

## Effect of E-Learning on the Achievement of Students in Basic Technology

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### Abstract

This study determines whether e-learning method makes a difference on student academic achievement in basic technology. Stratified random sampling was used to select 4 secondary schools from Minna metropolis. A total of 120 junior secondary school three (JSS 3) students were randomly selected from the 4 schools (60 students of equal gender each). Two null hypotheses were tested using the t-test statistics at 0.05 level of significance. The findings indicated that the experimental group performance was significantly higher than that of the control group. And again that male students performed better than their female counterparts. This implies that the e-learning in the teaching of basic technology in Niger State secondary schools should be encouraged in order to enhance better academic achievement of the students in basic technology.

### Introduction

Basic Technology is one of the pre-vocational subjects offered in the Nigerian junior secondary schools. According to Hassan (2005), the pre-vocational subjects provide students with a process of orientation in production and consumption through experiences in planning, testing, servicing and evaluating different types of consumer and industrial goods. It is a known fact that the pre-vocational subjects at the Junior Secondary School level are taught as an integrated subject which according to Nwoji (2003) has many component areas, such as Woodwork; Metalwork; Electrical/Electronics, Auto-mechanics; Ceramics; Food processing; plastic and rubber.

The preparatory aspect of pre-vocational training offered to students at the junior secondary level according to the FGN (2004) is for the purpose of:-

- Introductory into world of technology and appreciation of technology towards interest arousal choice of a vocation at the end of junior secondary school and professionalism later in life;
- Acquiring technical skills;
- Exposing usable captions in the world; and
- Enabling youths to have an intelligent understanding of the increasing complexity of technology.

Electronic learning or (e-learning) is a general term used to refer to a form of learning in which the instructor and students are separated by space or time where the gap between the two is bridged through the use of on-line technologies (Paris, 2004). E-learning is the process of teaching and learning using computer via internet. It involves passing of structured instructional materials from a repository to the learner, e-learning is seen as the appropriate application of the internet to support the delivery of learning skills and knowledge in a holistic approach. This study therefore attempt to determine the effect of using e-learning in basic technology instructor on performance for sustainable education development.

In many of the developed countries of the world, teaching and learning are gradually moving from the classrooms or lecture theatre to virtual relationships. In space, arena, teaching and learning are taking place more and more by instructors and learners with little or no physical contact between those involved in the education endeavours. Meanwhile, the countries involved in the dominantly internet education are experiencing rapid and spiral increase benefits in both human capital development and economic growth. Is Nigeria ready for this revolution called "Technological Innovation in teaching and learning?"

A growing number of organisations including Colleges of Education and Universities, Corporate Organisations, Military institutions and even secondary schools the world over are now delivering training and education over the internet. There is a shift from the traditional approach of teacher-direct/didactic to modern methods where computer technology plays a significant role. The Information and Communication Technology (ICT) has promoted learning and made it more meaningful, where students can stay even in their homes or classrooms and receive lectures without seeing the lecturer. The aspect of Information and Communication Technology that has brought about this revolution in students' learning is e-learning. There is an estimated ten million courses on-line and the U.S. alone report about seven hundred e-learning companies (Karrer, 2008). Some companies or institutions offer online tutoring to students at specific grade level, ranging from primary through university; others offer courses only for corporations; some offer courses for individuals in career development and/or personal development; and many offer training in various management, finance and ICT-related skills. Many universities in Europe and America are offering courses and degrees on-line. A growing number of physical universities, as well as newer online colleges, have begun to offer a set of academic degree and certificate programmes via the internet at a wide range of levels and in a wide range of disciplines. While some programmes require students to attend addition, several universities offer online student support services, such as online advising and registration, e-counselling, online textbooks purchase, student governments and student newspapers. For example, through university of Phoenix online, the university offers twenty five programmes online in sixteen different fields. They currently have seven thousand instructors teaching over forty nine thousand students (Holcomb, King and Brown 2004).

Electronic learning or e-learning is a general term used to refer to a form of learning in which the instructor and students are separated by space or time where the gap between the two is bridged through the use of on-line technologies (Wikipedia 2008). Horton (2005) defined e-learning as the use of internet and digital technologies to create experiences that educate our fellow human beings. Olaniyi (2006) defined e-learning as being all about learning that occurs at the computer. In this age, the learning at the computer simply means online knowledge acquisition through the internet or offline through CD-ROM. It encompasses the uses of network technologies to create, foster, deliver, and facilitate learning anytime, and anywhere. It is also the delivery of individualised, comprehensively, dynamic learning content in real time, aiding the development of communities of knowledge, linking learners and practitioner with experts. E-learning is naturally suited to distance learning and flexible learning, but can also be used in conjunction with face-to-face teaching, in which case, the term Blended learning is commonly used.

### **Statement of the Problem**

The declining performance of students in basic technology has been a matter of great concern to many educators. Some teachers in teaching the subjects attribute this to the abstract nature of the subject and the teaching method(s) adopted. This study therefore attempts to determine the effect of using e-learning in basic technology instruction on students performance for sustainable education development.

### **Purpose of the Study**

The purpose of the study was to evaluate the effect of e-learning on the achievement of students in Basic Technology, specifically, the study sought to:

1. Find out whether there is a significant difference in the mean achievement scores of basic technology students exposed to experimental conditions and their counterparts in the control group.
2. Find out whether any significant differences existed in the mean achievement scores of male and female students exposed to the experimental conditions.

### **Hypotheses**

The following null hypotheses were tested at 0.05 level of significance.  
H<sub>0</sub>: There is no significant difference in the mean achievement scores of students exposed to e-learning and those exposed to traditional lecture method.

H0<sub>2</sub>: There is no significance difference in the mean achievement scores of male and female students exposed to e-learning and those taught with traditional method.

### Significance of Study

This study (on the effect of e-learning on the achievement of students in Basic Technology) will solve the problem of abstractness of the subject by concretization of learning processes. The study also hopes to provide teachers, students, parents and curriculum planners with relevant data needed for Education Planning scientific advancement and help in solving the problem of acute shortage of qualified Basic Technology teachers.

### Reliability of the Instrument

The item analysis of the instrument was also conducted to determine how reliable the instrument was. The instrument was found to be reliable with coefficient value of 0.087.

### Sample and Method

The sample for the study consisted of 120 J.S.S. III students randomly selected from four Junior Secondary Schools in Minna. 30 students were selected from each school. Two (2) schools were assigned experiment; student taught basic technology using e-learning and two (2) control students taught basic technology using traditional lecture method group respectively. A pre-test was administered to both groups to determine the entry-level equivalence. The pre-test was followed by four (4) weeks of instruction on Basic Technology topics in geometry and maintenance to both experimental and control groups and thereafter a post test was administered to both groups after a week revision.

### Description of the Test Instruments

The test instrument consists of forty (40) multiple choice test items on Geometry and Maintenance (MCTIOGM) drawn from past Junior Secondary School Certificate Examination (J.S.S.C.E) questions. An expert in Technical Education validated the test questions before use. The test which was supervised by the researchers, lasted for one hour. The validation marking scheme was used to score students work. Each correct answer earns one mark and any wrong answer earns zero. The data generated from the pre-test and post test were analysed statistically using the mean, standard deviation and t-test.

### Research Design

A pre-test post-test experimental control group research design was adopted for the study.

### Reliability of Instrument

A test-retest method was used to determine the reliability of the instrument. A reliability coefficient of 0.87 was obtained using KR-21 formula.

### Results and Discussion

Hypothesis Ho<sub>1</sub>: There is no significant difference in the mean achievement scores of students exposed to e-learning and those exposed to traditional lecture method.

**Table 1: Mean Achievement Score of Students Exposed to e-learning and those Exposed to Traditional Lecture Method**

GROUPS	N	X	SD	df	t <sub>cal</sub>	t <sub>value</sub>	P
Experimental group	60	65.5	8.2	118	9.48	1.98	0.05
Control group	60	47.0	6.9				

The data in table 1 shows that, the t-calculated value of 9.48 is higher than the table value of 1.98 at 0.05 significance level. Therefore, the null hypothesis was rejected. Hence, there was significant difference in the mean achievement scores of students exposed to e-learning and those not exposed to traditional method.

Hypothesis Ho<sub>2</sub>: There is no significance difference in the mean achievement scores of male and female students exposed to e-learning and those taught with traditional method.

**Table 2: Mean Achievement Scores of Male and Female Students Exposed to e-learning**

GROUPS	N	X	SD	df	t <sub>cal</sub>	t <sub>value</sub>	P
Male	30	65.23	8.2	58	11.41	2.00	0.05
Female	30	43.33	6.7				

The data in table 2 indicated that, the calculated t-value of 11.41 was found to be higher than the critical table of 2.00 at 0.05 significance level. Therefore, the null hypothesis two is rejected. This revealed that there is significance difference in the mean achievement scores of male and female students exposed to e-learning.

### Discussions

From table 1 and 2, the two hypotheses formulated were rejected. The result in table 1 shows that there was significant difference in the mean achievement scores of students exposed to e-learning and those not exposed to e-learning. This is due to the fact that the experimental group performed significantly higher than those students in the control group. The finding of Onabanjo (2000) and Hassan (2005). Supported this idea by saying that students exposed to e-learning recorded more achievement.

The result in table 2 indicated that there was significance difference in the mean achievement scores of male and female students exposed to e-learning. This was also due to the fact that male students performed better than the female students. This findings disagreed with Okebukola (2000), Onabanjo (2000) and Hassan (2005) that no gender difference was seen in academic achievement in e-learning and traditional lecture method. The finding thus corroborates Paris (2004) and Anigbogu (2003) that male students are superior to female students in achievement in science in which basic technology is a science related subject. The result may also be attributed to the fact that science or science related courses is given a masculine image.

### Conclusion

The introduction of e-learning world wide has improved the quality of life. Its impact in health service, education, sports, homes and offices. Similarly, the use of e-learning in education for a sustainable national development cannot be over emphasised especially in areas of tutoring, scoring of students' work, simulations and games, research and salaries. This study, on effect of e-learning on the achievement of students in Basic Technology has revealed many potentials and opened up many areas for research. It was predicted that by the year 2020, most instruction in schools would be computer-based, thereby, laying a solid foundation for technological advancement.

There is no doubt that info-tech has come to stay in the world of ours. The need to apply it in all our daily life is imperative to our sustainable development. The educational sector which is the basis for the upbringing of the future professionals, leaders, researchers, scientists has witnessed a great turn around which calls for cross fertilization of ideas as well as knowledge about the recent development in the world in real time. It is hoped that policy makers, academicians and educators would develop a sound and effective education system for continuous development of the young generations of Nigerians that would strengthen their skills and foster positive interest, attitudes and values to cope with the opportunities and challenges posed by globalisation and in particular, e-learning methodology.

### Recommendations

- Based on the research findings above, the following recommendations were made:-
- Government at all levels should encourage the use of e-learning in secondary schools instruction by providing necessary resources and manpower for adequately training of teachers and students.
  - The Ministry of Education should organise seminars, workshops and conferences for schools teacher in order to equip them with relevant skills needed for capacity building.

- Government should ensure adequate supervision of schools and provision of basic technology workshops, computer laboratory facilities/software in schools.
- The government should provide adequate info-tech facilities to the institutions of higher learning in the country as well as primary and secondary school level.
- The schools should be properly financed so as to be able to compete with their other institutions abroad.
- Training and retraining of staff in the institutions about the latest e-learning tools.
- Government should prioritize the removal or decrease in the tariff rate on info-tech hardware.
- Adequate power supply.

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