The Effect of E-Learning on Secondary School Students’ Interest in Basic Statistics

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Abstract— Presently, we are on E-Technology era. Many countries of the world have introduced E-Learning into schools but its use is still in infancy stage in some developing countries of the world. The use of E-Learning enhances the quality of Education by helping teachers to do their job more effectively. E-Learning has been identified as an effective tool for teaching in the developed countries of the world. This had led to improving students’ interest in some Secondary School Subjects like Mathematics. The study was designed to explore the effect of E-Learning on Secondary School Students’ Interest in Basic Statistics. The study adopted a non equivalent quasi experimental design. Three secondary schools from Enugu State of Nigeria were used for the study. Purposive sampling was used because of the equipment involved and because school type was one of the variables. Two intact classes were randomly drawn from each school through balloting. One of the classes was assigned to experimental group. Two research questions and two null hypotheses guided the study. The research questions were used to ascertain the level of interest of students in teaching and learning using CAI. Data were collected using Statistics Interest Inventory (SII). Research questions were answered using mean and standard deviation while the hypotheses were tested at 0.05 using the analysis of Co-variance (ANCOVA). The result revealed that the students taught with E-Learning had higher mean interest than the control group. The result also shows that students in boys alone school have slightly higher mean interest than those of girls’ alone school but it’s not significant. However, it was recommended that teachers should be exposed to the use of E-Learning in teaching and learning by training and retraining as to keep them abreast of the innovation in education which will also help boosting the quality of learning.

Index Terms— Basic Statistics, E-Learning, Students’ Interest,

INTRODUCTION

Teaching and learning is an important process for development of man and affects society when both the teachers and students actively participate in the process. Well planned and properly directed education is a key to success and progress of a nation. No nation can boast of being buoyant in knowledge and skill without integrating technology in their educational system. Most of the developing countries or nations of the world education are still characterized by the traditional chalk and talk method of instruction which makes learning ineffective and deny learners the opportunity to apply the skills learned in the actual situations. Today, we live in a technological world, a world of technological revolution. Almost everyone associates with technology nowadays.

E-learning is an aspect of technology. It deals with the use of all types of technology, including electronic technologies in learning and education. This means using a computer to deliver part, or all of a course whether it is in school, part of your business training or a full distance learning course. It entails the use of electronic educational technology in learning and teaching[1].Those electronic educational technologies include: Information and Communication Technology (ICT) in education, Edtech, learning technology, multimedia learning, Technology Enhanced Learning,(TEL), Computer Based Instruction (CBI), Computer Managed Instruction (CMI),Computer Based Training (CBT), Computer Assisted Instruction (CAI), Internet Based Training (IBT) etc. [2].

E in e-learning is being interpreted variously, Bernard has it as, exciting, energetic, enthusiastic, emotional, extended, excellent and educational in addition to “electronic” while Eric, suggest that it should be referred to as everything, everyone, engaging, and easy” [3][4]. Moore et al found significant variation in the understanding and usage of the term E-learning [1].

Summarily E-learning is electronic learning which means using a computer to deliver part or all of a course whether it is in a school or anywhere.

E-learning (ICT) has become an important part of most organizations and businesses these days [5]. Several researchers suggest that E-learning will be an important part of education for the next generation too [6]. The use of E-learning in teaching is becoming increasingly vital owing to the global network of the twenty first century teaching and learning. In line with this, Lefebvre et al opined that the use of modern technology such as ICT, CAI etc. offers many means of improving teaching and learning [7].

The roles and values of E-Learning (ICTs) in education are varied and include:

1. Promoting students commitment to learning,
2. Introducing the concept of new learning eg. Many on-line learning packages which give students greater control over what they learn and how they learn,
3. Bringing students and teachers together for lessons, tutorials and one to one interactions across geographic locations.
4. Making students to do science effectively and conducting experiments as viewed on screen,
5. Facilitating the process of learning through interaction with simulations,
6. Fostering students interest and motivation,
7. Making the lessons more exciting and interesting for both teachers and students [8].

Meanwhile Koraw is of the opinion that lack of infrastructure and equipment and poor teaching method all contribute to students’ lack of interest [9]. Murphy has it that assessing education means that teachers have to use E-learning resources appeal to the interest of the younger learners to attract their attention [10]. This in effect will expose and nurture inherent potentials among students to create sustainable livelihood using E-learning skills they have acquired. Interest in learning can be as personal preference with regards to learning, which sometimes means an individual chooses one thing rather than the other things and sometimes choosing positive things.

Techniques employed in teaching can affect negatively or positively the interest of the learner. Interest is categorized and presented in five core themes pertaining to individual interest and situational interest, namely: Latent interest, actualized interest, text-based interest, task-based interest and knowledge based interest [11]. The latest listed interest is the context of this study. The use of E-learning gives learner a true sense of agency in his or her education. However, most students in traditional classroom setting do not have luxury of exploring, their own interests. It is important for a teacher to facilitate student’s interest towards learning mathematics.

Furthermore the barrier mathematics (statistics) teachers use to face in trying to incorporate students interests in their lesson are rigidity and scope of curriculum [2]. The link between interest in learning and equipment used is worthy of discussion. E-learning has come to stay in the education industry [12]. Schostak felt that E-learning would encourage more discoveries in education [13]. E-learning emancipates education [14].

The use of E-learning in education is over a score old in the developed countries of the world however in Nigeria it is still strange to some teachers and students in the country. That prompted the researcher to take up this study to ascertain whether E-Learning would have any effect on students’ interest in teaching and learning of Basic Statistics in Nigeria secondary school students. Moreso, it was reported that girls from single sex school show high interest in their academics than their counterparts [15].

This is also a variable that was considered in this study. Modern day instructions are therefore to take advantage of the benefits provided by these emerging technologies. Teaching and learning should incorporate new and emerging technologies in planning and execution of lesson delivery as computer and internet have become essential tools [16].

Purpose of the Study

The main purpose of the study was to investigate the effect of E-Learning on SS1 students’ interest in an aspect of mathematics (statistics). Specifically, the study investigated:

1. Students’ interest in statistics
2. Interest of students in statistics with regards to School type.

Research Questions

In this study attempt was made to provide answers to the following questions:

1. What are the mean interest scores and standard deviations of SSI students taught statistics with E-learning (CAI) and those taught with conventional method as measured by Statistics Interest Inventory (SII)?
2. Does school type have any effect on SSI students with regards to their interest in teaching and learning of statistics?

Research Hypotheses

Two hypotheses were formulated and were tested at 0.05 level of significance.

1. There is no significant difference in the mean interest scores of SSI students taught statistics with E-learning (CAI) and those taught with conventional method.
2. There is no significant difference in the mean interest scores of SSI mathematics students of single sex schools and those in co-educational school taught statistics with E-learning (CAI) and those taught with conventional method.

METHODOLOGY

This study employed a quasi-experimental design using pre-test and post-test non-randomized control group design. The study was carried out in Agbani Education zone of Enugu state in Nigeria. Three secondary schools were purposively sampled because school type is a factor in this study. Two intact classes were selected from each school using simple random sampling technique. One class was assigned to experimental group while the other was assigned to control group. The sample comprised of 203 SSI students in the study area while the target population consisted of 13, 420 SSI students in the education zone. The experimental groups were taught with computer Assisted Instruction (CAI) while the control groups were taught in a conventional manner without CAI (E-learning).

The instrument for data collection was Statistics Interest Inventory (SII) which consisted of 13 items. It was developed by the researcher. The items were structured response that sought to ascertain the student’s Interest. The Instrument was a 4 point scale Strongly Agree(SA), Agree (A), Disagree (D), and Strongly Disagree (SD). The PRESII were administered on the first day of the experiment and re-administered after six
The result in table 2 below, shows that the experimental groups in the three schools type, Girls alone, Boy alone and co-educational (mixed) had mean interest scores of 30.42 and 45.42, 25.04 and 46.67, 22.32 and 46.89 and standard deviation of 6.98 and 20.05, 5.40 and 2.57 and 3.72 and 12.77 respectively in pre and post interest respectively while in the control groups the subjects had mean interest scores of 22.48 and 25.06, 20.62 and 23.08, 20.44 and 23.10 and standard deviation of 4.32 and 10.97, 2.78 and 3.32, 5.95 and 2.72 respectively in pre and post interest. The result reveals that the mean difference of experimental and control group for Girls alone, Boys alone and mixed are 15.00 and 2.58, 21.63 and 2.46, 24.57 and 2.66 respectively.

Null Hypotheses
H01: There is no significant difference in the mean interest scores of SSI students taught statistics with E-learning (CAI) and those taught with conventional method.

The results on table 3 below indicated that F calculated is 2394.945 while critical value of F is 0.000. This level of significance is less than 0.05 level of confidence on which this study is based. On this basis, the null hypothesis one which predicted no significant difference in the mean interest scores of control and experimental groups of the subjects is thereby rejected. It was followed by indications on table I that the mean interest of the experimental groups is higher than those of the control groups.

TABLE 1
Mean interest score and standard deviations of subjects taught basic statistics using E-Learning (CAI) and conventional methods of teaching.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-interest</th>
<th>Post-interest</th>
<th>No of subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Experimental</td>
<td>24.22</td>
<td>5.58</td>
<td>46.35</td>
</tr>
<tr>
<td>E-Learning (CAI)</td>
<td>22.46</td>
<td>4.32</td>
<td>23.66</td>
</tr>
<tr>
<td>Control</td>
<td>22.94</td>
<td>3.46</td>
<td>23.66</td>
</tr>
</tbody>
</table>

Research Question 2:
Does school type have any effect on SSI students with regards to their interest in teaching and learning of statistics?
The results presented in the tables showed that there is significant difference in interest of students taught with CAI (E-learning) and those taught with conventional method. It implies that the interest of students in the experimental groups were improved and more encouraging than those students taught with conventional method. The findings have in turn given support to what was formerly stated that lack of infrastructure and equipment and poor teaching method all contribute to students’ lack of interest [9]. It was also discovered that techniques employed in teaching can affect negatively or positively the interest of the learner [17].

The results also indicated that there is no significant difference in the mean interest scores of single sex schools and those in co-educational school taught statistics with E-learning (CAI) and that taught with conventional method. The results in the ANCOVA in table 3 above showed that the computed F is 0.111 which is not significant at 0.895. The value is greater than 0.05 set for the study on this basis the null hypothesis 2 is accepted. It is therefore concluded that there is no significant difference in the mean interest scores of students in the single sex schools and those in the co-educational school types as revealed by SII.

**Conclusion:**

The findings of the study have shown that the students in the experimental groups have mean interest higher than that of the control groups. This means that E-Learning as equipment or instructional instrument used for the study has positive effect on interest of the student. Based on this, the use of E-Learning should be encouraged and recommended for teachers in teaching and learning so that our students can compete with their mates elsewhere and also face the challenges of this present era which is technology era.

**RECOMMENDATION**

Teachers should be exposed to the use of E-Learning in teaching and learning by training and retraining so as to keep them abreast of the innovation in teaching and learning which will also help boosting the quality of education in the country.

**REFERENCES**


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**TABLE 3**

Analysis of Covariance (ANCOVA) for Students mean interest scores by method and school type:

<table>
<thead>
<tr>
<th>Source of variance</th>
<th>Sum of squares of DF</th>
<th>Mean squares</th>
<th>F.cal</th>
<th>Level of significance</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates pretest</td>
<td>416.970 416.970</td>
<td>1 1</td>
<td>416.970 416.970</td>
<td>38.906 38.906</td>
<td>0.00 0.00</td>
</tr>
<tr>
<td>Main effects</td>
<td>25821.962</td>
<td>3</td>
<td>8607.321</td>
<td>803.111</td>
<td>0.00</td>
</tr>
<tr>
<td>Methods</td>
<td>25667.741</td>
<td>1</td>
<td>25667.741</td>
<td>2394.945</td>
<td>0.00</td>
</tr>
<tr>
<td>Schools</td>
<td>2.390</td>
<td>2</td>
<td>1.195</td>
<td>0.111</td>
<td>0.895</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explained</td>
<td>26385.849</td>
<td>6</td>
<td>4397.642</td>
<td>410.325</td>
<td>0.00</td>
</tr>
<tr>
<td>Residual</td>
<td>2100.624</td>
<td>196</td>
<td>10717</td>
<td>410.325</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
<td>28486.473</td>
<td>202</td>
<td>141022</td>
<td>410.325</td>
<td>0.00</td>
</tr>
</tbody>
</table>

S = Significant , NS = Not Significant @ 0.05 Level of Probability

**Ho2:** There is no significance difference in the mean interest scores of SSI mathematics (statistics) students of singles sex schools and those in co-educational school taught statistics with E-learning (CAI) and those taught with conventional method.
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