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IMPACT OF MULTIMEDIA INSTRUCTIONAL PACKAGE FOR TEACHING
COMPUTER MAINTENANCE IN COLLEGES OF EDUCATION IN ENUGU STATE,
NIGERIA

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Abstract

The study investigated the impact of multimedia instructional package for teaching computer maintenance in Colleges of Education in Enugu State, Nigeria. The study adopted quasi-experimental research design. Pre-test, post-test of both treatment and control groups were analyzed using Analysis of Covariance to answer each research questions. Findings from the study revealed that, there was significant difference in the mean responses of student's academic achievement favouring students in the treatment group. Hence, multimedia instructional package has much impact in improving student's academic achievement in computer maintenance in colleges of education than conventional method. It was therefore recommended that educators should adopt multimedia instructional package in teaching computer maintenance and other courses.

Keywords: Multimedia; Instructional Package; Computer Maintenance

Introduction

The world of education has been influenced by an increase in the use of technology (Kaur, Sharma & Singh, 2015). This technology can be used to strengthen students learning and can be used effectively as a cognitive tool for teaching in the classrooms (Bruce & Levin, 2001). In recent years, institutions of higher learning in the world over are incorporating multimedia into their educational curricula to enhance

the teaching process (Kamsah, Mokhtar, Ahmad & Yaakob in Neo, 2004). The ability to incorporate multimedia into teaching will modify and enhance the traditional teaching method. This will inevitably change the way educators teach and as well as the way

students learn. The pervasion of multimedia elements into the teaching environments has also pushed educators to becoming more technology-oriented. With the advent of multimedia in the classrooms, educators can equip themselves with information and

communication technological skills and become better communicators of their content materials, thus enabling the students to learn in a more productive way (Neo & Neo, 2004). Ogunbote and Adesoye (2006) expressed that multimedia technology adds new dimension to learning experiences because concepts were easier to present and comprehend when the words are complemented with images and animations. Ogunbote and Adesoye further stated that it has been established that students retain more when a variety of senses are engaged in impacting knowledge; and the intensity of the experience aids retention and recall by engaging social, emotional and intellectual senses. Ajmal, Rahman, Ullah, Hina and Ghayyur (2011) stated that multimedia is capable of activating the senses of sight, hearing and touch of the student thereby, improving memory retention, increasing motivation and generally

deepening understanding. Multimedia has been shown to elicit the highest rate of information retention and result in shorter learning time (Ng & Komiya, 2000).

Multimedia basically means many media (text, graphics, animation, video and sound) working together to present information to the learner via the computer (Maheshwari, 2011). Similarly, Angadi and Ganihar (2015) agreed that multimedia is a combined use of text, graphics, animation, sound and video to present information to the user via the computer. Oshinaike and Adekunmisi (2012) opined that multimedia is the combination of various digital media types such as text, images, sound and video, into an integrated multi-sensory interactive application or presentation to convey a message or information to an audience. Text provides information in written way; video provides the visualization; sound provides an emphasis; graphics provide the creative possibilities, and animation used to

demonstrate an idea or illustrate a concept (Shilpa & Sunita, 2016). Mayer (2001) classified multimedia presentation of materials into words and pictures. According to Mayer, pictures can be presented as static pictures, illustrations, graphics, animation, simulation, photos, or video; whereas words can be presented as on-screen text or narration. The power of multimedia lies in the fact that it is multi-sensory, stimulating the many senses of the audience; interactive, enabling the end users of the application to control the content and flow of information (Vaughan in Nco & Neo, 2001).

Multimedia is a technology that serves as a communication facilitator; and as an instructional delivery medium (Murali & Jaise, 2016). When multimedia is used effectively it can fascinate an audience, tug emotions, maintain attention, and contextualize scenario-based learning (Vipul & Jaya, 2016). Multimedia can stimulate more than one sense at a time which is crucial for maintaining concentration of students. Use of multimedia in teaching enhances attention getting and attention holding of students and it encourages deep reflective thinking and retention capacity of students (Reeves in Teoh & Neo, 2007). According to Razavi in Mehrabi and Faramarzi (2016), the use of multimedia is possible in three folds, including: presentation- in this way, the educator can use multimedia for content visual-audio presentation; collaborative learning- when students work as a team, the use of multimedia makes it easy relations between members of the group; and individual learning - when learners learn individually and independently, the interaction between the user and the software will be learning. According to Kapri (2017), the three potential pedagogical value and rationale for using multimedia in classroom are: to raise interest level, to enhance understanding, and to increase memorability. The introduction

of multimedia into the classroom has a profound impact on educators' role and on students' learning (Slack,1999),Sharman (2013)asserted that the use of multimedia in class draws the attention and interaction between students and educators.Multimedia allows educators to integrate text,graphics, animation,and other media into one package to present comprehensive information for their students to achieve specified course outcomes (Yamauchi,2008).Multimedia permits the demonstration of complicated processes in a highly interactive,animated way.Multimedia has the potential to create high quality learning environment, with the capability of creating a more realistic learning content through its different media (Abidoye, 2015). The most significant impact of multimedia is the ability to transform tacit knowledge into explicit knowledge (Hammza, Daw & Faryadi, 2013). Multimedia is now pervading the educational system as a tool for effective teaching(Udim &Etim,2016).

Teaching is a systematic presentation of facts, ideas, skills, and techniques to students. Teaching can be viewed as the processes and procedures used by the teacher to make learning happen. According to Okoye (2010), teaching involves imparting information to the learner for the learner's academic and mental development. Teaching involves a teacher; a learner; content in form of knowledge, facts, information and a skill to be imparted; and method and techniques to be adopted (Sangoleye & Kolawole,2016).Multimedia has broken monotony and provided variety in the teaching situation. Multimedia provides variety in the presentation of content which helps learners in concentration, better understanding, and long retention of information (Sansanwal. 2009). Multimedia has been integrated to complement whichever teaching methods. The effectiveness of classroom teaching

always depends upon the variety of the methods adopted by the educator.The proper method used for effective teaching of computer maintenance in this study is through integration of instructional package.

Instructional package is computer programs designed specifically to deliver instruction or to assist in the delivery of instruction on a topic (Roblyer & Doering. 2012).Instructional package is a set of strategies used in the instructional process so as to make teaching process more easy and simple (Rosa & Precchi, 2012). Instructional package is developed for the sole purpose of supporting instruction and/or learning.Multimedia instructional package is an organized learning system for auto instructional purpose which includes an interrelated use of different media from modern communication methods, and various learning and teaching strategies to create effective learning experiences (Angadi & Ganihar, 2015).Multimedia instructional packages enable the educator to present the information in various media via sound,text, animation,video and images (Sharma & Priyamvada, 2017). The combination of these various media provides a stimulating environment for making interesting and effective learning process in which student's participation is active and interactive. Multimedia instructional package consists of adobe flash (macromedia), accompanied by appropriate sound, video clips, charts, movie clips, simulation, animations and graphics. Advantages of multimedia instructional package include increased availability and repetition of instructional content; improved ability of students to learn at their own pace: increased student control of material; less demand on instructor time; and the provision of an alternative approach to describe complex topics or three-dimensional relationships (Smith,Cavanaugh & Moore, 2011). Multimedia instructional package is

bound to have profound influence on the retention capacity of students; foster and motivate the students towards learning computer maintenance.

Computer maintenance is a course of study taught as an elective unit at second semester third-year level for computer education students in Nigerian colleges of education (Nigeria Certificate in Education, 2008). Studies revealed that the objectives of the course is to help students identify common symptoms and faults associated with computer malfunctions: isolate the source of problem through basic troubleshooting techniques; and solve the problem. As computer maintenance is a practical course, it is essential that students have hands-on experience. Multimedia bridged the gap between theory and practice by giving students the opportunity to practice what they have learnt in safe and controlled environment. Furthermore, multimedia activities encourage students to work in groups, express their knowledge in multiple ways, solve problems, revise their own work, and construct knowledge (Rosa & Preethi, 2012). Rosa and Preethi further stated that multimedia instructional package is helpful to increase student's retention, develop various skills and promote students' self-esteem and developing high level thinking. Similarly, Gilakjani (2012) stated that the rationales for the use of multimedia in the classroom are: its use increases students' interest level, enhances their understanding, and increases their memorizing ability. Gilakjani further stated that there are different learning styles for different students and multimedia provides a variety of learning styles at the same time to cater for the requirement of different students and address individual differences. Hence, the need to make use of modern technology such as multimedia for instructional delivery in computer maintenance therefore arises.

Statement of the Problem

Studies had revealed that teaching and learning is characterized with the use of conventional method, which always makes educators to dominate the class while the learners remain passive (Abidoye, 2015). The conventional teaching method has failed to enhance problem-solving skills, curiosity, and critical and logical thinking among students (Shah & Khan, 2015). The use of conventional method often responsible for learners' low interest and poor academic achievement of students in the course (Abidoye, 2015). Furthermore, the use of multimedia in classroom teaching is very limited due to multiple reasons such as: high cost of multimedia, computers, and other related infrastructure; lack of computer-literate teachers and technical staff; and teachers' attitude towards multimedia use. (Shah & Khan, 2015). There is a need to move from traditional approaches to more innovative information and communications technologies (ICT) enriched approaches for meaningful learning. Therefore, this study investigates the impact of multimedia instructional package for teaching computer maintenance in colleges of education in Enugu State, Nigeria.

Purpose of the Study

The purpose of this study is to investigate the impact of multimedia instructional package for teaching computer maintenance in Colleges of Education in Enugu State, Nigeria. Specifically, the study sought to:

1. determine the academic achievement of students taught with multimedia instructional package and those taught with conventional method.
2. Ascertain gender difference in academic achievement of students taught with multimedia instructional package and those taught with conventional method.

Research Questions

Two research questions were formulated in line with the specific purposes of the study to guide the research study:

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1. What are the academic achievement of

2. What are the academic achievement of students taught with multimedia instructional package and those taught with conventional method with respect to gender?

Hypotheses

The following null hypotheses were formulated to guide the study and were tested at 0.05 level of significance.

HO1: There is no significant difference between academic achievement of students taught with multimedia instructional package and those taught with conventional method.

HO2: There is no significant difference in the academic achievement between male and female students taught with multimedia instructional package and those taught with conventional method.

Methodology

Table 1: Mean and standard deviation of academic achievement of students taught with multimedia instructional package and those taught with conventional method.

This study adopted a quasi-experimental research design. The study was carried out in six Colleges of Education in Enugu state during 2017/2018 academic session, with a population of 83 respondents which were computer education students. Three colleges of education that were taught with multimedia instructional package developed by the researchers served as treatment group while three other colleges of education that used conventional method served as control group. Pre-test was administered to both the treatment and control groups after which proper teaching commenced by using the prepared lesson plans. Each contact lasted for two hours per week and the course was taught by the institutionally assigned teacher. The treatment lasted for 4 weeks simultaneously with the control. At the end of the treatment, a post-test was administered to both groups. Analysis of Covariance (ANCOVA) was used to analyse each research question.

Results

Research Questions 1: What are the academic achievement of students taught with multimedia instructional package and those taught with conventional method?

GROUP	PRE-		TEST	POST-T	ST
	N	X	SD	X	SD
MULTIMEDIA	50	28.10	5.43	75.90	8.79
CONVENTIONAL	33	27.89	6.63	49.09	5.07

Key:X=Mean,SD=Standard Deviation, N=Number of Respondents

Table I show that the mean and standard deviation of the treatment group (pre-test) is 28.10 and 5.43 respectively: while the mean and standard deviation of the control group (pre-test) is 27.87 and 6.63 respectively. Furthermore, the mean and standard deviation of the treatment group Research Questions 2: What are the academic achievement of students taught with multimedia instructional package and

(post-test) is 75.90 and 8.79 respectively; while the mean and standard deviation of the control group (post-test) is 49.09 and 5.07 respectively. Comparing the post-test achievement of the two groups showed that treatment group had higher academic achievement.

those taught with conventional method with respect to gender?

Table 2: Mean and standard deviation of academic achievement of students taught with multimedia instructional package and those taught with conventional method with respect to gender.

		PRE	TEST	POST-T	EST
GENDER	N	x	SD	叉	SD
MALE	50	27.50	6.08	66.04	16.48
FEMALE	33	28.05	5.87	64.92	14.75

Key: F-Mean, SD=Standard Deviation, N-Number of Respondents

Table 2 shows that the mean and standard deviation of male students (pre-test) is 27.50 and 6.08 respectively; while the mean and standard deviation of female students (pre-test) is 28.05 and 5.87 respectively. Moreover, the mean and standard deviation of male students (post-test) is 66.04 and 16.48 respectively; while the mean and standard deviation of female students (post-test) is 64.92 and 14.75.

Table 2 shows that the mean and standard deviation of male students (pre-test) is 27.50 and

respectively. Comparing the post-test achievement of the students in terms of gender showed that male students had slightly higher achievement.

Null Hypothesis 1: There is no significant difference between academic achievement of students taught with multimedia instructional package and those taught with conventional method.

Table 3: Analysis of Covariance (ANCOVA) of academic achievement of students taught with multimedia instructional package and those taught with conventional method.

Source	Squares	Df	Mean Square	F	Sig.
Corrected Model	14825.42a	2	7412.71	145.71	0.00
Intercept	8933.316	1	8933.31	175.60	0.00
PRETEST	537.47	1	537.47	10.57	0.00
GROUP	14019.47	1	14019.47	275.58	0.00*
Error	4069.76	80	50.87		
Total	372175.00	83			
Corrected Total	18895.18	82			

Table 3 shows that the tested significance level 0.00 is less than the stated 0.05 level of significance. Therefore the null hypothesis was not accepted. This indicated that there is significant difference in the mean responses of treatment group (multimedia) and control group

(conventional) on academic achievement of students.

Null Hypothesis 2: There is no significant difference in the academic achievement between male and female students taught

with multimedia instructional package and those taught with conventional method.

Table 4: Analysis of Covariance (ANCOVA) of academic achievement between male and female students taught with multimedia instructional package and those taught with conventional method.

Source	Type III Sum of		df	Mean Square	F	Sig.
	Squares					
Corrected Model	840.36a	2	420.18		1.86	0.16

Intercept	8973.12	1	8973.12	39.76	0.00
PRETEST	818.72	1	818.72	3.63	0.06
GENDER	34.42	1	34.42	15	0.70*
Error	18054.82	80	225.69		
Total	372175.00	83			
Corrected Total	18895.18	82			

Table 4 shows that the tested significance level 0.70 is greater than the stated 0.05 level of significance. Therefore the null hypothesis was accepted. This indicated that there is no significant difference in the mean responses of male and female students on academic achievement.

Discussion of the Findings

The data presented on academic achievement of students taught with multimedia instructional package and those taught with conventional method at colleges of education revealed that the mean and standard deviation of the treatment group (multimedia) is greater than the mean and standard deviation of the control group (conventional). The finding of the study is in agreement with the findings of Sahin (2000) who stated that students instructed with multimedia are more successful compared to students instructed with conventional method. Similarly, Akbaba in Ilhan and Oruc. (2016) asserted that the academic success level of the classroom using multimedia was higher than the classroom which did not use it. In the same way, the findings relate to the findings of Taber N. Martens and Van-Merriënboer. (2004) who opined that schools that employ the use of multimedia instruction have higher student attendance and lower dropout rates that leads to greater academic achievements. When the treatment and control groups' pre-test and post-test scores were analyzed, the significant difference is in the benefit of the treatment group, which means the treatment group had increase in the post-test. Aloraini

(2012) asserted that there is statistically significant difference between the control and treatment group at the significance level of 0.05 in the post academic achievement test in favour of the treatment group

The findings revealed that there is no significant difference in the academic achievement between male and female students taught with multimedia instructional package and those taught with conventional method at colleges of education. The finding of this study was in conformity with the findings of Aloraini (2012) in a study on the impact of using multimedia on students academic achievement in the College of Education at King Saud University. Aloraini found out that there were no statistically significant differences between the pre and post achievement test at the significance level of 0.05 for both the male and female groups. It is observed that the development of the academic achievement for the male group is slightly greater than that of female group.

Conclusion

The course taught with multimedia instructional package has much impact, is more effective and better comprehended than the one taught through conventional method. It was found in this research that the use of multimedia in the teaching process does not only increase academic success level of the students, but create positive changes in the attitudes of the students towards learning. The study revealed that there is significant difference between multimedia instructional package and conventional method on student's academic

achievements. These results therefore showed that multimedia instructional package is a viable teaching method for Computer Maintenance in Colleges of Education in Enugu State, Nigeria.

Recommendations

The following recommendations were made based on the findings of the study:

1. The study should be replicated in other disciplines as well as other tertiary institutions.
2. Multimedia infrastructures should be provided to colleges of education by Tertiary Education Trust Fund (TETFund).
3. Governments at all level should encourage the use of multimedia instructional package in institutions of higher learning by providing multimedia tools.
4. National Commission for Colleges of Education should carry out a review of computer maintenance curriculum for Nigerian Colleges of Education with a view to incorporate multimedia instructional technique into the curriculum.
5. Computer educators nationwide should adopt the use of multimedia instructional package in teaching computer maintenance in colleges of education.
6. Multimedia instructional package should be used in teaching all other courses at colleges of education nationwide.
7. Yearly organization of training course for computer educators regarding the use of multimedia in teaching is highly needed.

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