Effect of Powerpoint Instruction on Students' Academic Achievement in Computer Science (Database Management System) in Colleges of Education in Rivers State

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Abstract
The study investigated the 'Effect of PowerPoint Instruction on Students' academic achievement in Computer Science'. Microsoft Office PowerPoint Instruction Strategy (MOSPPIS) was used as the experimental variable while Lecture Method was the control. Two research questions and two null hypotheses guided the study. The study which adopted a quasi-experimental, pre-test, post-test, non-equivalent control group was carried out in the College of Education, River State. Sample of 346 two hundred level computer science student were used for the study. Two intact classes from each College of Education were used; the intact classes were taught meaning of database management using MOPPIS and LM groups. The instrument Computer Science Achievement Test (COSAT) was developed by the researcher and validated by three experts before using it for data collection. The instrument was administered as pretest and reshuffled as posttest. The research questions were answered using mean and standard deviation scores. The hypotheses were tested at 0.05 level of significance using analysis of Covariance (ANCOVA). The results showed that the experimental group taught with Microsoft PowerPoint Instruction Strategy (MSPPIS) obtained a higher mean achievement score than the control group in the post COSAT. The difference was however, not significant. The male students had higher mean achievement scores than their female counterparts. It was recommended among others that MOSPPIS should be given more emphasis in the training and re-training programmes of colleges of education computer science lecturers.
Keywords: PowerPoint Instruction, Academic Achievement, Data Base Management System, Instructional Strategy & Computer Science.

Introduction
Information and communication technology (ICT) has reduced the world to a mere global village. There are enhanced information and communication techniques that can be used in improving teaching and learning activities in the classroom (Liao, 2007). One of these ICT tools that aid effective teaching and learning is Computer Based Instruction (CBI). According to Dogan (2010), CBI is a broad term that refers to virtually any kind of computer technique used in educational settings including drill and practice, tutorials, simulations, instructional management, supplementary exercise, programming, database development, writing using word processors, and other applications.

The level of achievement of a nation, according to Effendiogha and Yelken (2010), depends on the extent of application and interaction of ICT in education. Computer based instruction (CBI) provides an interactive approach to teaching and learning and enhances learners' active participation (Grad, Rosenberg and Matear, 2003). CBI is essential because of the positive/desirable transformation it brings to learning environment (Effendiogla and Yelken, 2010). CBI makes use of computers in teaching and learning activities. CBI enables students to learn by self-evaluating and reflecting on their learning process. It also motivates students to learn better by providing them with the immediate feedback and reinforcement and by creating an exciting and game-like learning environment. CBI enables the student to progress at their pace and provides them with appropriate alternative ways of learning (Mkpa, 2009). There are many aspect of CBI, this includes among others programmed Instruction Strategy (PIS), Concept Mapping Strategy (CMS) and Microsoft Office PowerPoint Instruction Strategy (MOPPIS).

Microsoft Office PowerPoint Instruction Strategy (MOPPIS) is one aspect of computer based instruction (CBI). MOPPIS helps any educational level to convey information better and allows students to proceed at a comfortable learning rate (Osigwelem, 2005). According to Bayrktar (2001), MOPPIS is a slide show presentation programme currently developed by Microsoft Office PowerPoint initially named presenter. MOPPIS is used to develop slide-based presentation format, and is currently one of the most commonly-used presentation programmes available. Slides may contain text, graphics, sound, movies, and other objects, which may be arranged freely. According to Dorgan (2010), the presentation can be printed, displayed live in/on a compiler, or navigated through at the command of the presenter.

According to Efendiogle and Yelken (2010), the following are the five features of Microsoft Office

PowerPoint (MOPP) adding smart art, inserting shapes, inserting an image, slide transitions, and adding animations. Each of these five features can be used to enhance teaching and learning of various subjects at primary, secondary, and tertiary levels of education. The tertiary levels of education comprise of the university, polytechnics, and colleges of education or agriculture etc. The MOPPIS can be utilized in teaching male and female undergraduate students in colleges of education. There are several computer courses offered in colleges of education in Nigeria, one of these courses is Database Management System. The choice of Database Management System by the researcher is based on the low performance of students on the course in previous years; and the low performance is attributed to poor teaching method adopted by the lecturer in Colleges of Education.

A database Management System (DBMS) is a set of programs that manages any number of databases and is equally application software that interacts with the user. In addition to that, Database Management System is responsible for accessing data, inserting, updating and deleting data, security integrity, facilitate by logging, application-defined rules, including triggers, supporting batch and on-line programs, facilitating backups and recoveries, optimizing performance, maximizing availability, managing the buffer pools, acting as interface to other system programs and supporting user interface package, such as the popular SQL interface for relational database systems.

Isman (2005), Liao (2007) and WiseGeek (2013) had pointed out that lecture method of teaching used by teachers of computer science had not been effective in classroom delivery. According to Wikipedia, (2014) lecture method involves showing by reason or proof, explaining or making clear by use of examples or lectures in computer science courses.

Numerous studies had shown that student's achievement in computer science are bedeviled with poor performance. This notion of poor achievement has been attributed by researchers to the continual use of uninspiring method of teaching adopted by teachers of computer sciences in Nigeria College of Education. Some innovative methods have been suggested which include Programmed Instruction Strategy (PIS), Concept Mapping Strategy (CMS) and Microsoft Office Power point Instruction Strategy (MOPPIS).

Researches had shown that gender is a predictor of academic achievement, and also the effect of gender on academic performance of students exposed to problem-based learning which showed that sex was a determinant of academic performance irrespective of the pattern adopted. The effects of gender would be considered in this study. Gender as a factor in academic achievement has for sometime generated a lot of concern for lecturers. A number of researchers have divergent opinion on male and female performance. Therefore an investigation of gender influence as intended in this research would shed more light on the issue.

Consequently, there is need to shift to other innovative teaching strategies such as Microsoft Office PowerPoint Instruction Strategy (MOPPIS). Hence, the research intends to investigate the effect of Microsoft Office PowerPoint (MOPP) Instruction Strategy on students' academic achievement in colleges of education in Rivers State, Nigeria.

Purpose of the Study
The main purpose of this study is to investigate the effect of Microsoft Office PowerPoint instruction strategy on students' academic achievement in computer Science in colleges of education in Rivers State, Nigeria. Specifically the study sought to:
1. Determine students' mean academic achievement score in computer science (Database Management System) when taught with Microsoft power point instruction strategy and lecture method.
2. Examine male and female students' mean academic achievement score in computer science (Database Management System) when taught with Microsoft PowerPoint instruction strategy and lecture method.

Research Question
The study provided answers to the following research questions:
1. What is the pretest and posttest mean achievement scores of students in experimental and control group in computer science DBMS when taught with Microsoft PowerPoint Instruction Strategy and lecture method respectively?
2. What are the pretest and posttest mean achievement scores of male and female students in experimental and control group in computer science when taught with Microsoft PowerPoint Instruction strategy and lecture method respectively?

Hypotheses
The following null hypotheses were formulated and will be tested at 0.05 level of significance.
$H0_1$: There is no significant difference between the mean achievement scores of students taught DBMS with Microsoft PowerPoint and that of those taught with lecture method.
$H0_2$: There is no significant difference between the mean achievement scores of male and female students taught

DBMS with Microsoft Office PowerPoint and that of those taught with lecture method.

Methods

This is a quasi-experimental study of the effect of Microsoft PowerPoint instruction on students' achievement. Specifically, the study was a non –equivalent control group design. This design is deemed appropriate because, the study involved the use of intact classes in which there was no random assignment of the subjects to experimental and control groups (Best, 2000). The design is represented schematically as follows:

Schematic Representation of Pre-test Post –test Control Group Design

Group	Pre-test	Treatment	Post-test
Experimental (E)	O_{E_1}	$P_E O_{E_2}$	
Control (C)	O_{C_1}	$P_C O_{C_2}$	

Where:

O_{E_1} =Pre-Basic Computer Achievement Test For experimental Group

O_{E_2} =Post –Basic Computer Achievement Test For experimental Group

O_{C_1} =Pre-Basic Computer Achievement Test For control Group.

O_{C_2} =Post-Basic Computer Achievement Test For control Group

P_E = Microsoft PowerPoint Instruction

P_C = Lecture Method

   Lecture method was used as control. According to Nworgu (2004), an essential and indispensable feature of quasi-experimental design was the use of control. He opined that a control group is one to which the experimental treatment was not administered.

   The study was conducted in Colleges of Education in Rivers State. In the state there are two colleges of Education namely College of Education Rumuolemini Port Harcourt which is state owned and Federal College of Education (Technical) Omoku. The rational for this choice is based on the fact that, they are located in areas with good facilities like electricity laboratories which are prerequisite for the experiment. Also, students in these areas achieve poorly in Computer Science Education. The Population for the study consists of all 346 two hundred Level students in the two Colleges of Education in River State.

   The researcher used all the three hundred and forty six (346) two hundred level computer science Education students from two Colleges of Education in the State. There was no sampling, since the entire population is manageable. According to Nwanne (2007), the entire population could be studied when the size of the population is considered small.

   The instrument for data collection for the study was Computer Science Achievement Test (COSAT). COSAT which was developed by the researcher using Computer Science scheme of work of two hundred Level students. It consists of two sections: section A contains information on the personal data of the research course and section B consists of instructions for the test and 40 multiple choice questions. The 40 items were drawn from the contents spelt out in the table of specification. Each item has four response options a, b, c, and d. The instrument served as Pre-test and Post-test. For the Post-test, the Pre-test items were reshuffled without altering the options.

   The instrument was validated by three experts (two from the Department of Science and Computer Education, ESUT and one from Department of Computer Science Education, Federal College of Education, Omoku Rivers State). An estimate of internal consistency for the COSAT was determined using Kuder-Richardson formula (K-R_{20}) yielding an internal consistency index of 0.79.

   The COSAT was administered to both students groups as (pretest), three days before the treatments. Sixty minutes was allowed for the test. The tests enable the researcher to determine the prior knowledge and achievement of the students. At the end of the treatment which lasted for six weeks, the pretest items were reshuffled and given to the two groups again as post-tests. One mark each was assigned to the test items in the pre-COSAT and post-COSAT.

   The 40 items pre-test, posttest- was scored one mark each. The maximum mark were 40 and lowest zero. The scores for both experimental and control groups were recorded accordingly. The researcher used mean and standard deviation to answer the research questions. Mean score was used because it is the most reliable measure of central tendency (Uzoagulu 2014). The hypotheses formulated for the study was tested at 0.05 level of significance, using Analysis of covariance (ANCOVA). This is because, Analysis of Covariance is the most appropriate statistical tool for analyzing data based on pre-test, post- test design since it takes care of initial differences in the ability levels of the tests (Uzoagulu, 2014).

Results

Test of Research Hypotheses

H01: There is no significant difference between the mean achievement scores of students taught with Microsoft power point and that of those taught with lecture method in computer science Data Base Management System (DBMS).

Table 1: Analysis of Covariance (ANCOVA) results of posttest scores of Computer Students Taught DBMS with Microsoft power point instruction and Lecture method.

Tests of Between-Subjects Effects

Source	Sum of Squares	Df	Mean Square	F	Sig. (p>.05)
Corrected Model	207.825[a]	5	41.565	1.167	.328
Intercept	5066.532	1	5088.523	197.671	.000
(Main effect Method	121.163	1	121.163	.075	.035
Gender	5,639	1	5.639	.158	.0.2
Method *Gender	.485	1	200.652	66.884	.135
Error	5698.006	335	35.613		
Total	199984.000	346			
Corrected total	5905.831				

a. R Squared = .012)Adjusted R Squared = -.019)

Table 1 shows that the calculated probability value of main effect is 0.035 which is less than the declared probability of alpha level 0.05. Therefore, hypothesis 1, is rejected or not accepted. This implies that there exists a significant difference between mean achievement score of computer science student taught with Microsoft power point instruction strategy (MOPPIS) and lecture method.

H02: There is no significant difference between the mean achievement scores of male and female students taught DBMS with Microsoft office power point and that of those taught with lecture method in Computer Science.

Table 2: Analysis of covariance (ANCOVA) result of male and female pre-test and posttest scores in computer student taught with Microsoft office power point instruction strategy and lecture method.

Source	Sum of Squares	Df	Mean Square	F	Sig. (p>.05)
Corrected Model	62.632a	10	62.632	1.521	.225
Intercept	3309.523	1	3309.677	80.386	.000.
(Main effect) Method	10.399	1	10.399	.361	.025
Gender	3.671	1	3.671	.033	.056
Method *Gender	.485	1	200.652	66.884	.035
Error	2223.296	330	41.172		
Total	71026.000	346			
Corrected total	2285.929	345			

As shown in table 2, the calculated p-value 0.025 of the main effect is less than the level 0.05. Therefore, the null hypothesis 2 is rejected. This implies that there exist significant difference between male and female taught computer science with Microsoft power point and lecture method.

Discussions

Effect of programmed DBMS instruction on Students Achievement: Result on table-showed that experimental group obtained a higher mean score than the control group in the post COSAT. The findings showed that students taught with DBMS achieved significantly better achievement Test than those exposed to lecture method. This result was in agreement with the findings of Turney (2015), and Akgun (2005) who found in their separate studies that DBMS treatment was more effective than the lecture method in enhancing students' achievement. Programmed DBMS method was better than lecture method. More relevant tests, motivation and enough constant practice must have taking place in the learning process. The attributes of DBMS as active method of students and relevant performance might have facilitated the students' performance in Microsoft office power point strategy for effective learning (Akilli, 2008).

Effect on gender of students: The study revealed that the male students had higher mean achievement scores than the female counterparts. The mean achievement scores of male student were slightly better than the female counterparts. The findings of the study in respect of gender were in agreement with the findings of Mercer (2009), Ogbu (2015), Ejimaji, Ordua and Bella (2015) who found in their individual and collective studies that significant effect existed with respect to gender in student achievement. This was in agreement with the findings of Agbola (2007), and Oyemede (2007) who found out in their individual studies that male computer science students achieved better than their female counterpart. This could be associated with the social detachment of the male (John 2000). In computer science and believing that if was gender biased.

Educational Implication of the Study

The conclusion drawn from the study has some implications for the teacher's student's supervisors, curriculum planners. The study had slightly enhanced student's achievement in colleges of education in South South Zone. This suggested the need for DBMS computer science teachers to study the teaching model with a view to using it. Based on the results of the findings, the students had the opportunity of finding out web-like connection of computer science concepts based on real life experiences. This method of teaching computer science had positive effect on students' achievement. The findings of the study may promote the need to develop activity or power point based curriculum in which students are allowed much more participation in the learning process with learning most fame being facilitated by the students as experts.

Computer science text book may then be failure towards using DBMS to included students activities, driving questions and teachers guide. The findings showed that computer science classes should be heterogeneously composed of male and female for active participation in computer science lessons.

Conclusion

From the results of the study, conclusion was drawn. The effect of DBMs programmed instruction strategy of teaching computer science in academic achievement had been significant. From the study it had been found that DBMS in computer science MSPPIS is better than the lecture method. The study found out that the mean achievement scores of male was significant.

Recommendations

In view of the findings and the educational implication of the study, the following recommendations are hereby made:

1. The use of DBMS should be given greater emphasis in curriculum for the pre-service teachers in computer science so as to popularize the use among teachers and lecturers.

2. In view of the learning effectiveness of the model and the fact that the servicing computers may of be familiar with its use, seminars and workshops should be organized by the relevant professional bodies as National Teacher Institute (NTI) and Science Teachers Association (STA) to educate and sensitize the lecturers on the use of DBMS in computer science education.

3. The curriculum planners should incorporate and emphasize the use of DBMS in all colleges of education in the South-South Nigerian. Authors of computer science text books should develop books which will reflect DBMS in computer science with teachers guide.

Government and relevant professional associations should sponsor further research on the effectiveness of DBMS in enhancing academic achievement in other aspect of computer science education technology.

Limitation of the Study

The researchers could not control some variable as age of students, students' socio-economic status and ability. Although four research assistants were used for the study, there may be some difference in the abilities of the facilitators to effectively use the method. It may be possible that the research assistant who taught the treatment one group did not use enough relevant real life experiment as may be required. The researcher was not always with them while using the treatment to avoid bias.

The research subjects used in the treatment one and two groups were in the same school, the difference in the treatment given to them might have been observed by some of the research subject.

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