The Effects of Inquiry and Lecture Methods on Academic Performance of Students in Basic Technology in Uyo Local Government Area for Achieving Sustainable Development Goal

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ABSTRACT

The study determined the effects of inquiry and lecture methods on students' academic performance in basic technology in Uyo Local Government Area for sustainable development goals. The non-equivalent control group quasi-experimental research design was used for the study. A sample size of 45 Junior Secondary Two students were randomly selected from the population of 1470 students. The researcher-developed instrument called Basic Technology Achievement Test (BTAT) was used to collect data for the study. Reliability coefficient of the instrument stood at 0.88 and was established through test-retest method. ANCOVA and MANOVA were used for data analysis. Findings of the study revealed that there are significant effects of inquiry and lecture methods on the academic performance of students in basic technology; and there is no significant effect of inquiry and lecture methods on the academic performance of male and female students in basic technology for achieving sustainable development goal. It is recommended among others that qualified teachers should be employed to teach basic technology in junior secondary schools.

KEYWORDS: Inquiry method, Lecture method, Academic performance, Basic technology, Sustainability, Sustainable development goals

Introduction

Basic technology is one of the pre-vocational subjects offered by students at the junior secondary school level in Nigeria in compliance with the provisions of the National Policy on Education. The purposes of pre-vocational subjects are: introduction of the learner into the world of technology and appreciation of technology towards interest arousal and choice of vocation at the end of junior secondary school and professionalism later in life; acquiring technical skills, exposing students to career awareness by exploring usable options in the world of work; and enabling the youths to have an intelligent understanding of the increasing complexity of technology (Federal Republic of Nigeria, 2004).

The scheme of work for basic technology, according to Wenrich and Wenrich (2010), covers appreciation and exploratory activities in metal work, woodwork, technical drawing, building construction, auto-mechanics, electrical installation and electronics. The teaching and learning of basic technology should sufficiently furnish the students with saleable work skills and competencies to enhance the development of self-reliant initiatives.

However, if the achievement of the goals of pre-vocational subjects must be realized, appropriate instructional methods must be selected to suit teaching and learning situations. Ogwo and Oranu (2006) asserted that an instructional method is the science and art of assisting a person to learn. The science aspect entails the use of the acquired knowledge from natural and behavioural sciences in order to help appreciate the circumstance and personality of a learner, while the art aspect involves the use of creative and demonstrative skills in aiding the delivery of instruction. One of the characteristics of a good instructor is that he must be conversant with a wide variety of instructional methods and materials from which he can select the one that best accomplishes a particular goal or meets the demands of existing situation. Some of the instructional methods are inquiry, lecture, team, demonstration and discussion.

Inquiry learning provides opportunities for students to ask questions, through which they can gather information about the subject matter (Sasketchecran Education, 2009). This requires a high level of interaction among the learners, the teachers, the area of study, available resources and the learning environment. Inquiry is a process in which learners use scientific means to investigate and arrive at generalization (Ikpe, 2005). The author added that in inquiry strategy, the learners should be aware of the objectives, formulate hypothesis, collect and analyse data, test the hypothesis, draw conclusion, apply the conclusions to new situations and develop generalization. Ncharam (2005) found out that inquiry method was effective in enhancing the performance of students than the traditional method.

Lecture strategy is a teacher-dominated approach to teaching. It involves the teacher telling the students what he knows about a concept. It involves a one-way communication in which the teacher is a dominant figure and the students' participation is usually non-existent. Onwuka (2006) views lecture method as a traditional method of teaching in which the teacher knows everything and the learner is almost blank. It is derived from the commonly held notion that in the teaching-learning situation, the teacher is an embodiment of knowledge to the pupils, whereas the pupils who seem to be ignorant and bare, acquired the knowledge from their teacher. Ekpo (2008) argues that there was no reason to believe that teaching-learning could be properly handled with the lecture method of instruction. Research studies indicate better students' performance in favour of guided inquiry approach against the lecture method (Ugwuanyi, 2008). Nsa (2007) reported that there was no significant effect of gender on students' performance when taught with different methods of teaching.

Quality instruction, as one of the tools for achieving sustainable development goals, can be achieved through the selection of suitable instructional methods that was appropriate for the learning situations. A competent teacher, irrespective of gender, has knowledge, skills, attitudes and judgment required for successful performance of tasks in order to bring about excellent students' achievement and sustainable satisfaction. Quality instruction demands that the teacher must possess some basic abilities to organize, coordinate and utilize personal qualities and competencies in lesson preparation, presentation and evaluation.

Sustainability is the ability to exist constantly. It refers to the capacity to meeting the needs of the present, without compromising the ability of future generations to meet their needs (Utuk and Udoh, 2019). The concept of sustainability is anchored on three pillars namely; economic (for profit), environmental (planet) and social (people) considerations. The 2012 United Nations conference on sustainable development emphasized that every state has the responsibility "to respect, protect and promote human rights and that democracy, good governance and the rule of law, etc. are essential for sustainable development" in each of its three dimensions: economic growth, social development and environmental protection (UN, 2012). The Sustainable Development Goals (SDGs) include goals and targets that promote environmental protection. However, the targets were often written in language that is neither concrete nor closely linked to existing human rights obligation (Knox, 2015).

One of the sustainable development goals was to achieve Education for All (EFA) by the year 2000. This goal had not been achieved despite the effort of government in different nations due some militating factors which include: poverty, ignorance, paucity of funds and corruption, to mention but a few. Based on the foregoing issues, the study was conducted to determine the effects on inquiry and lecture methods on academic performance of students in basic technology in Uyo Local Government Area for achieving sustainable development goals.

Statement of the Problem

Basic technology is one of the pre-vocational subjects taught at the junior secondary school level. It seems that the subject is not taught properly in many schools in the study area. Instructions in basic technology lack proper approaches in most cases. This eventually results in low academic performance by the students. It was noted that the difference in the performance of students has been attributed to teachers' methods of lesson presentation (Ekpo, 2008). In order to improve on the quality of education, the study was conducted to determine the effects of inquiry and lecture methods on students' academic performance in basic technology in Uyo Local Government Area for achieving sustainable development goal.

Purpose of the Study

The objectives of the study were to:

1. determine the effects of inquiry and lecture methods on the academic performance of students in basic technology for achieving sustainable development goal.
2. determine the effects of inquiry and lecture methods on the academic performance of male and female students in basic technology for achieving sustainable development goal.

Null Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant effects of inquiry and lecture methods on the academic performance of students in basic technology for achieving sustainable development goal.
2. There is no significant effects of inquiry and lecture methods on the academic performance of male and female students in basic technology for achieving sustainable development goal.

Delimitation of the Study

The study was delimited to: the effects of inquiry and lecture methods on academic performance of students in basic technology in Uyo Local Government Area for achieving sustainable development goal; Junior Secondary Two students in Uyo Local Government Area were used for the study.

Research Method

Design of the Study

The research design was a nonequivalent control group quasi-experimental design. Inquiry method was used for experimental group while lecture method was used for control group.

Population of the Study

The population of the study consisted of 1470 Junior Secondary Two (JSS2) students in Uyo Local Government Area.

Sample and Sampling Technique

A total sample size of 45 JS2 students were selected for the study. Two intact classes consisting of 20 and 25 were randomly selected for the study.

Instrumentation

The researcher-developed instrument called Basic Technology Achievement Test (BTAT) was used to collect data for the study. The instrument consisted of sections A and B. Section A gathered information on the demographic data of the students; while section B comprised 20 multiple choice questions with four options (A, B, C and D).

Validation of the Instrument

The instrument (BTAT) was subjected to face and content validity by three experts from the Faculty of Education, University of Uyo. These experts include two lecturers in the Department of Industrial Technology Education and one lecturer in the Department of Educational Foundations, Guidance and Counselling, University of Uyo, Uyo.

Reliability of the Instrument

Test-retest method was used to establish the reliability of the instrument. The instrument was administered twice on 10 students that did not take part in the actual study at two weeks interval. The reliability coefficient of the study was determined using Cronbach Alpha method to yield a coefficient of 0.88. This indicated that the instrument was reliable for usage.

Scoring of the Instrument

1. BTAT, a 20-item pretest to give 20 points, was used to determine the performance of the students before the treatment.
2. Also BTAT, a 20-item post-test to give 20 points, was used to determine the performance of the students after the treatment.

Method of Data Analysis

Analysis of Covariance (ANCOVA) and Multivariate Analysis of Variance (MANOVA) were used for the analysis of data.

Results and Discussion

The findings of the study are as follows:

H_{01}: There is no significant effects of inquiry and lecture methods on the academic performance of students in basic technology for achieving sustainable development goal.

Table 1: Analysis of Covariance of Effects of Inquiry and Lecture Methods on the Academic Performance of Students in Basic Technology (N=45)

Source of Variance	SS	df	MS	Fcal.	Fcri.
Between groups	224.97	1	224.97	49.66*	4.08
Within groups	190.12	42	4.53		
Total		**43**			

*** = significant at 0.05 level of significance**

Data analysis in Table 1 indicates that the calculated F-value of 49.66 is greater than the critical F-value of 4.08 at the degree of freedom of 1 and 42; and at 0.05 level of significance. Hence, the null hypothesis is rejected. Therefore, there is significant effects of inquiry and lecture methods on the academic performance of students in basic technology for achieving sustainable development goal.

H_{02}: There is no significant effects of inquiry and lecture methods on the academic performance of male and female students in basic technology for achieving sustainable development goal.

Table 2: Multivariate Analysis of Variance (MANOVA) of the Effects of Inquiry and Lecture Methods on the Academic Performance of Male and Female Students in Basic Technology (N = 45)

Source of Variance	SS	df	MS	Fcal	Fcri
Between column (gender)	3.06	1	3.06	0.59^{ns}	4.08
Between row (teaching methods)	219.04	1	219.04	42.53	
Between row & column (interaction)	210.7	1	210.7	210.7	
Between groups	221.65	3	73.88	14.35	
Within groups	211.15	41	5.15		
Total	**432.80**	**44**			

ns = not significant at 0.05 alpha level

Data analysis in Table 2 reveals that the calculated F-value of 0.59 is less than the critical F-value of 4.08; and at 0.05 level of significance. Hence, the null hypothesis is accepted. Therefore, there is no significant effect of inquiry and lecture methods on the academic performance of male and female students in basic technology for achieving sustainable development goal.

Discussion of Findings

Findings of the study revealed that there are significant effects of inquiry and lecture methods on the academic performance of students in basic technology in Uyo Local Government Area for achieving sustainable development goal. The findings of the study goes in line with the work of Ugwuanyi (2008), who discovered better performance of students in favour of guided inquiry

approach against the lecture method. Also in support of the findings of the study, Ncharam (2005) found out that inquiry method was effective in enhancing the performance of students than the traditional method.

The findings of the study also revealed that there is no significant effect of inquiry and lecture methods on the academic performance of male and female students in basic technology for achieving sustainable development goal. In support of the findings of the study, Nsa (2007) discovered that there was no significant effect of gender on students' performance when taught with different methods of teaching.

Conclusion

The effects of inquiry and lecture methods on academic performance of students in basic technology in Uyo Local Government Area for achieving sustainable development goal had been investigated. The study concludes that there are significant effects of inquiry and lecture methods on the academic performance of the students. However, there is no statistically significant effect of inquiry and lecture methods on the academic performance of male and female students in basic technology for achieving sustainable development goal.

Recommendations

The following recommendations were made based on the findings of the study:

1. Qualified teachers should be employed to teach basic technology in junior secondary schools.
2. Government should train basic technology teachers through workshops and seminars to update their knowledge on the selection of appropriate teaching methods.

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