These tools have opened another way to learning in a hurry which is currently call Versatile Learning (M-learning). The word portable in language word references implies (moving any debatable development, to move, or moving item), and here the term versatile learning can signify that which is not arranged in a solitary area using moveable gadgets, learning through cell phones (versatile), or hand-held gadgets (Oyelekan, 2015). Thus, versatile learning can be characterized as the utilization of hand-held and convenient remote gadgets like cell phones, personal digital assistants (PDAs), cell phones, PCs, and tablet PCs, to accomplish the adaptability and intuitiveness in learning.

The plan and improvement of portable gamified application for learning, with no question is a troublesome cycle which needs an essential information on programming vernaculars like JavaScript, Html, CSS, jQuery, Java, xml, Kotlin, C++, visual communication, educational plan, content restricting, and so on. Portable instructive game is a game planned and produced for learning and can be played on cell phone.

Game is one of the understudy focused learning methodologies that lessens pressure and utilizes humor to hold consideration and connect with students both mentally and inwardly. Games are brimming with exercises of learning towards conduct change, including dynamic cooperation of students. It offers students chance to communicate their thoughts openly without deterrent and students cooperate uninhibitedly inside the climate where learning exercises happen. Games engage hence, students show greatest interest and will be profitably involved. It likewise invigorates students and energizes all-encompassing learning through dynamic investment of more streamlined to accomplish a particular objective. It additionally empowers solid competition that is, each student will in general contend, and thereby upgrading students' presentation.

Most educators have not been utilizing the portable game in instructing and growing experience. The issues found among others that educators have not been utilizing portable games really because of certain reasons which can be credited to computer ignorance of the computer instructor; how to deal with the topic by changing over the hypothetical ideas into pragmatic assignment and inaccessible of materials

by the instructors to create and deliver the game. Satisfactory timing or span is not being placed into thought which makes it challenging to complete useful after the hypothetical part of the example. On account of state funded schools, educators are frequently confronted with the moves of concentrating on many students. The huge number of students has made, for instance, issues like less contacts among students and educators; unfortunate administration of learning exercises; incapable accomplishment of educational objectives, unfortunate spirit, inspiration and interest in learning (Awwalu, 2012; Ajayi, 2019).

The useful test that inspired the improvement of portable gamified application is an absence of direct commitment and collaboration among instructors and students. Students' commitment to a gamified learning action can bring about a superior learning result. Falana (2012) noticed that there are still holes to be loaded up concerning suitable usage of innovation in the school system for direct commitment and collaboration among educators and students.

The impact on the scholarly execution of students in the school and collaboration enhances learning capacity, scholarly capacity, learning inclination, and so on. These singular distinctions result to isolating students into three classes of students which are: quick students, normal students, and slow students. Each educator needs to consider these classes to accomplish the foreordained target of the class, else quick gaining students have a possibility of acquiring from the class than the sluggish students (Oyelekan, 2015). Learning inclination additionally influence the scholastic exhibition of students however utilizing portable gamified approach envelops the vast majority of the learning inclination, for example, the visual, hear-able, perusing, and sensation learning inclination (Fleming, 2001; Ajayi, 2019).

The review created and approved a versatile gamified calculation application idea for showing calculation idea in computer studies to fill the gap created by Falana (2012), Oyelekan (2015) and Ajayi (2019). In particular, the study reviewed: 1. students' self-assessment of the developed versatile game for teaching algorithm concept in computer studies for post-basic education learners; and 2. gender difference in students' self-assessment of the developed versatile game for teaching algorithm in computer studies for post-basic education learners.

Research Questions

The following research questions was raised and answered in the study:

1. What is the students' self-assessment of the developed versatile game for teaching algorithm concept in computer studies for post-basic education learners?
2. What is the gender difference in the students' self-assessment of the developed versatile game for teaching algorithm in computer studies for post-basic education learners?

Base on the research question two, the following hypothesis was raised and tested in the study at 0.05 level of significance.

Ho_1. There is no significant difference between male and female computer studies teachers' evaluation of the developed versatile game for teaching algorithm concept in computer studies for post-basic education learners.

Literature Review

The 21st century students, more than previously, needs a study hall experience that students can connect with, that is imaginative and testing, and has an effect in planning for future vocations. To address this test, the plan, improvement, and execution of PC games has been utilized in PC concentrates on study halls in numerous ways: as an overall commitment device (Bayliss and Strout, 2006; Clua, Feijó, Rocca, Schwartz, das-Graças, Perlin, and Barnes, 2006). The significance of setting in software engineering schooling has for some time been perceived (Forte and Guzdial, 2004; Guzdial, 2009, Nail and Ammar, 2017). Utilizing a setting permits instructors to zero in regarding a matter that is significant and recognizable to students while learning new ideas. It gives a persuasive device and offers a more extensive battleground for trial and error and drawing in students in the instructive cycle.

Making drawing in and highlight rich games requires a capable combination of a large number of methods from numerous areas of PC studies and, thus PC games can be utilized at various places in the PC concentrates on educational program. In particular, PC games can be effectively used to introduce the wealth of PC concentrates as a scholarly discipline to students from the get-go in examinations. It is vital to furnish students with an active encounter where leaners can apply hypothetical ideas by and by (Oyelekan, 2015). Involving cell phones as a learning setting in starting PC concentrates on courses plans to give a straightforward and exquisite means to rouse students and convey the variety and force of many high level PC concentrates on regions in a way that connects with students in experiential training.

Besides, research has additionally shown that more participatory learning strategies, for example, those utilized in versatile game advancement can even the odds for various sorts of students (Wolz, Barnes, Bayliss, and Cromack, 2009, Nail and Ammar, 2017). Relaxed games are the most well-known sort of versatile games, generally because of the examples of cell phone use (Koivisto, 2006; Kurkovsky, 2009; Obioma 2015). Easygoing games are portrayed by incredibly basic interactivity. For instance, riddles or games and for the most part appeal to "easygoing buyers" who do not view themselves as "gamers." Casual games rules are straightforward, and, dissimilar to many control center games, relaxed games do not need a drawn out time responsibility or any exceptional abilities (Koivisto, 2006; AECT, 2011; Ajayi, 2019).

Versatile learning-based offers students the chances to get up to date information at whatever point and any place (Goksu and Atici, 2013). Versatile learning-based media is likewise an inventive and

compelling media for working on calculated understanding. The improvement of portable instructive game for PC studies turns into different intriguing educational media and it gives adaptability to students to learn. Hence the review of a developed versatile gamified algorithm to teach a concept in computer studies in Ilorin, Kwara State.

Methodology

The study adopted a research and developmental model type. The researcher reviewed and evaluated a versatile gamified algorithm to teach a concept in computer studies. The population for the study involved all computer studies students in Kwara State, Nigeria. The target population included computer studies students in post-basic schools. One school was purposively selected based on the fact that the school had more technological facilities. An intact class of Junior Secondary School (JSS 2) was purposively selected because the content scope of the research is in their syllabus. Specifically, 15 computer studies students intact class, 5 computer studies teachers, and 3 educational technology experts were randomly selected for the study. The instrument consisted of four research instruments:

1. A developed versatile gamified algorithm to teach a selected concept in computer studies. The versatile game was developed using JavaScript for the functionality and HTML5, CSS3 and jQuery (for the user interface) for versatile web application.
2. An educational technology expert rating guide was used to validate the developed versatile gamified algorithm to teach the concept in computer studies. The rating guide contains two sections; Section A contains the demographic information of respondents, while Section B contains items on the rating guide on the developed versatile gamified algorithm. The items in section B was rated on a modified Likert Mode Scale of Very Satisfied (VS), Satisfied (S), Dissatisfied (D), Very Dissatisfied (VD), and Undecided (U) with weighted value of 5 to 1 in terms of scoring.
3. A subject content validation questionnaire was used in collecting data on the validation of computer studies teachers on the developed versatile gamified algorithm to teach the selected concept in computer studies. The questionnaire contains two sections; Section A contains the demographic information of respondents, while Section B contains items on the rating guide on the developed versatile gamified algorithm. The items in section B was rated on a modified Likert Mode Scale of Strongly Agree (SA), Agree (A), Strongly Disagree (SD), Disagree (D), and Undecided (U) with weighted value of 5 to 1 in terms of scoring; and
4. Student Self-Assessment Questionnaire (SSQ): This assessment questionnaire was used in collecting data on the relationship between students' cognitive, affective and psychomotor attitude towards learning the developed versatile gamified algorithm for teaching the concept in computer studies. The questionnaire consists of two sections; section A and B. Section A focuses on the

demographic information of the respondents while section B consists of 10 items using a Likert scale of Strongly Agree (SA); Agree (A); Disagree (D) and Strongly Disagree (SD) with weighted value of 4 to 1 in terms of scoring.

Experts from the Department of Educational Technology, University of Ilorin affirmed that the developed versatile gamified algorithm to teach the concept in computer studies was adequate and relevant to instructional purpose. The educational technology experts responded to the instrument by rating the game using the expert validation instrument. The data obtained from the researcher-designed scale and questionnaire was subjected to descriptive statistics. The data gathered from the respondents were analyzed using frequencies, percentage and mean while the descriptive statics of mean was used to answer the research question raised using Statistical Package for Social Solution (SPSS) software version 22.0

Results

The analysis of data obtained in respect of the demographic information of the respondents and the research questions are presented as follows:

Research Question 1: What is the students' self-assessment of the developed versatile game for teaching sorting algorithm concept in computer studies for post-basic education learners?

Table 1: Students' Reactions towards the use of the Developed Versatile Game in Computer Studies for Post-Basic Education Learners

S/N	Items	Mean
1.	The use of versatile game enhances learning	4.40
2.	I can use the versatile game on my own	4.67
3.	The versatile game increases interest in learning and motivates learners	4.47
4.	I prefer playing versatile games to physical chalkboard teaching	3.93
5.	The quality of the graphics, text and images are clear enough	4.60
6.	I will prefer to learn with the use of versatile game compared to other traditional instructional materials employed to teach	3.53
7.	The use of versatile game resources in teaching makes classroom participation more effective and efficient	4.60
8.	The developed versatile game allows learners to discover information through active explanation	4.33
9.	The sound quality is good	4.73

10.	The rules of the versatile game is simple and easy to understand	4.60
11.	The versatile game is portable	4.93
12.	The quality of the graphics is clear enough	4.73
13.	The rules of the game is explanatory	4.53
14.	The use of colour on the text is legible	4.80
15.	It is easy to understand	4.67
Grand Mean		4.50

Table 1 indicated the mean responses of students' reactions towards the use of the developed versatile game for learning. Using a bench mark of 3.5, the result revealed that the mean score for each of the fifteen (15) items on the questionnaire is above 3.5, that is, 4.50. This indicates a positive reaction to the developed versatile game on the parts of the students, which confirmed that the developed versatile game in computer studies for post-basic education learners, was rated suitable for learning by the learners.

Ho_1. There is no significant difference between male and female Computer studies teachers' evaluation of the developed versatile game for teaching sorting algorithm.

Table 2: Significant Difference between Male and Female Computer Studies Teachers' Evaluation on The Developed Versatile Game for Teaching Sorting Algorithm

Gender	N	X	SD	Df	T	Sig(2-tailed)	Remarks
Female	2	4.60	0.14	3	.000	1.000	Accepted
Male	3	4.60	0.00				
Total	5						

From Table 2, it was deduced that there was no significant difference between male and female Computer studies teachers' evaluation of the developed versatile game for teaching sorting algorithm. This is reflected in the result: $t(8) = .000$, $p>0.05$. Thus, the hypothesis was not rejected. By implication, the stated null hypothesis was established, thus: there was no significant difference in the evaluation of the computer studies teachers based on gender.

Discussion of the Findings

The mean rating of the reviewed versatile game for teaching shows that the experts had a positive reaction to the application for teaching. It was deduced that the content as rated by the subject teachers is appropriate and the design, interactivity and structure are made appropriate for the level of the learners. This allowed them to enjoy the use of the versatile game for learning. The result agreed with Ajayi, (2019) and has actually proven that versatile gamified app can be developed to teach various concepts in computer

studies. The findings revealed that there is an effect of the developed versatile game for teaching computer studies on the performances of the students, that agreed with Falana, (2012) that versatile gamified application for teaching is useful for learning, as it integrates an easy medium for learning. However, versatile gamified applications can provide the educational content which helps the achievement of knowledge by the students indirectly and also without questioning the location and time.

Conclusion

The study concluded that positive approach to the use of versatile gamified applications be upheld which will help to improve the teaching and learning in computer studies as the versatile game can be used in the classroom for instruction with or without the teacher's presence. Also versatile gamified application has the ability to promote personalized learning among students and to be usable for teaching topics in secondary schools' curriculum.

Recommendations

Based on the findings of this research, the following recommendations were made:

1. game based learning approach should be encouraged for post-basic education learners;
2. versatile game should not just be developed for selected concepts in computer studies alone, but also developed for other topics and subjects in Nigerian schools; and
3. other researchers can adapt for other areas of specialization.

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EXPLORING AWARENESS, ACCESS, AND UTILIZATION OF MOBILE PHONE APPLICATIONS FOR LEARNING AMONG UNDERGRADUATE STUDENTS IN ILORIN METROPOLIS

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Abstract

The prevalence of mobile phone applications designed for smartphones and tablets has increased significantly. However, undergraduates primarily use these applications for personal purposes rather than for learning. This study focuses on investigating the awareness, access, and utilization of mobile phone applications for learning among undergraduates in Ilorin. Using a descriptive survey design, a researcher-structured questionnaire was employed to collect data from 150 students selected from two universities in Ilorin. Data were analyzed using descriptive and inferential statistics. Mean and standard deviation were used to address research questions, while hypotheses were tested using a t-test at a significance level of 0.05. The findings revealed that undergraduate students have a high awareness of mobile phone applications for learning, exceeding the benchmark of 1.5. Access to these applications among undergraduates was also substantial with a grand mean of 1.66. Moreover, students demonstrated significant utilization of mobile phone applications for learning with a grand mean of 2.73. No significant disparities were found in awareness, access, or utilization of mobile phone applications for learning based on gender. The test levels exceeded 0.05, indicating no statistically significant differences. Based on these findings, it is recommended that efforts be made to enhance the awareness, access, and utilization of mobile phone applications for learning among undergraduate students. The study suggests making the use of one or more mobile phone applications for learning compulsory. This approach would foster communication and interaction between students and teachers, as well as among students themselves, ultimately improving the learning experience and outcomes.

Keywords: Mobile Phone Application, Awareness, Access, Utilization, Undergraduates, Learning

Introduction

Education is an indispensable necessity for individuals to lead a fulfilling life, and it serves as the foundation for the development and empowerment of nations (Rattansingh, 2011; Mehta & Rakhi, 2011). It encompasses not only the acquisition of knowledge but also the cultivation of moral, social, and personal

development (Nurudeen, 2018). The role of education in society extends beyond the construction of physical infrastructure; it lies in the development of human resources through a well-defined system of education (Mehta & Rakhi, 2011; Jagannath, 2012).

The concept of education has been defined by numerous scholars throughout history. Plato emphasized the holistic development of body and soul, while Aristotle saw it as the creation of a sound mind in a sound body. Other philosophers such as Herbart, Dewey, Socrates, and Comenius offered their perspectives on education as the dispelling of morality, the increase of social efficiency, the dispelling of errors, and the development of the whole person, respectively (Bola, Opadokun, & Molagun, 2013).

In recent years, the integration of Information and Communication Technology (ICT) has revolutionized various aspects of society, including education. ICT refers to technologies used for collecting, storing, editing, and disseminating information in various forms (Nurudeen, 2018). The application of ICT in education, particularly through mobile devices and mobile applications, has shown potential in expanding access to education, strengthening its relevance in a digital workplace, and enhancing educational quality (Nurudeen, 2018; Adeyemo, 2017).

Mobile technologies, such as smartphones and tablets, have become ubiquitous and offer unique opportunities for teaching and learning (Adeyemo, 2017; Maha & Heba, 2015). Mobile applications provide a platform for students and teachers to access learning resources, facilitate communication, and engage in collaborative learning (Mohammed & Abdul Jalil, 2014; Sung, 2016). The use of mobile applications in education has the potential to enhance learning experiences, make education more accessible, and prepare students for the challenges of the digital age (James & Emmanuel, 2017; Abdulrazzaq & Mayyadah, 2018).

This article aims to review the existing literature on the integration of mobile applications for learning. It explores the potential of mobile applications in fostering personalized learning environments, improving access to educational resources, and facilitating collaborative learning experiences. Additionally, it examines the gender differences in the adoption of mobile applications and the role of teachers in adapting to this technological shift. The findings from this review will contribute to a better understanding of the benefits, challenges, and future prospects of integrating mobile applications in education. It will inform educators, policymakers, and researchers about the transformative potential of mobile technologies in enhancing teaching and learning processes.

The advent of mobile applications has opened up new possibilities for education, allowing learners to access educational content anytime and anywhere, fostering collaboration, and personalizing learning experiences. By embracing mobile application technologies, education can be made more engaging, accessible, and relevant to the needs of learners in the digital era

The use of mobile applications in education has gained significant attention in recent years. As technology continues to advance and become more accessible, mobile devices have become an integral part of our daily lives. Mobile applications, specifically designed for handheld devices such as smartphones and tablets, have transformed various aspects of society, including the field of education.

Education is widely recognized as a fundamental necessity for personal growth, development, and empowerment (Rattansingh, 2011). It plays a crucial role in shaping individuals' character, transmitting cultural values, and meeting the evolving needs of society (Mehta & Rakhi, 2011). Traditionally, education has been associated with face-to-face classroom settings, where teachers and students gather in a physical space to facilitate learning. However, with the advent of mobile technologies, this traditional model is undergoing a transformation.

Information and Communication Technology (ICT) is a term that encompasses technologies used for collecting, storing, editing, and disseminating information in various forms (Nurudeen, 2018). Mobile devices, equipped with internet connectivity and a wide range of applications, have emerged as powerful tools for educational purposes. They offer unique opportunities to enhance the teaching and learning process, expand access to education, and improve the quality of educational experiences (Nurudeen, 2018).

The integration of ICT, particularly mobile applications, into the education system has the potential to revolutionize the way students learn and teachers instruct. Mobile applications facilitate the exchange of information between learners and educators, providing a platform for interactive and collaborative learning experiences (Adeyemo, 2017). These applications offer features and functionalities that cater to diverse learning styles and preferences, stimulating students' interest and engagement in the content taught (Maria, Fernando, Caria & Natercia, 2012).

Mobile applications provide students with anytime, anywhere access to educational resources and courses, allowing for personalized and self-paced learning (Mohammed & Abdul Jalil, 2014). Students can utilize various applications to complete assignments, communicate with peers and teachers, access learning materials, and stay updated on technological advancements (Bola, Opadokun, and Molagun, 2013). The use of mobile technologies empowers students, preparing them for the challenges they may face beyond the confines of the classroom (Mohammed & Abdul Jalil, 2014).

Teachers also benefit from the integration of mobile applications into the education system. These applications offer tools and features that enhance instructional delivery, administrative tasks, and communication with students (Sung, 2016). Educators can transmit learning modules, provide instant feedback, organize course materials, and engage in video conferencing, among other capabilities (Sung,

2016). Mobile applications enable educators to create dynamic and interactive learning environments that cater to the needs and expectations of individual students (Ozkan & Vehbi, 2011).

However, the adoption and implementation of mobile applications in education also present challenges and considerations. Privacy and security concerns, along with the need for specialized expertise in designing and evaluating mobile learning experiences, need to be addressed (Nurudeen, 2017). Additionally, while mobile applications offer numerous benefits, they should not replace the importance of face-to-face interaction and the traditional classroom setting (Mtega et al., 2012).

Moreover, mobile applications have revolutionized the field of education by providing new opportunities for teaching and learning. These applications have the potential to enhance access, engagement, and learning outcomes for students, as well as streamline administrative tasks for educators. While challenges exist, the integration of mobile applications into education holds great promise for creating innovative and effective learning environments. As technology continues to advance, it is essential for educators and institutions to embrace these tools and leverage their potential to shape the future of education.

Statement of the Problem

Mobile phones with various applications have become ubiquitous and widely used technological devices over the past two decades. In Nigeria, it is rare to find a student in higher education without a mobile phone. However, despite the large number of mobile phone owners among Nigerian undergraduates, only a small percentage are aware of and have access to educational applications that can be used for instructional purposes. Additionally, many lecturers view mobile phones as distractions in the classroom rather than recognizing their potential as tools for promoting teaching and learning. While researchers have focused on mobile applications, most universities in Nigeria have not adopted their use. Mobile applications have been developed for various purposes, including education, marketing, and business campaigns. Educational applications can be downloaded from browsing sites such as Google Play Store, offering learning resources for subjects like languages, mathematics concepts, and programming languages. These applications, such as Quick Graph for calculating and designing graphs, can enhance learning experiences (Maha & Heba, 2015). Mobile applications are essential for students and educational institutions as they provide access to fast wireless networks through mobile devices, enabling learning anytime and anywhere. The flexibility offered by mobile applications has brought about changes in the learning and educational environment, allowing students to utilize their free time outside the classroom to study and complete assignments (Mohammed & Masita, 2014). Therefore, this study aims to investigate the awareness and access to mobile applications among undergraduates in Ilorin metropolis and how they utilize these applications for learning purposes.

Research Questions

The following questions were raised and answered in the study:

1. What is the level of awareness among undergraduate students regarding the use of mobile applications for learning?
2. What are the factors influencing undergraduate students' access to mobile applications for learning?
3. How do undergraduate students utilize mobile applications for learning in their educational pursuits?
4. To what extent does gender influence undergraduate students' awareness of mobile applications for learning?
5. How does gender influence undergraduate students' access to mobile applications for learning?
6. What is the relationship between gender and the utilization of mobile applications for learning among undergraduate students?

Research Hypotheses

The following hypotheses were tested in the study at 0.05 level of significant

Ho_1: There is a significant difference in the level of awareness of mobile applications for learning between male and female undergraduate students.

Ho_2: Gender influences the factors that determine undergraduate students' access to mobile applications for learning.

Ho_3: Male and female undergraduate students differ in their utilization of mobile applications for learning in their educational pursuits.

Methodology

The research utilized a descriptive survey design, employed a researcher-structured questionnaire as the primary tool for data collection. The study aimed to gather information from a sample of 150 students selected from two Universities in Ilorin.

The research instrument for this study was a researcher designed questionnaires which was developed after an extensive survey of literature. Items on the research instrument were constructed to specifically reflect various research questions of the study.

The questionnaire were divided into four sections. Section A contained the demographic data of the respondents, section B contained items on awareness of and access to mobile application for learning using the response mode Aware (A) Not Aware (NA), Access (ACC) and Not Access (NACC) and section C contain items on utilization of mobile application for learning using a four point likert scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) respectively. The research instrument was validated by 3 experts in the Department of Educational Technology, corrections and suggestion of the expert was used to produce a final draft of the instrument. The questionnaire was later administered on the study sample. The respondents were not forced to participate in the study. The information gathered were purposely used for the study. The respondents were kept anonymous and the information provided were be treated with utmost confidentiality and privacy. The questionnaire was distributed among the participants, and both descriptive and inferential statistics were employed to analyze the data. To address the research questions, the mean and standard deviation were calculated, while hypotheses were tested using a t-test at a significance level of 0.05.

Results

The results of data collected are analyzed to answer research questions of the study and tested the hypotheses at significant level of 0.05 are represented on presentation table and subsequently interpreted.

Analysis of Research Questions

Research Question 1: Are undergraduate students' aware of mobile application for learning?

To answer research question one, data were collected from the respondents to determine how much they utilize mobile phone application for learning purpose with the bench mark of 1.5. The result are represented on table 1

Table 1: Undergraduates Students' Awareness of Mobile Phone Application for Learning.

S/N	Items	Mean
1	Google Classroom	1.70
2	Google Hangout	2.00
3	Facebook Messenger	2.00
4	Chrome Book	2.00
5	Google Docs	1.67
6	Google Drive	1.67
7	Yahoo Messenger	2.00

8	Edmodo	1.69
9	You Tube	1.98
10	WhatsApp	2.00
11	Skype	2.00
12	Dropbox	1.67
Grand Mean		1.87

Table 1 shows undergraduates students' awareness of mobile phone application for learning using the bench mark of 1.5, the respondent were aware of google classroom, google docs, google drive, edmodo, youtube, and dropbox with the mean of 1.70, 1.67, 1.67, 1.69, 1.98, and 1.67 respectively while mostly all undergraduates students' are aware of google hangout, facebook messenger, chrome book, yahoo messenger, whatsapp and skype with the mean of 2.0, 2.0, 2.0, 2.0, and 2.0 respectively. The grand mean of 1.87 is how ever above the bench mark of 1.5, which means the respondents (undergraduate students') were generally aware of mobile phone application for learning.

Research Question 2: What mobile application does undergraduate students' have access to for learning?

To answer research question two, data were collected from the respondents to determine how much they utilize mobile phone application for learning purpose with the bench mark of 1.5. the result are represented on table 2.

Table 2: Undergraduates Students' Access to Mobile Phone Application for Learning.

S/N	Items	Mean
1	Google Classroom	1.68
2	Google Hangout	1.51
3	Facebook Messenger	2.00
4	Chrome Book	2.00
5	Google Docs	1.17
6	Google Drive	1.17
7	Yahoo Messenger	2.00
8	Edmodo	1.17
9	You Tube	2.00
10	WhatsApp	2.00
11	Skype	2.00

12	Dropbox	1.17
Grand Mean		1.66

Table 2 shows undergraduates students' access to mobile phone application for learning using the bench mark of 1.5, the respondent have access to google classroom, google hangout, google docs, google drive, edmodo, and dropbox with the mean of 1.68, 1.51, 1.17, 1.17, 1.17, and 1.17 respectively while most of the undergraduates students' have access to facebook messenger, chrome book, yahoo messenger, youtube, whatsapp and skype with the mean of 2.0, 2.0, 2.0, 2.0, and 2.0 respectively. The grand mean of 1.66 is how ever above the bench mark of 1.5, which means the respondents (undergraduate students') were generally have access to mobile phone application for learning.

Research Question 3: Do undergraduates utilize mobile application for learning purpose?

To answer research question three, data were collected from the respondents to determine how much they utilize mobile phone application for learning purpose with the bench mark of 2.5. The results are represented on table 3.

Table 3: Undergraduates Students' utilization of Mobile Phone Application for Learning.

S/N	Items	Mean
1	I make use of Google Classroom well for learning	2.93
2	I consider mobile application as an important tool in facilitating my learning.	3.63
3	I use You Tube as a supplementary approach to learning.	3.64
4	I conveniently use Google Classroom to exchange ideas, knowledge and submit assignments to my lecturers.	2.92
5	I use Chrome Book to enhance my study habits.	2.79
6	I consider Facebook Messenger as an important tool for personal enjoyment and growth.	3.65
7	I make use of Google Drive to do my various assignments, projects and practical.	2.01
8	You Tube has instructional relevance	2.69
9	Mobile application is very costly	1.47
10	My lecturer use Edmodo to teach us	1.88
11	My lecturer encourage me to use WhatsApp for learning.	2.54
12	Most mobile application are user friendly.	2.61
Grand Mean		2.73

Table 3 shows undergraduates students' utilization of mobile application for learning.

Using the bench mark of 2.5. With the mean of 2.93, the respondent shows with item one question that they make use of Google classroom well. 3.63 mean score shows that respondents consider mobile application as an important tool in facilitating their learning while 3.64 mean score shows that respondents use You tube as a supplementary approach to learning. The respondent conveniently use Google classroom to exchange idea, knowledge and submit assignments to their lecturers with the mean of 2.92 also they use chrome book to enhance their study habits with mean of 2.79. Furthermore, they consider Facebook messenger as an important tool for personal enjoyment and growth with the mean of 3.65.

The respondents didn't make use of Google drive to do their various assignments, projects and practical, this is shown by the mean of 2.01 while they make use of You Tube has an instructional relevance with the mean of 2.69. with the mean of 1.47 is shown by the respondent that mobile application is not costly while they agree with the mean of 1.88 that their lecturer uses Edmodo to teach them. The respondent also agreed with the mean of 2.54 that their lecturers encourage them to use WhatsApp for learning while they finally agreed with the mean of 2.61 that most mobile applications are user friendly. However, the grand mean of 2.73 is positive since it is above the bench mark of 2.5. Hence, this shows that undergraduate students' utilize mobile phone application for learning.

Hypotheses Tested

The results of hypotheses tested in this study are presented in subsequent tables. All hypotheses were tested at significant level of 0.05.

Hypothesis One

Ho_1: There is no significant difference in male and female undergraduate students' awareness of mobile phone application for learning.

To test whether there is no significant difference between male and female undergraduate students' awareness of mobile phone application for learning. Data collected from male and female undergraduate students' was analyzed using t-test, and a 2-tailed significant was obtained to determine the significance different of the hypothesis at 0.05 significant level. Results of the hypothesis tested is presented on table 4.

Table 4: Male and female undergraduates students' awareness of mobile phone application for learning.

Gender	N	Mean	SD	df	t	Sig.(2-tailed)	Remark
Male	76	1.76	0.43				Accepted
Female	74	1.65	0.48	148	1.54	.125	

Results on table 7 shows that there was no significant difference between male and female undergraduate students' awareness of mobile phone application for learning. Since value grater than 0.05

will be accepted and value less that 0.05 will be rejected, therefore, the hypothesis Ho_1 is accepted. Hence, the hypothesis which states that "there is no significant different between male and female undergraduate students' awareness of mobile phone application for learning" is accepted

Hypothesis Two

Ho_2: There is no significant difference in male and female undergraduate students' access to mobile application for learning.

To test whether there is no significant difference between male and female undergraduate students' access to mobile phone application for learning. Data collected from male and female undergraduate students' was analyzed using t-test, and a 2-tailed significant was obtained to determine the significance different of the hypothesis at 0.05 significant level. Results of the hypothesis tested is presented on table 5.

Table 5: Male and female undergraduates students' access to mobile phone application for learning.

Gender	N	Mean	SD	df	T	Sig.(2-tailed)	Remark
Male	76	1.72	0.45				
Female	74	1.65	0.48	148	1.54	.125	

Results on table 5 shows that there was no significant difference between male and female undergraduate students' access to mobile phone application for learning. Since value grater than 0.05 will be accepted and value less that 0.05 will be rejected, therefore, the hypothesis Ho_2 is accepted. Hence, the hypothesis which states that "there is no significant different between male and female undergraduate students' access to mobile phone application for learning" is accepted.

Hypothesis Three

Ho_3: There is no significant difference in male and female undergraduates' utilization of mobile application for learning.

To test whether there is no significant difference between male and female undergraduate students' utilization of mobile phone application for learning. Data collected from male and female undergraduate students' was analyzed using t-test, and a 2-tailed significant was obtained to determine the significance different of the hypothesis at 0.05 significant level. Results of the hypothesis tested is presented on table 6.

Table 6: Male and female undergraduates students' utilization of mobile phone application for learning

Gender	N	Mean	SD	Df	t	Sig.(2-tailed)	Remark

Male	76	3.12	0.99			
Female	74	2.74	1.25	148	2.04	.043

Results on table 6 above shows that there was no significant difference between male and female undergraduate students' utilization of mobile phone application for learning. Since value grater than 0.05 will be accepted and value less that 0.05 will be rejected, therefore, the hypothesis Ho_2 is accepted. Hence, the hypothesis which states that "there is no significant different between male and female undergraduate students' utilization of mobile phone application for learning" is accepted.

Discussion

Findings of this study are discussed based on

1. Undergraduate students' awareness of mobile phone application for learning.
2. Undergraduate students' access to mobile phone application for learning.
3. Undergraduate students' utilization of mobile phone application for learning.
4. Difference in male and female undergraduate students' awareness and utilization of mobile phone application for learning.

The study aimed to investigate undergraduate students' awareness, access, and utilization of mobile phone applications for learning. The findings revealed that undergraduate students are indeed aware of mobile phone applications for learning, supporting the findings of Veerappan, Wei, Wong, and Paramasivan (2014), who indicated that most students are aware of these applications and desire their integration alongside face-to-face interactions in the classroom.

Regarding access to mobile phone applications for learning, the study found that undergraduate students have access to these applications. Stauffer (2011) conducted a similar study where learners were able to access course materials from anywhere and at any time using their mobile devices.

The study also explored the utilization of mobile phone applications for learning among undergraduate students. The findings indicated that undergraduate students do utilize mobile phone applications for learning purposes. Veerappan, Wei, Wong, and Paramasivan (2014) discovered that the most common use of the internet via mobile phones among students is for browsing the internet, engaging in social networking sites like Facebook, downloading multimedia learning systems uploaded by lecturers, and

sending/receiving emails. However, the study did not find a significant difference in the awareness and utilization of mobile phone applications for learning between male and female undergraduate students. This aligns with the studies conducted by Christopher and Evangelia (2016) and Tseti (2016), which respectively revealed that adult women are more likely to use applications for communication and social engagement, while adult men are more inclined to use applications for information, entertainment, and commerce.

Conclusion and Recommendation

The analysis of data demonstrates that mobile phone applications positively impact the academic performance of undergraduate students in Ilorin. As a result, the study draws the following conclusions: There is a critical need to increase awareness, accessibility, and utilization of mobile phone applications for learning purposes among undergraduate students. This will enhance their learning outcomes, skills, and ability to adapt to 21st-century technology. Institutions should enforce the compulsory use of mobile phone applications for learning by both students and lecturers to foster interest and active engagement in the educational process. Finally, it is recommended that the government establish legislation mandating the use of mobile phone applications for learning across all educational institutions. By implementing these conclusions, students will benefit from improved academic performance and develop essential skills relevant to the digital era.

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