

EXTENT OF THE USE OF MOBILE LEARNING IN TEACHING COMPUTER GRAPHICS IN TERTIARY INSTITUTIONS IN ENUGU STATE, NIGERIA

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Abstract

The study aimed at investigating the extent of the use of m-learning in teaching computer graphics in universities in Enugu state. Four research objectives, four research questions and two null hypotheses were formulated to guide the study. The design adopted for the study was descriptive survey design. The population for the study is forty-four (44) lecturers in computer education departments in public universities in Enugu state. A structured questionnaire titled extent of the use of m-learning in teaching computer graphics questionnaire. (EUMLTGC) which was developed by the researcher and validated by experts. The reliability of the instruments was established using Cronbach Alpha yielding a coefficient of .75 showing that the instrument is reliable. The data collected was analyzed using the mean and standard deviation while t-test and ANOVA Statistics were used to test the hypothesis at 0.05 level of significance. The findings reveal that: there is a low extent of the null of m-learning in teaching image creation in computer graphics in universities in Enugu State, there is low extent of the use of m-learning in teaching image editing in computer graphics in universities in Enugu state. The analysis of the study reveals that the extent of the use of mobile learning by lecturers in tertiary institutions in Enugu state to teach image publishing and motion graphic is low. This study further reveals that there is no significant difference in the mean responses of male and female computer education lecturers on the extent of the use of mobile learning to teach computer graphics in tertiary institutions in Enugu state. The analysis of the study also reveals that there is significant difference in the mean responses of universities and colleges of education lecturers on the extent of the use of mobile learning in teaching computer graphics in Enugu state. Based on the findings, the study recommended that tertiary institution lecturers in Nigeria should strive to adapt the use of mobile learning tools and its platform in teaching computer graphics.

Introduction

Information and Communication Technology (ICT) has become the hub of the 21st century without which many works of life are not easily carried out. ICT is the combination of tools that capture, electronic data and information capture, transmission, and presentation in the manufacturing and service sectors for modern computing (Cochrane,2019). According to Rupert (2020), ICT is the integration of a variety of electronic tools that deliver and exchange information to enhance the quality of life that is not restrained by location, time and distance. The emergence of ICT is one of the wonderful gifts of modern science and technology which has brought tremendous changes in all aspect of life including education.

One of the advancements of the use of ICT in education is mobile learning, also known as M-learning. According to Charland, and Britan (2019), m-learning is e-learning supported by digital electronic tools and media, learning that takes place with the help of mobile devices. Turner (2019) views mobile devices as a pervasive medium that may assist in studies at leisure

time in meaningful ways. According to Palof & Pratt (2019), Mobile learning as ‘a form of education whose site of production, circulation, and consumption is the network. More recently, Tsiotakis and Jimoyiannis. (2016) opines that m-learning is any educational provision where the sole or dominant technologies are handheld or palmtop devices. Furthermore, Osika (2016) relates mobile learning as learning that takes place when the learner is not in a fixed location, or when the learner takes advantages of the learning opportunities offered by mobile technologies. The foundation of every growing economy depends on education and learning; however, significant technical improvements and drastic changes are required in the educational system. A more prominent version of e-learning called mobile learning is starting to take shape as a first step toward revolutionizing the educational system and offering practical answers to the related issues of inadequate systems and practical equipment (Cochrane & Thomas, 2019). The next major breakthrough in technology following the introduction of the internet was the creation of wireless mobile phones, smart phones, tablets and mobile devices that are common, affordable, and adaptable. (Higgins, Hartley & Skeleton, 2018). In the context of this study, mobile technology depicts the use of mobile devices or technologies in teaching and learning.

Students have embraced handheld devices in large numbers, not only for communication purposes but also to allow schooling to be more tailored to their individual requirements (Sun, 2020). The rapid adoption of learning via mobile devices is due in part to wireless media rich practices, which foster greater student and teacher participation and cooperation (Rahiem, 2020). Students gain expertise in using mobile and online technologies for studying and to enhance their education. (Charland & Britan, 2018). After creating the learning material (mostly using a desktop) they can share it with the participants so they can learn using their mobile devices, in their own time.

Moreover, M-learning, also offers a plethora of benefits that are beneficial to all generations to come. Mobile learning is a powerful method for engaging learners on their own terms and enhances broader learning experience because of its mobility, quality and supporting platform (Robinson, Perryton & Creed 2020). Mobile learning is a new way to access learning content using mobile devices. It’s possible to learn whenever and wherever, as long as the learner has a present-day mobile device with an Internet connection. With m-learning, students can carry their course contents with them and facilitates any feedback that may be received from the team. Most students have started overcoming their difficulties regarding the place and time of lectures via the effective exploitation of their mobile phones or other mobile device.

Institutions are equally pressurized to find new and better ways to impart knowledge to students, including exploring of m-learning in teaching courses like computer graphics.

Computer graphics is the use of computers to create and manipulate pictures on a display device which comprises of software techniques to create, store, modify and represent pictures (Hill, 2022). Computer graphics is responsible for displaying art and image data effectively and meaningfully to the user. It is also used for processing image data received from the physical world, such as photo and video content. Computer graphics provides tools for producing pictures not only on concrete real-world objects but also on abstract, synthetic objects such as mathematical surface in 4D. Computer graphics is a practical oriented course that needs constant and regular drills for appropriate skill acquisition. Using Computer Graphics one can notice Group of Images (or) Image (or) videos on computer monitor screens.

Computer graphics is the sub part of computer science which studies about manipulating visual content, Synthesizing digitally. Computer graphics is a challenging subject to teach and because it involves a wide variety of skills such as mathematics, programming, physics, cognitive psychology, spatial reasoning, problem solving, human-computer interaction, art, design and learn (Du & Shu, 2011; Han, 2008; He & Zhao, 2012; Peternier, 2016; Sueyasu, 2010; Zhou, 2010). Computer graphics deals with creation, manipulation and storage of different type of images and objects on a display device. Some of the applications of computer graphics are; Computer Art which is using computer graphics to create fine and commercial art which include animation packages, paint packages. These packages provide facilities for designing object shapes and specifying object motion. Cartoon drawing, paintings, logo design can also be done. Computer graphics can also be used in Computer Aided Drawing where designing of buildings, automobile, aircraft is done with the help of computer aided drawing, this helps in providing minute details to the drawing and producing more accurate and sharp drawings with better specifications. Computer graphics is also used in presentation of graphics for the preparation of financial report, statistical, mathematical, scientific, economic data for research reports, managerial reports; moreover, creation of bar graphs, pie charts, time chart that can be done using the tools present in computer graphics (Hill, 2020).

Computer graphics can be used for entertainment by using it to creating motion pictures, music video, television shows, and cartoon animation films. In the game industry where focus and interactivity are the key players, computer graphics helps in providing such features in the efficient way (Aristidou, Lasenby, Chrysanthou 2018). Computer graphics can be used in Education by generating models that are extremely useful for teaching huge number

of concepts and fundamentals in an easy to understand and learn manner. Using computer graphics many educational models can be created through which more interest can be generated among the students regarding the subject. Computer graphics is also used for training the candidates in a way that can be grasped in a short span of time with better understanding (Jarabo, Masia, Marco, Gutierrez, 2018; Visual Informatics, 2017). Creation of training modules using computer graphics is simple and very useful. Another application of computer graphics is visualization, today the need to visualize things has increased drastically, the need of visualization can be seen in many advance technologies. For example, data visualization helps in finding insights of the data, to check and study the behavior of processes around us, we need appropriate visualization which can be achieved through proper usage of computer graphics (Rahmouni, Nozick, Yamagishi 2017). Computer graphics is also used in image processing where various kinds of photographs or images require editing in order to be used in different places. Processing of existing images into refined ones for better interpretation is one of the many applications of computer graphics. Schools have adopted the learning of computer graphics as a course.

Computer graphics is a course studied under computer education program in higher institution because it is a practical oriented course that has its application on most of the areas of computer. The practical teaching of computer graphics as a course of study under computer education program involves the use of basic tools which include crop tools, property tools, free hand tools and pen tools. These tools are used for functions like image creation, image editing, image publishing and motion graphics (Islomovna, Isomjonovna & Islom, 2021).

Image creation in computer graphics allows users to draw single line segments and curves. Image creation tools enables sketching of curves and lines with the help of a mouse. Image creation is done under Free hand tool that has a number of drawing options that allows users to create and draw. Image editing tools transforms images to a desired shape (Shadiev, Hwang & Huang 2018). These tools allow the user to alter the image objects with the help of rotation angle, rotation free, and resize. The free transform tool also allows the user to bend the image in order to structure it in a diverse way. After creating an image on the graphic environment, the next action is to modify the image which is known as image editing.

Image editing which is another important feature of computer graphics which can be achieved with property tool. Image editing uses the property tools to displays the most commonly used commands and settings related to whichever tool that is active, the property bar displays commands such as text formatting alignment and editing tools. The property bar

can also be customized to change its size or position, or add or remove commands and change displays preferences such as icon size (Paloff & Pratt 2019). The next important function of computer graphics is image cropping under image editing. Crop Tool can be found next to free transform tool at the task bar which can be used in clipping the region of an image that is not needed. Crop tool removes distractive background elements and create a focus on the desired objects in the image by default, the resolution remains the same as the original image. The basic function of the crop tool is to reduce the size of the canvas. Crop tool will allow you to reduce your image size by cutting out pieces of the image. The crop tool allows the users to select an area of an image and discard everything outside the selected area (Godse & Godse, 2022). The cropping tool is located third from the third in the tool bar. Another important function of image editing is text writing under the text tool. Text writing allows text to be typed unto the current layer using with the use of primary colour. The text controls in the tool bar can be used to change the font, the size of the font, formatting text, justification and blend mode. The text tool allows users to add text to images and also to add text to your file (Zhu & Mumford, 2007). The next function of computer graphics under editing is line editing with the use of pen tools which allows the user to curve one segment at a time. The pen tools are used in line editing to create mathematical objects that represents curves and shapes. It allows the artist to create shapes with free form curves and with time and skill. Most curves found in the real world can be duplicated using the pen tool (Feng , Fan& Bednarz, 2022). After modifying an image on a graphic page, the modify image can be published on a hard copy with the use of printer.

Image publishing in computer graphics is the use of personal computers to design books and booklets under graphics that are intended to be printed by ink jet or laser printers. The software that supports desktop publishing has a WYSIWYG graphical user interface (GUI) to make the set-up for publishing as easy as possible. Desktop publishing (DTP) in graphics is the creation of documents using page layout software on a personal desktop computer Desktop publishing software can generate layouts and produce typographic-quality text and images comparable to traditional typography and printing. Desktop publishing is also the main reference for digital typography. This technology allows individuals, businesses, and other organizations to self-publish a wide variety of content from menus to magazines to books, without the expense of commercial printing (Blanz, Scherbaum & Vetter, 2004). The modified image on the graphic environment can make some movement on the screen which is known as motion graphic.

Another important aspect of computer graphics is motion graphics which is a method to interact with those watching, deepen the narrative, and convey an idea through the use of music and persuasive copy. We utilize them to produce advertisements, movie title patterns, explainer videos, and informational content. Motion graphics is a type of animation which describes moving or animated graphic design. Animation is an umbrella term for the whole field of moving imagery (Kolos & Ulyanov, 2019). Motion graphics is a type of animation that transforms static designs into moving pictures. The animations are typically in two- or three-dimensional format and sometimes have sound. Motion graphic designers use software programs to create visual narratives digitally or on television (Mantiuk & Tomaszewska, 2012).

To impart the proper skill of computer graphics to students in order to achieve all these functions, there is a need for constant and regular drills for proper understanding and that is what mobile learning method of teaching can offer whereby the students can study at their own time and convenience. Though mobile technologies are in the hands of youths and students today, the extent to which mobile learning has been used in teaching and learning of the mentioned components of computer graphics in tertiary institutions in Enugu State is not certain. It is on this background, this research work intends to assess the extent mobile learning has been utilized in teaching of computer graphics (Abdellah, 2016). Therefore, this study is aimed to identify the extent mobile learning has been used in teaching and learning of computer graphics.

The following research questions guided the study:

- i. To what extent is mobile learning used in teaching the image publishing/Rendering in computer graphics?
- ii. To what extent is mobile learning used in teaching motion graphics?

Research Hypotheses

This study was guided by the following null hypotheses and tested at 0.05 level of significance:

1. There is no significant difference in the mean response of lecturers on the extent of use of mobile learning for teaching computer based on gender.
2. There is no significant difference in the mean response of lecturers on the extent of use of mobile learning for teaching computer graphics based on institutions.

Methodology

The study was carried out in Enugu state of Nigeria. The State is among the five states in the south-Eastern geopolitical zone of Nigeria. Enugu state has four tertiary institutions that offer computer graphics in the computer education programme and these institutions have also introduced and accepted mobile learning as a means of instruction delivery. The population for the study is forty-four (44) computer education Lecturers in tertiary institutions in Enugu State. The population comprises of 4 Lecturers in Enugu state University of science and Technology, 20 Lecturers from university of Nigeria Nsukka, 14 Lecturers from Federal College of education Eha-ama Ufu and 6 from Enugu State College of education Technical, Enugu State. (The population is shown on Appendix A, page 82)

The entire population was studied due to the fact it was manageable. The instrument for data collection is titled “The extent of the use of m-learning in teaching and learning of computer graphics Questionnaire (TEUMLTCGQ)”. The instrument has two sections; section A and B. Section A will elicit information on the respondent’s personal data such as institution, Age, gender. Section B has twenty-eight items arranged into four clusters (A-D) meant to answer the research questions for the study. Cluster A elicited information on the extent to which M-learning is used in teaching image creation in computer graphic, Cluster B elicited information on the extent to which M-learning is used in teaching image editing in computer graphics, Cluster C will provide information on extent of the use of mobile learning in teaching image publisher/rendering in computer graphics, Cluster D obtained information on the extent of the use of mobile learning in teaching motion graphic.

The instrument was designed on a four-point rating scale of Very High Extent (VHE)/Strongly Agree (4), High Extent (HE)/Agree (3), Low Extent (LE), Disagree (2), very low extent (VLE) Strongly Disagree (1). These are in line with Likert-type rating.

The interview guide consists of 4 questions eliciting information on the extent of the use of m-learning in teaching image creation, image editing, image publishing/ rendering and motion graphics by computer education lecturers in tertiary institutions in Enugu state (Appendix C, pg. “84”).

The research instrument was subjected to face validation by three experts, two from department of Computer and Robotics Education, University of Nigeria Nsukka, and one from the department of computer science, Enugu State University of Science and Technology, Enugu. The experts were asked to make corrections access and correct the mistakes such as ambiguous or wrongly worded statements, missing information and other observed errors. The experts made suggestions for the improvement of the instrument. Their corrections and

suggestions were used to produce the final copy of the instrument. The reliability of the instrument was evaluated using the Cronbach Alpha reliability test. The instrument was distributed to twenty lecturers in Imo State University, who are not part of the study. The completed instruments were collected and analyzed with a reliability index of .75 was established.

The instrument was administered (face to face) on the respondents by the researcher with the help of three research assistants. The research assistants were instructed on how to administer, moderate the process and collect the copies of the completed instrument. The copies of the instrument were administered and retrieved on the spot to ensure high return rate. On the side of the interview, three days' notice was given to the interviewees by the interviewer (the researcher) for them to get prepared for it before the actual interview day. At the time of interview, the conversations between the interviewer and the interviewees were noted. However, two computer education lecturers, a male and a female from each tertiary institution under this study were interviewed and the interviewees were coded R1, R2 to R8 (which represents respondent 1 to 8).

Data collected from the administered instrument were analyzed using Statistical package for social science (SPSS V.24). Mean was used to answer the research questions on a Cut-off point of 2.50, while standard deviation (SD) was used to test the level of disparity of the responses. Any item with a mean of 2.50 or above indicated that lecturers utilize M-learning to teach computer graphics for that item to a high-extent, else the extent the lecturers utilized mobile learning to teach computer graphics is to a low extent. t-test was used to test the null hypotheses at 0.05 (α) level of significance. The null hypothesis would be upheld if the probability (p) value from the t-test analysis is greater than 0.05 level of significance ($p \geq \alpha$), otherwise it will be rejected if the probability value is less than 0.05 level of significance ($p < \alpha$).

Results

Research Question 1:

To what extent is m-learning used in teaching image publisher/Rendering in computer graphics?

Table 3: Mean and Standard Deviation of Responses of Computer Education Lecturers on the Extent of Using Mobile Learning in Teaching Image Publisher/Rendering in Computer Graphics.

S/N	ITEM STATEMENT	\bar{X}	SD	DEC
1.	I use goggle classroom in m-learning to teach my students on	1.91	.772	L

how to publish their work on newspapers and magazines in graphics.			
2. I use pictouch of m-learning tools to teach my students on how to publish brochure, posters, flyer, leaflets and catalogue in computer graphics.	1.80	.823	L
3. I instruct my students with the use of m-learning on how to publish their work on books and e-books in graphics.	1.73	.727	L
4. I use image creation tool of m-learning to teach my students on how to publish their modified images on web pages.	1.68	.740	L
5. I teach my students with the use of m-learning on how to publish as a banner and newsletters.	1.82	.657	L
6. I use many eyes in m-learning to teach my students on how to enhance appearance for all produce documents in computer graphics.	1.70	.701	L
7. I use online chat tool in m-learning to teach my students on how to customize all kinds of projects in an easier and understandable ways in computer graphics.	1.64	.838	L
Cluster details.	1.75	.751	L

Keys: X mean, SD=Standard deviation, DEC. decision, L=low

Data in Table 3 shows the mean and standard deviation of responses of computer education lecturers on the extent of mobile learning is used in teaching image publisher/ rendering in computer graphics in tertiary institutions in Enugu state. The result indicated that the extent of the use of m-learning in teaching image publisher/ rendering in computer graphics is low with the mean ranging from 1.64 to 1.91 which is below the cut-off point of 2.50 and the standard deviation is ranging from .657 to .838 showing closeness of the responses. The cluster details are 1.75 which shows that there is low extent in using m-learning to teach image publisher/rendering in tertiary institutions by computer education lecturers in tertiary institution in Enugu state.

Research Questions 2. To what extent is m-learning used in teaching animation in computer graphics?

Interview question 1: To what extent do you use mobile learning to teach image publisher/ rendering in computer graphics? if high, what are your reasons? If low, point out your reasons?

R5: “I do not use mobile learning to teach image publishing/rendering at all as a result of not being familiar with mobile learning platform for teaching. As a result of that, the extent that I use mobile learning to teach image publishing/rendering is low”

R6: “The extent that I used mobile learning to teach image publishing/rendering is extremely low. I don’t have the skill to set up the platform for students to learn.”

Table 2: Mean and Standard Deviation of Responses of Computer Education on the Extent of Using Mobile Learning in Teaching Motion Graphic.

S/N	Item Statements	X	SD	DEC
1.	I teach my students with the use of lovely chart of m-learning on how to create moving object and graphics for various media television, the internet, and film in computer graphics.	1.82	.815	L
2.	I use goggle classroom in m-learning to teach my students on how to transform static design into moving pictures in computer graphics.	1.80	.795	L
3.	I teach my students with the use og google meet in m-learning to create visual narratives on television to entertain the audience in computer graphics.	1.84	.745	L
4.	I teach my students with the use of m-learning to capture the pictures and then to animate these in the desired sequence in computer graphics.	1.89	.813	L
5.	I use google collab in m-learning to teach my students on how to animated graphics for film and TV credits, advertising and digital marketing in computer graphics.	1.80	.878	L
6.	I teach my students with the use of m-learning on how one can bring movement to graphic images and text in motion graphics.	1.68	.829	L
7.	With the use of m-learning, I teach my students on how one can initiate movement to objects that are static in computer graphics.	1.68	.909	L
Cluster details.		1.79	.826	L

Keys: X= mean, SD=Standard deviation, DEC,=decision, L=low

Table 4 shows the mean and standard deviation of responses of computer education lecturers on the extent mobile learning is used in teaching animation in computer graphics in tertiary institutions in Enugu state. The result indicated that the extent of the use of m-learning in teaching animation in computer graphics is low with the mean ranging from 1.68 to 1.89 and the standard deviation is ranging from .745 to .909 showing closeness of responses. The cluster mean is 1.79 which shows that there is low extent in using m-learning to teach computer animation in tertiary institutions by computer education lecturers in tertiary institutions in Enugu State.

Interview question 2: To what extent do you use mobile learning to teach animation in computer graphics? If high, what are your reasons? If low, point out your reasons?

R7: “I use mobile learning to teach animation in computer graphics occasionally. I am more conversant with classroom method of teaching.”

R8: “I have the knowledge of mobile learning and its positive impartation on student’s academic performance but the awareness and facilities to set up the platform is not there. So the extent I use mobile learning to teach computer animation is low.”

Hypothesis 1

H₀₁ Significant difference does not exist in the mean responses of male and female computer education lecturers on the extent of the use of mobile learning in teaching computer graphics in tertiary institution in Enugu State.

Table 5: Summary of the t-test, analysis of the mean responses of male and female Computer Education Lecturers on the extent of use of m-learning in teaching computer Graphics in Tertiary institutions in Enugu

Lecturers	N	\bar{X}	Std.Dev	Sig.	t	DF	Sig (2 tailed)	decision
Male	24	1.85	.59	1.54	1.164	38.000	.84	NS
Female	20	1.68	.34					

The data presented on Table 5 reveals that the significant value 1.54 is above the p value of 0.05: these indicate that there is no significant difference in the mean responses of male and female computer education lecturers on the extent of the use of m-learning in teaching computer graphics in tertiary institutions in Enugu state. Therefore, the null hypothesis is upheld.

Hypothesis 2

H₀₂: Significant difference does not exist in the mean responses of computer education lecturers in Universities in Enugu State on the extent of use of m-learning in teaching computer graphics.

Discussion of the Findings

The Extent of the use of Mobile Learning in Teaching Image Publishing/ Rendering in Computer Graphics

The findings from the analysis presented in Table 3 reveals that computer education lecturers in tertiary institutions in Enugu state are making use of mobile learning to teach image

publishing/rendering at a very low extent. Answer from the interviewed computer education lecturers revealed that some of the lecturers do not know what it means to teach image publisher/rendering with mobile learning while some use mobile learning at a low extent which support what Kumar, Bervell (2019) said on the use of Google Classroom for mobile learning in higher education is still on a low extent.

The Extents of the use of Mobile Learning in Teaching Animation in Computer Graphics

The analysis in Table 4 reveals that computer education lecturers in tertiary institution in Enugu state use of mobile learning to teach computer animation is at a low extent. The result from the respondents interviewed lecturers in tertiary institution in Enugu state revealed the same result of low extent of the use of mobile learning in teaching computer animation by computer education lecturers. Another female respondent from tertiary institution in Enugu state further revealed that she uses mobile learning to teach computer animation occasionally. She explains that old classroom method is more familiar with both the lecturers and students.

The summary of the result from the analysis of the four tables reviewed those computer education lecturers in tertiary institution in Enugu state use of mobile learning to teach computer graphics is at a low extent which is in line with Hoi (2020) on the negative attitude towards the use of mobile learning. From the responses of the interviewed lecturers in Enugu state tertiary institution revealed that some lecturers in computer education do use mobile learning to teach computer graphics at a low extent, while few do not use it to teach computer graphics at all.

Discussion on the Hypothesis Findings

From the analysis on the extent of the use of mobile learning in teaching computer graphics in universities in Enugu state, it was found out that there is no significant difference in the mean responses of male and female lecturers in the extent of the use of m-learning in teaching computer graphics in tertiary institutions in Enugu State.

It was also found out from the analysis that there is significant difference in the mean responses of lecturers from different institutions. A POST HOC test analysis on mean responses from tertiary institutions in Enugu state was carried out to find out where the disparity is coming from and it was found out that the difference is from UNN. The analyses reveals that University of Nigeria Nsukka (UNN) has a mean value that is higher and different from the range of mean values from other institutions score of 2.045, this indicates that some lecturers in UNN may be

using mobile learning in teaching computer graphics to an extent, (Ezema & Nworgu, 2021). The authors support the findings by indicating in their work that University of Nigeria Nsukka has been using m-learning to teach some courses to an extent.

Conclusion

Due to the advance in technology in our society today, there is a need for computer education lecturers in tertiary institution to shift from classroom method to mobile learning platform. There is inadequate utilization of mobile learning by computer education lecturers to teach computer graphics. This could be as a result of poor awareness or inadequate of the facilities to set up the platform for teaching computer graphics. Based on this note, this study sought to determine the extent of the use of mobile learning by university lecturer to teach computer graphics. Data were collected, analyzed and interpreted and interpreted. Based on the findings of the study, it was concluded that the extent of the use of mobile learning by computer education lecturers in tertiary institution in Enugu state is found to be low and there is need to create awareness on the use of mobile learning platform in teaching computer graphics. Reviewed studies proved that using mobile learning to teach computer graphics increase the academic performances of students in higher institutions. It was observed that teaching computer graphics with mobile learning platforms can be effectively and comfortably allow the students to acquire the right skill with constant practices which has been observed to be the best and more convenient which increase the rate at which students do their practices on computer graphics that help them to be more competent in computer graphics as a course and also develop skill, behavior and confidences necessary to excel in computer graphics courses.

Recommendation.

Based on the findings of the study, the following recommendations were mad

1. Tertiary institutions in Nigeria should strive to adapt the use of mobile learning tools and its platform in teaching computer graphics. This will enable the students to practices more at their own time and confidence which will enable them to acquire the right skill to excel in computer graphics.
2. Federal ministry of education should encourage the use of mobile learning in teaching computer graphics and media related courses by lecturers in tertiary institutions by integrating in the curriculum for all computer graphics courses in the universities.
3. Facilities of ICT should be made available to schools to ensure the effective application of mobile learning in teaching of computer graphics.

4. Seminars, workshops and conferences should be organized by the NUC, NCCE and NBTE in collaboration with ministry of education where computer education lecturers will be trained on how to make effective use of mobile learning to teach computer graphics in our various institutions.
5. Tertiary institutions should also employ ICT staff to be in charge of mobile learning delivery. Hence it will be the duty of this staff to ensure that lecturers make use of mobile learning platform in teaching computer graphics and other related media courses that need constant practices for acquisition of skills that will improve their performances in computer graphics compulsory thing thereby getting themselves ready with the skills needed

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