

## EFFECTS OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) ON ACHIEVEMENT AND INTEREST OF JUNIOR SECONDARY SCHOOL STUDENTS IN BASIC SCIENCE AND TECHNOLOGY

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### Abstract

*Information and Communication Technology (ICT) is a viable tool for the upliftment of the standard of education in our institutions. It has the potentials and application in all aspect of life inducing education sub sector. This study investigated the effects of Information and Communication Technology (ICT) on achievement and interest of junior secondary school students. The study was carried out in Minna Metropolis. Two junior secondary schools were purposively chosen because of the availability of computers in these schools. A sample of one hundred and nine (109) JSSII students was involved in the study. The design used was quasi-experimental design. Two intact classes were used; four research questions and four hypotheses guided the study, while mean, standard deviation and t-test were used to test the hypotheses at 0.05 level of significant. The result revealed that the mean and standard deviation of the post-test achievement score of experimental and control groups are 60.25 and standard deviation 0.12 and 31.15 and standard deviation 0.10 respectively in favour of the experimental group and the interest inventory score of experimental and control groups are 58.43 and standard deviation 0.18, and 32.23 and standard deviation 0.23 respectively in favour of the experimental group. The study revealed no significant difference in the mean achievement and interest scores of male and female students taught using ICT. Some recommendations were made among which is that basic science and technology teachers should include the use of Information and Communication Technology as one of the strategies to be employed in classroom teaching and learning.*

### Introduction

Basic Science and Technology is one of the core subjects in both the junior secondary school curricula. Such inclusion justifies the recognition of basic science and technology in our day-to-day activities such as cooking washing, trading, medical preparation, tailoring etc cannot be over emphasized. In fact, any statement having to do with "how much or how many" is expressing basic science and technology. Adeleke (2007) asserted that basic science and technology also serve as useful tool in the management of life affair. The science and technology was therefore developed as a means for solving the quantitative problems that arise in our rapidly changing and expanding society.

However, performance in junior secondary school has not been encouraging. Several factors ranging from the teachers, curriculum, method of instruction and instructional materials, and the school environments have been identified through earlier studies as contributing to poor achievement of the students in school basic science and technology teachers and other stakeholders (Tokpah, 2008). Infact, attempts have been made by researchers in sciences and technology education to solve the problem of under achievement in school basic science and technology.

In recent years, many technological media devices and systems have been invented and developed. They have appeared to offer major contribution to the effectiveness and efficiency of educational instructions. Among the most widely known technological media device and systems are motion pictures, television, videotapes and discs, computers, Information and Communication Technology (ICT) software package and programmed learning. A considerable amount of research have been conducted based on technological media devices to identify the kinds of educational contributions they can make to improve the teaching and learning of mathematics in schools (Adegunna, 2008).

The information revolution in form of Information and Communication Technology (ICT) is a significant development and an important advancement in the 21<sup>st</sup> century. According to Akudolu (2002), ICT refers to all kinds of electronic systems that are used for broadcasting, telecommunications and all forms of computer mediated communications. It is the study of collection, retrieval, use, storage and communication of information using computers and microelectronic system (Ivawi, 2002). The National Policy for information Technology (2001) describes ICT as any equipment or interconnected system of equipment that is used in the automatic acquisition, storage, manipulation, management control, display, switching and transmission of information. ICT encompasses a range of new technologies and their application abound in all aspects of life where the use of computers, microelectronic devices, satellite and communication technologies are required (The common wealth secretariat, 1991)

The use of ICT in different sectors and especially in education has changed what is learnt, how learning takes place and where. ICT has introduced the concept of new learning and it has brought into Education many on-line packages which give students greater control over what they learn and how they learn. In this regard effective learning can occur once a student start working on a computer loaded with educational software. ICT has tremendously influenced development in all facets of human endeavors. Its application is closing the communication gap between persons, nations and continents in different parts of the globe. The utilization of ICT in facilitating knowledge acquisition and dissemination within and between various disciplines had been such that human input is reduced to the barest minimum with a supersonic speed. However, evidence in the developing countries of the world including Nigeria appears to show that effective utilization of ICT in facilitating knowledge acquisition and dissemination is more common in such disciplines as Engineering, Technology and Sciences than in Education. The implication is that in those disciplines in which the use of ICT had not been fully embraced, monumental human input and obsolete resources are invested with minimal output. The reform of teacher education though the use of new technology becomes an urgent task in view of current reality, that new learning environment taking place in the emerging knowledge based society are affecting role of teachers.

Having seen the role of ICT in shaping the new world economy and the need for agricultural teacher to be ICT complaint, the study sought to investigate the constraining factors to the utilization of ICT in agricultural teacher education programme in tertiary institutions and determine how the utilization can be enhanced.

### **Purpose of the Study**

The main purpose of this study is to determine the effects of Information and Communication Technology on achievement and interest in basic science and technology among junior secondary school students in Basic Science and Technology Minna, Niger State. Specifically the objectives are to:

1. Determine the effect of Information and Communication Technology (ICT) on the mean achievement score of junior secondary school students in basic science and technology compared to those taught the same basic science and technology using the traditional method.
2. Determine the effect of ICT on the mean interest score of secondary school students in basic science and technology compared to those taught the same basic science and technology using the traditional method.

3. Find out whether differences exist between the mean achievement scores of male and female students taught basic science and technology using the ICT.
4. Find out whether differences exist between the mean interest score of male and female students taught basic science and technology using ICT.

### **Research Questions**

The following research questions guided the study:

1. What is the mean achievement score of secondary school students taught basic science and technology using the ICT compared to those taught the same basic science and technology using the traditional method?
2. What is the mean interest score of students taught basic science and technology using the ICT compared to those taught the same basic science and technology using the traditional method?
3. What is the mean achievement score of male and female students taught basic science and technology using the ICT?
4. What is the mean interest score of male and female students taught basic science and technology using the ICT?

### **Hypotheses**

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

- Ho<sub>1</sub>: There is no significant difference in the mean achievement score of secondary school students taught basic science and technology using the ICT and those taught the same basic science and technology using the traditional method.
- Ho<sub>2</sub>: There is no significant difference in the mean interest score of students taught basic science and technology using the ICT and those taught the same basic science and technology using the traditional method.
- Ho<sub>3</sub>: There is no significant difference in the mean achievement scores of male and female students taught basic science and technology using the ICT.
- Ho<sub>4</sub>: There is no significant difference in the mean interest scores of male and female students taught basic science and technology using the ICT.

### **Methodology**

The research design for this study is quasi-experimental design using non-equivalent control group design (Sambo, 2008). Two intact classes were used for the study. The population for the study comprises all the 2,550 students' from 8 co-education junior secondary schools class two (JSSII) in Minna Metropolis. Purposive sampling technique was used to obtain two junior secondary schools that are well equipped with computers facilities and 109 students comprising 65 male and 44 female students that were randomly assigned to experimental and control groups using simple random sampling technique. The experimental group consist of 29 male and 23 female students while the control group consist of 36 male and 21 female students. Experimental group was taught basic science and technology using ICT while the control group was taught basic science and technology using the traditional teaching method. This lasted for 4 weeks. Achievement Test on basic science and technology (ATOBST) and interest inventory on basic science and technology (INIOBST) were designed by the researcher and were used in collecting data for the study. The achievement test consists of 20 (twenty) multiple choice times with four options (A-D) and the INIOBST consist of 20 questionnaires. The instruments were subjected to face and content validities. A trial test was used to determine the reliability of the instruments using test retest method. The coefficient of 0.82 and 0.73 were obtained for ATOBST and INIOBST respectively this indicated that he instruments were reliable.

The data collected for the study were analysed using Mean and Standard deviation and t-test to test the hypotheses formulated at  $P = 0.05$  level of significance with the aid of Computer Statistical Package for the Social (SPSS Version 20).

### **Results**

### Hypothesis One

There is no significant difference in the mean achievement score of secondary school students taught basic science and technology using ICT and those taught the same basic science and technology using the traditional method.

Table 1: Analysis of the Post-test Mean Scores of the Experimental and Control

Variable	N	df	X	SD	t-value	P-value
Experimental Group	65	107	60.25	0.12	1.288*	0.000
Control Group	44		31.15	0.10		

\*=Significant at  $P < 0.05$

Table 1 shows mean and standard deviation of the achievement scores for experimental and control groups as 60.35 and standard deviation 0.12 and 31.15 and standard deviation 0.10 respectively. The table revealed that the achievement of experimental and control groups differ significantly as  $t = 1.288$  with  $df = 107$  at  $P = 0.000$  which is less than 0.05 significant level set for the hypothesis, hence the hypothesis was therefore rejected.

### Hypothesis Two

There is no significant difference in the mean interest score of students taught basic science and technology using ICT and those taught the same basic science and technology using the traditional method.

Table 2: Analysis of the mean interest scores of the experimental and control groups.

Variable	N	df	X	SD	t-value	P-value
Experimental Group	65	107	58.43	0.18	1.984*	0.012
Control Group	44		32.23	0.23		

\*=Significant at  $P < 0.05$

Table 2 shows mean and standard deviation of the interest scores for experimental and control groups as 58.43 and standard deviation 0.18 and 32.23 and standard deviation 0.23 respectively. The table revealed that the interest of experimental and control groups differ significantly as  $t = 1.984$  with  $df = 107$  at  $P = 0.012$  which is less than 0.05 significant level set for the hypothesis, hence the hypothesis was therefore rejected.

### Hypothesis Three

There is no significant difference in the mean achievement scores of male and female students taught basic science and technology using the ICT.

Table 3: Analysis of the mean achievement scores of Male and Female students taught basic science and technology using ICT

Variable	N	df	X	SD	t-value	P-value
Male	29	50	48.73	0.18	1.788 <sup>NS</sup>	0.324
Female	23		39.53	0.23		

NS = Not Significant at  $P > 0.05$

Table 3 shows the mean and standard deviation of post-test scores of male and female students are 48.78 and standard deviation 1.58, and 39.53 and standard deviation 1.03 respectively. Therefore, the mean achievement score of the male students taught with ICT is higher than that of the female students taught with the same ICT, the table revealed that the male students' achievement did not differ significantly from

the female as  $t=1.788$  with  $df=50$  is not significant at  $P=0.324$  which is more than 0.05. This indicates that using ICT produced no significant difference on gender. Therefore, the hypothesis is hereby not rejected.

#### Hypothesis Four

There is no significant difference in the mean interest scores of male and female students taught basic science and technology using the ICT.

Table 4: Analysis of the mean interest scores of male and female students taught basic science and technology using ICT.

Variable	N	df	X	SD	t-value	P-value
Male	29		54.25	1.82		
		50			1788 <sup>NS</sup>	0.434
Female	23		29.72	1.24		

NS = Not Significant at  $P > 0.05$

Table 4 revealed that the mean and standard deviation of post-test interest scores of male and female students are 54.78 and standard deviation 1.82, and 29.72 and standard deviation 1.24 respectively. Therefore, the mean interest score of the male students taught with ICT is higher than that of the female students taught with the same ICT. The table revealed that the male students' achievement did not differ significantly from the female as  $t=1.788$  with  $df=50$  is not significant at  $P=0.434$  which is more than 0.05. This indicates that using ICT produced no significant difference on gender. Therefore, the hypothesis is hereby not rejected.

#### Discussion

The result in Tables 1 and 2 indicated that treatment using ICT produced significant difference on students' achievement and interest in basic science and technology. This result is in support of Yusuf and Afolabi, (2010), Etukudo (2009) and Tabassum (2004) who showed that the achievement and interest of students exposed to ICT was better than their counterparts exposed to conventional classroom instruction. The result in Tables 3 and 4 produced no significant difference in the achievement and interest of male and female students taught basic science and technology using ICT. This result agrees with Arbab, (2003) and Chado, (2009) which stated that computer is gender friendly. Therefore, the use of ICT in classroom instruction is a means of motivating students' interest and improving students' achievement in Mathematics irrespective of sex.

#### Conclusion

The results of this study provide evidence that the use of ICT enhanced students' achievement and interest in basic science and technology. Therefore, the use of Information and Communication Technology could be a means of improving students' performance in mathematics.

#### Recommendations

The following recommendations were made based on the findings of this study.

1. Since the use of ICT enhance achievement of students in Basic Science and Technology, the Basic Science and Technology teachers should use it as one of the strategies to be employed in classroom teaching and learning.
2. Workshops / Seminars should be organized by the Government for Basic Science and Technology teachers to enable them learn how to use computer in teaching Basic Science and Technology.
3. Parents should be encouraged to buy computers for their children to use at home after normal classes. This will help the students to practice what they have learnt in school and also discourage them from engaging in unnecessary ventures after school hours.

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