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#### **ABSTRACT**

*The study focused on effect of e-learning on students' academic achievement in Basic Science in secondary schools in Eket L.G.A. The design for the study was quasi-experimental design. The students were drawn from five secondary schools out of the 23 schools. Three schools were assigned to the treatment group while two schools were assigned to control group. The population for the study consisted of 1650 JSS2 students. The sample consisted of 200 respondents. Research instrument consisted of 20 which items were used for data collection: Basic Science Achievement Test (BASAT) was face validated by three experts in science education department. Two null hypotheses were formulated as a guide to the study. The t-test statistic was used to test the hypotheses. The reliability index of the instrument was 0.75 using Kuder Richardson 20. The findings of the study are that the students who learn Basic Science under e-learning method achieve higher than those who learn through conventional method. There is no significant difference in the achievement scores of male and female students when e-learning method is used in teaching Basic Science. Based on it was recommended that Basic Science teachers should be encouraged to adopt e-learning method in teaching Basic Science in JSS2 classrooms. Basic Science is a multi-disciplinary approach to understanding the world. It is a straightforward, easy to read but substantial introduction to the fundamental behaviour of matter and energy in living things. Conceptual Integrated Science has to do with physics, chemistry, biology, science and astronomy curricula.*

**KEYWORDS: E-Learning, Students' Academic Achievement, Basic Science.**

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#### **INTRODUCTION**

E-learning is one of the learning methods that is learner centered. It is an instructional method involving students with the use of computers through internet browsing. These help students to learn Basic Science content easily in order to achieve the desired educational goals (Tran, 2014 & Ubanna, Abima and Obi, 2018). It could also be seen, as the use of computer and computer softwares to assess learners work and boost information. According to Opera (2021), the use of e-learning in teaching facilitates learning of physics.

Olanyi (2021) and Iwang, Offem and Okeke (2018) defined e-learning as the convergence of learning process and the internet technologies. They added that it is the delivery of individualized, comprehensive and dynamic learning which aids development of communities knowledge linking learners and practitioners with experts. They added that, e-learning enhanced the collection, sharing of information, quality of education and delivery of instructions across multiple locations.

Iwang, Offem and Okeke (2018) opined that e-learning has the potential to accelerate, enrich and deepen skills of the students and improve students' achievement. Therefore

teachers should be motivated to encourage students in the use of e-learning in order to relate their experience to work. E-learning involves the delivery of a learning programme by electronic means involving the use of computers: (Obumeke-Okeke, Anyachebelu, Uba (2024) and Iwang, Offem & Okeke, 2018). From the above view, e-learning is a process that uses information, communication technology (ICT), as a communication and delivery tool, to support students to learn easily. This is done through internet using satellite.

In response to alternative teaching method that will be interactive and student centered. Basseyy and Ibuot (2012) opined that, e-learning involves the use of information technology for the purpose of students learning and ranges from word processing to on the screen testing. This learning method serves as the most valuable mechanism in the business of test and measurement. E-learning is one of the fastest growing technologies in the world (hessabring and Williams, 2017).

It is worth knowing that, the use of e-learning has challenged the traditional or conventional method of teaching and learning of Basic Science in secondary schools. In the traditional method, students sit for test and examination through paper and pen mode (Ebeh 2018 and Bandele, 2020), instead of using computer to answer examination questions. The unsatisfactory nature of the traditional learning method ushered in the era of e-learning in our educational system, as observed in Joint Admission and Matriculation Board (J.A.M.B.) Examination.

With the advent of e-learning, teaching and learning have gone beyond teachers standing in front of the learners to disseminate information to the students without the students actively participating in the teaching learning process (Okoye 2014 & Alayi, 2022). They further observed that this new approach (e-learning) is a strong indication that the era of teachers without e-learning has gone. It is imperative that, there is need for teachers and students to be electronic literate. Offorma (2015) opined that the use of internet in teaching enhanced independence and autonomy of students and encourages file sharing, collaborative learning and changes the role of the teachers from being a dispenser of knowledge to a facilitator of learning.

Electronic learning involved learning derived from using computers aided gadgets (Noah 2002). It is a form of computer mediated instructional strategy that is useful in both pedagogic and administrative functions (Mark, 1998). According to Offorma (2015) e-learning resources include internet, e-mails, video, teleconference, digital camera and data base. They are useful for exchange and sharing of information through electric media (Okoye, 2014 and Bharaktar, 2019).

Research studies on e-learning have shown that the learning process is activity based and learner centered as well as enhances student's achievement (Orukotan, 2007; Bandele, 2015; Basseyy and Ibuot, 2023; Slavin, 2018 and Ubana, Abima and Obi, 2018). E-learning has the potential to provide a conducive learning environment and consequently arouse student's interest in Basic Science.

E-learning is learning utilizing electronic technologies to access educational curriculum outside a traditional classroom (Barth & Burandt, 2019). In most cases, it refers to a course, program or degree delivered completely online. The e-learning in education is to allow people to learn for personal accomplishment or to earn a professional degree without physically attending a traditional university or academic setting.

Today, the latest information and communication technologies (ICT) are like the use of the internet and integral part of the society (Barth & Burandt, 2019). There is a move from an industrialized society towards information or knowledge society (Foray, 2022). The rise of ICT during the new economy boom in the late 1990s brought huge expectations for the educational sector (Tolbert, 2018). Barth (2017) defines e-learning as a teaching and learning process that involves the use of ICT. E-learning was thus hoped to provide information at the

fingertips, education on demand and just-in-time learning, to name only some of the most popular catchphrases of that time.

These rather optimistic expressions were based on two different lines of expectations: on the one hand, e-learning was expected to bring an increased quality to the learning process. Schulmeister (2019) critically deconstructs such expectations as pedagogical myths that cannot be justified empirically (Russell, 2019). Thus, e-learning does not per se deliver more efficient or better learning process compared with traditional learning.

Nevertheless, e-learning has the potential to be a technology-based pedagogical innovation in education and also help in improving academic performance of students in school (Dillenbourg, 2019). Nwana (2021) defined e-learning in education as a wholesome integration of modern telecommunication equipment, particularly the internet into the education system. The definition further stress that the main purpose of e-learning in education is to transform the old methods and approaches of curriculum implementation in order to bring about certain changes in the behaviour of the learners in and outside the classroom, thereby determining the extent to which the changes take place.

E-learning is the exploitation of the internet and digital resources to create new experiences in a learner which in turn improve the lives of other beings. It is one of the educational challenges of the modern age about which progressive academic institutions must make bold efforts to excel and compete favourably in the global market where education is the option.

Basic Science is a multi-disciplinary approach to understanding the world. It is a straightforward, easy to read but substantial introduction to the fundamental behaviour of matter and energy in living things. Conceptual Integrated Science has to do with physics, chemistry, biology, science and astronomy curricula.

Basic science is an interdisciplinary curriculum which deals with different methods to teaching and learning of science in the following way, which covers the aspect of:

- a. Funder mental unity of scientific thought
- b. Strategies and processes of scientific enterprise and
- c. Scientific knowledge of the environment of learners.

Basic science covers all areas of science cutting across all subject boundaries and includes all the areas, leading to meaningful understanding of the chemical and physical science, the material wall and technology.

Howell (2022), stated that basic science is the beginning course to teach learners what science is and how scientist work. He regarded basic science as some form of unified science.

Khahele (2015) on his part, drew attention to the UNESCO publication in which basic science was defined as an approach to the teaching of science in which concept and principles are presented, so as to express the funder mental unit of scientific thought and avoid premature or undue stress on the distinctions between the various scientific fields.

Arbon (2020), maintains that basic science eliminates the repetition of subject matter from the various sciences and does not recognize the traditional subject boundaries when presenting topics.

#### **FEATURES OF BASIC SCIENCE**

1. It is a beginner science
2. It teaches learners what science is and how scientist work
3. It eliminates the repetition of subject matter from the various sciences.
4. It does not recognize the traditional subject boundaries.

#### **OBJECTIVES FOR THE TEACHING OF BASIC SCIENCE**

1. Observe carefully and thoroughly.

2. Report completely and accurately what is observed
3. Organize information acquired from observation
4. Make generalization based on acquired information
5. Design experiment to check prediction with control
6. Use model to explain natural phenomenon when necessary
7. Continue the process of inquiry when new data does not confirm to prediction.

Also, teachers of basic science should note that the following three strategies should be used viz;

1. Use of discovery teaching strategies
2. Inclusion of problem solving activities.
3. The involvement of learners in open ended laboratory exercises.

In the learning of basic science Howell, (2022) presented out that there are three types of skills that the learners can acquire which are;

1. Process skills: such as observing, measuring, collecting, sorting, recording, reporting, analyzing, predicting, etc.
2. Manipulative skills: which includes drawing, cutting, coupling, dissecting, fitting equipment, painting, fixing.
3. Social skills: such as socializing, relating, cooperating, sharing etc.

All this skills are easily acquired during the learning of basic science when strategies which are child centered and full of activities are employed, learners are grouped together which draws them together and closer. Skills for manipulation can be developed when they are allowed to carry out simple laboratory exercises and outdoor activities.

Some of the activities displayed by scientist while working include;

1. Curiosity
2. Objectivity
3. Open mindedness
4. Honesty
5. Humility
6. Empiricism
7. Skepticism
8. Parsimony.

### **Benefits of E-learning**

According to Iwang, Offem and Okeke (2018) there are many benefits that can be derived from e-learning. These are:

1. Learners assess the materials at their own time and study at their own pace and place.
2. Learners can assess the content through window based computers.
3. E-content has been developed and uploaded on the server, it is relatively inexpensive to distribute domestically and worldwide.
4. It enables the content to be easily and regularly updated and instantly available to all learners.
5. E-learning promotes collaborative learning.
6. Content can be delivered to a small or large number of learners with little effort. Enhance and consistent mode of delivery of knowledge.

### **Statement of the Problem**

The importance of Basic Science in the technological development of a nation cannot be over emphasized. However, one cannot lose sight of the fact that in any teaching learning situation, the students, the method of teaching and electronic literacy are important parameters, as these factors contribute seriously to the overall performance of the students.

The E-learning method is learner centered. Teaching and learning have gone beyond the teacher standing in front of the learner to disseminate information to them without the learners actively participating. The new approach (e-learning) is a strong indication that the era of Basic Science teachers without e-learning in their classrooms is gone. So it becomes imperative that Basic Science teacher should introduce electronic literacy in which the students lack and they should introduce e-learning to their students in order to compete globally with their counterparts worldwide. Therefore, there is need for Basic Science teachers to adapt e-learning method in teaching and learning of physics. This is the problem of the study.

### **Purpose of the Study**

This study is intended to determine the effect of E-learning on students' academic achievement in Basic Science. Specifically, the study sort to determine:

- i. Effect of e-learning on student's academic achievement in Basic Science
- ii. Effect of e-learning on male and female student's academic achievement in Basic Science.

### **Hypotheses of the Study**

The following null hypotheses guided the study and tested at 0.05 level of significance.

**HO<sub>1</sub>:** There is no significant difference between the mean academic achievement scores between students taught Basic Science with e-learning method and those taught with the conventional method.

**HO<sub>2</sub>:** There is no significant difference between the academic achievement scores of male and female students' taught Basic Science with e-learning method and those taught with the conventional method.

### **Materials and Method**

The study adopted a quasi-experimental design. The sample of the study was 200 respondents selected from five out of 55 secondary schools in the area of study. The population of the study comprised of 1650 Basic Science students (zonal education office Uyo, Akwa Ibom State). The instrument used was Basic Science Achievement Test (BSAT) and was face validated by three experts in test and measurement. The reliability of the instrument was done by administering the BSAT to 10 students' who did not participate in the main study. Two hypotheses were formulated as a guide to the study. The t-test statistics was used to test the hypotheses. The reliability index of the instrument was 0.75 using Kuder Richardson 20. Base on this, the instrument was found suitable for the study. The research assistants' were trained and given instruction on the lesson plan on the concept of Energy in Basic Science. The post test were administered after pre-test. A copy of the BSAT was given to each of the 200 respondents to respond for 35 minutes. For the purpose of data analysis, the completed copies of the BSAT were collected from respondents, scored and graded. The data collected were analyzed using t-test statistics. The data results were presented in tables.

### **Results**

The results of the data analysis are shown in the tables below.

#### **Hypothesis One**

Ho 1: There is no significant difference between the mean academic achievement score of students' taught Basic Science with e-learning method and those taught with the conventional method.

**Table 1: t-test Analysis of Achievement Scores by Learning Methods**

Item	X	Mean	SD	DF	tcal	tcri
e-learning method	98	63.20	7.21	198	2.24	1.98
Conventional method	102	55.10	8.45			

As shown in table 1, the calculated t-value of 2.24 is greater than the critical t value 1.98 at 198 degree of freedom at 0.05 level of significance. Therefore the null hypothesis which states that, there is no significant difference in the mean achievement of students' taught Basic Science with e-learning and those taught with the conventional method is rejected. This implies that e-learning does significantly influence academic achievement of students' in Basic Science.

### Hypothesis Two

H<sub>02</sub>: There is no significant difference between the academic achievement scores of male and female students' taught Basic Science with e-learning method and those taught with the conventional method.

**Table 2: t-test Analysis of Achievement of Male and Female Students**

Item	X	Mean	SD	DF	tcal	tcri
e-learning method	122	62.50	8.3	198	0.21	1.98
Conventional method	78	62.10	46.72			

As shown in table 2, the calculated t-value of 0.21 is less than the critical t-value 1.98 at 198 degree of freedom at 0.05 level of significance. Therefore the hypothesis which states that, there is no significant difference in the academic achievement of male and female students' taught Basic Science with e-learning method and those taught with conventional method is accepted. This implies that e-learning has the same effect in facilitating learning among male and female students'.

### Discussion of Findings

The result of hypothesis one shows that e-learning method enhances students achievement in Basic Science than the conventional methods. The result is in agreement with that of Opera (2021), and Iwang, Offem and Okeke (2018) that found e-learning method to be more effective in enhancing students' achievement than the conventional method. Therefore, achievement in Basic Science is likely to improve if e-learning method is adapted.

In hypothesis 2, there was no significant difference between the achievement scores of male and female students' studying Basic Science. The no significant difference between the achievement of male and female Basic Science students' using e-learning method is accepted. This may not be unconnected with the fact that a good teaching method like the e-learning does not have any disparity in the achievement of the male and female students'. This result conforms to that of Iwang, Offem and Okeke (2018). Which indicates that e-learning does not discriminate among gender? From the result, if appropriate instructional method is employed, the female students' could perform as well as their male counterparts in Basic Science.

### CONCLUSION

This study concludes that the students' who learn Basic Science under e-learning method achieve higher than those who learn through conventional method. E-learning method enhanced achievement and stimulates cognitive activities in Basic Science.

**RECOMMENDATION**

The paper recommended as follows:

- Basic Science teachers should be encouraged to adopt e-learning method in teaching Basic Science.
- Curriculum planners should incorporate e-learning method on all preservice teachers' curricula to equip them with e-learning method on graduation.

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