EFFECT OF TUTORIAL PACKAGE OF COMPUTER AIDED INSTRUCTION ON STUDENTS' ACHIEVEMENT IN PROBABILITY

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Abstract

The study investigated the effect of tutorial method of computer-aided instruction of students' achievement in probability in Enugu State. Two research questions and two hypotheses_gnided the study. A total of 192 subjects were used for the study. The subjects were randomly assigned to experimental and control groups. The experimental group was taught probability using tutorial method while the control group was taught with expository method and the difference in their performances were taken. The result revealed that students in the experimental group performed better than their counterpart in the control group. The study also revealed that there is no significant difference in the mean performance of male and female students in the experimental group.

Introduction

The usefulness of mathematics in every facet of human life is so expedient that there is no school curriculum or national development planning that did not take cognizance of the development in school mathematics especially in secondary schools. Menassah (2005), defined mathematics as the communication system for those concepts of shape, size, quality and order used to describe diverse phenomena both in physical and economic situation.

In spite of the importance of mathematics in our schools, it has been shown by the secondary school Certificate Examination (SSCE, 2005, 2006), that students' achievements in mathematics have been declining progressively. Harbor-Peters (1992), identified some topics in the senior secondary school mathematics and further mathematics that students found very difficult to comprehend, and included probability as one of those topics that students find difficult. Probability is a branch of mathematics that has its root on man's search to know the events of tomorrow (Alio, 2003). Because man cannot be too sure, he thinks only of the degree of likelihood of an event taking place and that is what is called probability. Obioma (1991), observed that probability is a difficult topic in school mathematics both to students and teachers, to the extent that some teachers leave probability untaught till the end of the academic session simply because it is considered difficult.

Achebe and Keys (1974), emphasized that mathematics educators and teachers have tried over the years the varieties of teaching methods at their disposal, which include synthetic method, analytic method, deductive method, laboratory method, guided inquiry methods etc, to improve the learning of mathematics. Some of the teaching methods adopted according to Menassah (2005), have been criticized and-seen not To be effective for the teaching of some aspects in secondary school mathematics.

Computer Aided Instruction (CA!) is an emerging issue in education and it is in use in the developed countries of Europe, America, Japan and other Scandinavian countries (UNESCO, 1991). Here in Nigeria, Ozofor (2001-), stated that computer Aided instruction in Mathematics (CAiM) sound Utopian as many teachers of mathematics have no access to a computer machine not to talk of making use of it in teaching school mathematics. However, with many consignments of computer systems already available in many states in Nigeria, using computer to teach mathematics can be initiated in all schools. Various modes of computer Aided Instruction techniques exist, but the one that the researcher tested its efficacy in the teaching of mathematics is Tutorial approach of computer Aided Instruction.

According to Ozofor (2001), tutorial method is a type of programmed learning, using Stimulus-Response theory of learning. It demands self contained and guided instructional program. The program requires little or no assistance from mathematics teachers. Its study environment has to be prepared well for an individualized type of learning. The computer monitor has to be operationally in order to enable a proper display of the concept to be learnt. The students have to be properly taught on the use of the keys of the computer keyboard.

Differences in academic achievement due (o sex have required the research attention of some educationists like Olagniju (2001), who noted that the controversy as to whether male students

performed better than female students in science concepts have been an age-long problem. Hence the need to find out whether the male and female students will benefit equally when they are taught probability with tutorial method of computer aided instruction,

Statement of the Problem

There has been consistent call on how to improve the method of teaching mathematics in Nigerian schools. With this, the exploration of emerging issues in Nigerian education especially in computer systems becomes obvious. Ozofor (2001). noted that five instructional methods have been modeled for use via computer assistance. They include games, simulation, problem-solving. Tutorial and Drill-Practice approaches. (Sinclair, 1990), stated that games and simulation are not conventionally suitable for teaching mathematics. Problem-solving requires an in-depth knowledge of computer high level of programming language like Fortran, and our secondary school students are yet to be exposed to this computer program. The researcher is left only with Tutorial and Drill practice methods but the one that the researcher wants to test its efficacy in the teaching and learning of probability is the tutorial approach of Computer Aided Instruction. Since this study is considering gender as a necessary variable, then would male and female students achieve equally where (his approach is proved to be efficacious?

Purpose of the Study

The purpose of the study was to find out the effect of tutorial package of Computer Aided Instruction on Senior Secondary School achievement in probability. Specifically, the study sought to:

1. determine the mean achievement scores of students taught probability using tutorial method and those taught with expository method.
2. determine the mean achievement scores of male and female students taught probability using tutorial method.

Scope of the Study

The study was restricted to the utilization of tutorial method of computer Aided Instruction and expository method of teaching probability to senior secondary class two (SSII) students. The topics covered in probability are

(1) set theories and case of simple events.
(2) Problems on probability.

Research Questions

The following research questions guided the study -

1. What are the mean achievement scores of students in the experimental group (taught probability using tutorial method) and students in the control group (taught probability using the expository method) as measured by Probability Achievement Test (PRAT).
2. What are the mean achievement scores of male and female students in the experimental group as measured by PRAT.

Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance.

1. There is no significant difference between the mean achievement scores of students taught probability using tutorial method and those taught using expository method.
2. There is no significant difference between the mean achievement scores of male and female students in the experimental group.

Method

The research design for the study is quasi-experimental research design. The reason for this choice of design was because a pure-experimental research design was not possible for research in education since the extraneous variable must always exist and these variables are beyond the control of the researcher. Students exist in Intact classes and this does not permit randomization.

The population for the study consisted of all the senior secondary class two students in single sex public school in Enugu education zone in Enugu State and they were!690 students in number. Simple random sampling techniques by balloting method was used to select two male and two female schools from 17 single sex schools. Out of the four schools selected, 2 schools (male and female) were assigned to experimental group and the remaining 2 schools (male and female) were assigned to control group. Two intact classes in each of the schools were used for the study. The classes were randomly assigned to

experimental and control groups. One of the classes in each school was the experimental group taught with tutorial method while the other was the control group taught with expository method. In all, there were 95 students in experimental group (47 females and 48 male) and 97 students in the control group (47 female and 50 male).

Instrument for Data Collection

The instrument for data collection was made up of twenty-five essay question on Probability Achievement Test (PRAT). The instrument was developed by the researcher using a table of specification. Two experts in Measurement and Evaluation and two experienced Mathematics educators face validated the test blue print.

Reliability

The reliability of the instrument was established using co-educational schools (in the same zone) that was not used for the study. The internal consistency of the instrument (PRAT) was determined using Cronbach Alpha. The value obtained was 0.75. This index was high realizing the fact that PRAT was an essay test.

Co-ordination of Teachers

Two teachers from each of the sampled schools were utilized for the administration of treatments. The teachers were university graduates with the same year of experience. The teachers were trained to ensure some degree of uniformity in the approach used in teaching the content. Many experimental controls were adopted.

Scoring of the PRAT

The researcher prepared the marking scheme based on 100% and handed it over to another experienced mathematics teacher in another school not used for the study for scoring.

Method of Data Analysis

The research questions were answered using the mean scores. The hypotheses were tested using ANCOVA statistic at 0.05 level of significance.

Results

Research Question 1

What are the mean "achievement scores of students in the experimental group (taught probability using tutorial method) and students in the control group (taught probability using expository method) as measured by PRAT.

Table I: The Mean Scores of Students in Experimental and Control Groups

	Experimental Group	Control Group
Mean	13.765	12.273
Number	95	97

Table 1 above, shows that students in the experimental group had a higher mean score of 13.765 than students in the control group who had a mean score of 12.273.

Research Question 2

What are the mean achievement scores of male and female students in the experimental group as measured by PRAT.

The population for the study consisted of all the senior secondary class two students in single sex public school in Enugu education zone in Enugu State and they were!690 students in number. Simple random sampling techniques by balloting method was used to select two male and two female schools from 17 single sex schools. Out of the four schools selected, 2 schools (male and female) were assigned to experimental group and the remaining 2 schools (male and female) were assigned to control group. Two intact classes in each of the schools were used for the study. The classes were randomly assigned to experimental and control groups. One of the classes in each school was the experimental group taught with tutorial method while the other was the control group taught with expository method. In all, there were 95 students in experimental group (47 females and 48 male) and 97 students in the control group (47 female and 50 male).

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Research Question 2

What are the mean achievement scores of male and female students in the experimental group as measured by PRAT.

The result in table 2, showed that male students in the experimental group performed higher than their female counterpart; however, result in table 3, showed that the difference in their performance is not significant.

The result of the findings is in line with that of Ozofor (2001), who states that students taught with tutorial and Drill Practice Method perform better than those taught with expository method.

The result also revealed that male and female students benefited equally when taught with tutorial method. The finding is consistent with that of Olagniju (2001). who discovered that significant difference in performance between male and female students do not exist in mathematics.

Conclusion

The researcher concludes from the findings of the study that tutorial method of Computer Aided Instruction was significantly better than the expository method on enhancing students' cognitive achievement in probability.

There was no significant difference in the mean achievement scores of male and female students in

the experimental group. This implies that male and female students achieved equally when they were taught with tutorial method of Computer Aided Instruction. Any difference that occurred in their performances might he due to chance

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