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Guided-Discovery, Demonstration Methods and Physics Students' Acquisitions of Entrepreneurial Skills in Household Electrical Circuit Sketch and Wiring in Akwa Ibom State

Uduak J.U and Onwiodukit, F.A.
Department of Science Education
Akwa Ibom State University, Uyo
+2348062855761; +2347061518962
uduakutibe@aksu.edu.ng; fidelisonwioduokit@uniuyo.edu.ng

Abstract

The main aim of this study was to examine the effect of Guided-Discovery, Demonstration Methods and Senior Secondary Physics Students' Acquisitions of Entrepreneurial Skills in household electrical circuit sketch and wiring skills in Akwa Ibom State. This study adopts a quasi-experimental multi-stage design using students from two purposely selected schools to form the two experimental groups. This study was conducted in Abak Local Government Area of Akwa Ibom State. The population for the study was all the Senior Secondary one (SS1) physics students for 2017/2018 session in the 19 public secondary schools in Abak Local Government Area of Akwa Ibom state. Three null hypotheses were formulated to guide in the study. Two instruments namely: Household electrical circuit sketch and wiring skills Test lessons on electrical circuit sketch and wiring skills were used for the collection of data for the study. The data collected in the course of the study were analyzed using Descriptive statistics and Analysis of covariance (ANCOVA). All the hypotheses were upheld when tested at 0.05 alpha level of significance. It was recommended that Guided-discovery and demonstration methods should be used in the teaching of entrepreneurial skills in household electrical circuit sketch and wiring skills to physics students.

Keywords: Teaching Methods, Entrepreneurial skills, Household electrical circuit sketch and wiring skills

Introduction

The study of physics has been and will continue to be of tremendous importance to the human society because of its central role in solving human societal problems. Notable areas where physics is crucial in providing solutions to the problems of the society include household electrical circuit sketch, wiring, safety and creation of jobs, among others (Utibe, 2016). Considering this critical role of physics to the society, it is needful to lay a solid foundation in physics students to enhance their proficiency and subsequent application of the concepts in entrepreneurial skills' development within and outside the school. Several household suffer from several electrical damages, inconsistent power supply, high number of unemployment, as well as several electrical circuit related domestic problems which predicts low level of electrical circuit sketch, wiring skills and entrepreneurial development (Anyakoha, 2006).

The general objectives of the 2008 Physics Curriculum are to provide basic literacy in Physics for functional living in the society, acquire essential scientific and entrepreneurial skills (electrical circuit sketch and wiring skills) and attitudes as a preparation for technological application of Physics and stimulate/enhance creativity. These objectives were vigorously tackled in this study in line with the vision of the Federal Ministry of Education as stated in the National Policy of Education (FME, 2014).

Physics as the branch of science does not only deal with the fundamental questions on the structure of matter and the interaction of the elementary constituents of nature which are susceptible to experimental investigation and theoretical inquiry but also with the study of the societal needs and the related entrepreneurial skills. It is an important science subject taught at the senior secondary school level in the country.

The importance of physics as a requirement for scientific and technological development of any nation cannot be overemphasized. The technological potentials, societal comforts and entrepreneurial skills and development of Nigeria depends on the quality of the physics education provided (Onwioduokit, and Efut 2000). The knowledge of physics helps to transform Nigeria through entrepreneurial skills (electrical circuit sketch and wiring) and creation of jobs (Utibe, 2017). The study added that the unique nature of physics gives the learners advantage over other science subjects. Major areas of these advantages are the application of learn concepts in physics to solve the society problems, creation of entrepreneurs and job creation.

The performance of candidates in physics examinations conducted by WAEC is usually not encouraging as reports often reveal (WAEC Chief Examiners Report CERs, 2014 - 2018). There had been a fluctuating failure rates for physics over the years. For example, the failure rate in physics in 2014 was 54.7% while in 2015 and 2016; it drop to 53.9% and 49.3% respectively. For the period 2014 - 2018 reported, the highest failure rate was recorded in 2017 with 57.1% of students falling in the examination. These percentages have continued to fluctuate in recent times.

Onwiodnokit and Mkpanang (2001) opines that since the African culture provides differential experiences to boys and girls and consequent differential opportunity and motivation for learning in specific areas, it follows that sex is a relevant factor to be associated with students' understanding.

Furthermore, WAEC CERs for June 2014 - 2018 points to a display of basic poor

understanding of and difficulty in electricity concepts as required in the certificate examinations. For instance, most candidates are said not to be able to comprehend the demands of such questions hence were poorly attempt. Illustrations with diagrams and electrical circuits in questions were also observed to be poorly attempted (WAEC CER 2014 - 2018). Science educators have equally expressed concern at the failure of many traditional approaches to instruction used at every level of education. It has also been recognized that among students, individual differences exist in learning abilities and in rates of learning (Onyegegbu, 2000). These considerations have directed concerned science educators and teachers to examine a variety of teaching methods in search of motivation, knowledge enhancement, attitude change and enrichment in the science classroom. These methods ranged from "structured" to "unstructured" (Fenstermacher and Richardson, 2000). One such method is an attempt to enrich the classroom through the Skills and Entrepreneurial development method using Physics Education devised and utilized for this study. Physics is one particular subject that is also a requirement for all science and engineering courses in the polytechnics and universities (FME, 2014).

The responsibility of the teacher is to help students attain maximum achievement in their learning tasks. Several skills are expected of the teacher in order to achieve this goal. Some of the skills include ability to use appropriate methods in teaching. Apart from the teachers' skills, the learner characteristics such as entrepreneurial interest play a key role in the students' performance in a subject (Uyoata, 2002). There has equally been a great shift in emphasis in science teaching and learning all over the world. The concern in recent times is to have science classroom that is student centered, activity oriented and focused on skill development rather than rote-learning and simple recall of knowledge (Owolabi, 2002).

Stuart (2000) asserted that there should be innovations in the methods of teaching which this study hope to address. It might be assumed that the interest in, and attitude to science skill profile which a child exhibits and the subsequent entrepreneurial skill the child attains might be greatly influenced by the pedagogical techniques individual teachers use during instructional process (Uyoata, 2002).

Since the major aim of science education is to promote the understanding of the concept being taught with a view to applying knowledge of such understanding to real life situations, the consistent poor performance in and negative attitude towards science attest to the fact that science teaching has not been properly done. Hence, the concepts being taught are not properly understood. This improper science teaching has led to a vigorous search for appropriate teaching method that would best achieve the aim of science teaching such as the entrepreneurial skill development embedded in this study, thus improving performance and enhancing positive attitudes towards science subjects including physics (Utibe, 2015). McMillan (2001) has advocated the need to organize science learning in such a way that it takes into consideration the innate skills of students. Such skills include among others; active manipulation and exploring of the environment. This search for methods and procedures for effective teaching and learning has not only engendered the birth of many procedures, and methods but resulted in a new method with potentially radical teaching applications. Being faced with how to organize instruction in such a way as to facilitate learning for the majority of the students for comprehensive achievement profiles, science teachers especially physics teachers need to employ the manipulative (guided-discovery or demonstration)

skill method of teaching (McBrien and Brandt, 2002) in fashioning out useful and entrepreneurial teaching methods. Entrepreneurial skill method, in a nutshell, is a pluralized way of understanding the intellectual skills (Okebukola, 2002).

Specifically, entrepreneurial skill teaching methods leads to higher positive affective achievement profiles in females than males (Abonyi, 2002) as well as positive affective achievement profiles for both males and females. Students with high reasoning ability exhibited positive affective achievement profiles towards teaching methods that brought out the best in them (Camion and Simpson, 2003).

Further considering the gender and learning ability of students, it has been found that entrepreneurial skill methods have led to an improvement in cognitive and psychomotor achievement profiles in favour of females in some instances in the physics classrooms (Leinhardt, 2001) and male students over female students in some other instances (Ige and Arowolo, 2003). Also, the achievement and application of knowledge of students in physics based on novel teaching methods bordering on gender differences had recorded no significant effect on criterion measures (Njoku, 2004). The attempts to take a scientifical stand on these controversies inform the rationale for this study.

In this study the cognitive theory would be applied in assisting the student to learn trades and become entrepreneurs in life. Constructivism really got its start in the late 1980s. But many people did not know how to label what they were doing. Bartlett (1989) pioneered what became the constructivist approach (Good, Sikel and Brophy, 1990). Constructivists believe that "learners construct their own reality or at least interpret it based upon their perceptions of experiences, so an individual's knowledge is a function of one's prior experiences, mental structures, and beliefs that are used to interpret objects and events." "What someone knows is grounded in perception of the physical and social experiences which are comprehended by the mind". The Assumptions of Constructivism which this study is based are that knowledge is constructed from experience, learning is a personal interpretation of the world, learning is an active process in which meaning is developed on the basis of experience, conceptual growth comes from the negotiation of meaning, the sharing of multiple perspectives and the changing of our internal representations through collaborative learning and that learning should be situated in realistic settings; testing should be integrated with the task and not a separate activity (Matthews, 2000)

The step by step presentation of this study and its exposures will enable the learners to fit into the constructivists' model of learning. The principles of Constructivism are broadly adopted in many areas of education as in this study. The notions of authentic activities, social negotiation, juxtaposition of instructional content, nurturance of reflexivity, and student-centered instruction inspired many instructors to examine and think about the importance of interactions between teachers and students, students and students, and students and learning materials as well. Therefore, this study would employ this strategy to enhance the effectiveness of teaching and learning among the students.

Statement of the Problem

As an Akwa Ibomites and Landlords, the researchers have personally observed a consistent societal problem link to electricity concepts and the general physics as highlighted in the background of this study. The researchers have also observed that the physics students leave the school with little or no trace of skill despite the many skills available in the senior secondary school physics curriculum.

The physics students who have been taught the concept of electricity and household electrical circuit sketch and wiring skills in their senior secondary one (Akwa Ibom State Ministry of Education scheme of work 2008 and Federal Ministry of Education Senior Secondary School Physics Curriculum, 2008) exhibit a very abysmal level of application of the physics concepts in electricity to solve societal problems and their development of entrepreneurial skill is very low. It is on the bases of these observations and others that motivated the researcher to carry out this study with a view of training students that would apply the physics concept of electricity to developed entrepreneurial skills in household electrification, improve on their performances in physics examinations and on graduation become self-employed rather than job seekers to lessen the pressure of unemployment on the labour market.

Purpose of the Study

The purpose of this study was to investigate the Effects of Guided-Discovery and Demonstration Methods on Senior Secondary Physics Students' Acquisitions of Entrepreneurial Skills in Household electrical circuit sketch and wiring skills in Akwa Ibom State. The study is designed to achieve the following specific objectives to:

1. Compare the mean scores of physics students in Household Electrical Circuit Sketch, Wiring Skills when taught using guided-discovery and demonstration methods.
2. Compare the mean scores of male and female physics students in Household Electrical Circuit Sketch, Wiring Skills when taught using guided-discovery and demonstration methods.

Research Questions

In order to guide the researcher in the study, the following research questions were posed:

1. What is the difference between the mean scores of physics students in Household Electrical Circuit Sketch, Wiring Skills when taught using guided-discovery and demonstration methods?
2. What is the difference between the mean scores of male and female physics students in Household Electrical Circuit Sketch, Wiring Skills when taught using guided-discovery and demonstration methods?

Hypotheses

To guide the researcher in the conduct of the study, the following null hypotheses were tested at 0.05 level of significance:

Ho1. There is no significant difference between the mean scores of physics students in Household Electrical Circuit Sketch, Wiring Skills when taught using guided-discovery and demonstration methods.

Ho2. There is no significant difference between the mean scores of male and female physics students in Household Electrical Circuit Sketch, Wiring Skills when taught using guided-discovery and demonstration methods.

Ho3. There is no significant difference in the interaction effect in mean scores of physics students using teaching methods and gender in Household Electrical Circuit Sketch, Wiring Skills.

Significance of the Study

The results of this study would find applications in:

1. Brining to the knowledge of the education managers and the general public on the need to adopt innovative teaching method such as the guided-discovery and demonstration methods used in this study to promote the teaching and learning of physics in the school.
2. Serving as source of literature review for other researchers and as a book of reading for scholars.
3. Improving students' application of learned concepts to entrepreneurial skills development.

Delimitations of the Study

This study was delimited to the Senior Secondary one (SS1) physics students in public secondary schools in Abak Local Government Area of Akwa Ibom State because this concept in electricity is schedule for this category of students both in the FME Senior Secondary School Curriculum for Physics (2008) and Akwa Ibom State Ministry of Education Scheme of Work for Senior Secondary Schools (2008). This study was also delimited to the concept of electricity (Household electrification) as contained in both the National Curriculum and Akaw Ibom State scheme of work for physics, guided discovery and demonstration teaching methods and also the entrepreneurial skills in household electrification.

Limitations of the Study

The shortcomings envisaged in the study which could directly or indirectly influenced the scope of generalization of the research findings are the attitudes of the research assistants towards the evaluation and supervision of the students during the practical sessions, the attitudes of the students during the training and evaluation sessions, the environmental factor on the students who come from their homes throughout the six weeks of training and evaluation, insufficient practical equipment in the schools, insufficient support staff in the schools and the duration used for the training session among others.

Method

This study adopts an experimental multi-stage design using students from two purposely selected schools to form the two experimental groups (Onwioduokit, 2000) in a 2 x 2 factorial arrangement. This design, according to Onwioduokit is a type of design that contains different levels and can be used in an investigation to establish the combined effects of two or more independent variables. An important characteristic of this design is that several hypotheses can be tested at the same time. This study was conducted in Abak Local Government Area of Akwa Ibom State. Abak is one of the thirty-one Local Government Areas in Akwa Ibom state. It was linked to the National grid in 1973 and this long history of its electrification, its strategic location relative to the state capital (Uyo), the present of public secondary schools that meets the criteria for the schools needed for the study and the numerous other contributions of the town to the economy of the state validate the rationale of selecting it for the study.

The population for the study was all the Senior Secondary one physics students for the year 2017/2018 session in the nineteen (19) public secondary schools in Abak Local Government Area of Akwa Ibom state. The population was 2754 students. A total of 240 students (120 students in the

first experimental and 120 students in the second experimental group) constitute the actual sample for the study. The use of the word 'actual' implies that even though intact classes were used for the study only two hundred and forty students were selected and used for the final analyses in the study. Multi-stage sampling procedure was used. In the first stage purposive/criterion sampling technique was used to select the schools. The criteria were:

i. Schools that are currently presenting candidates for the senior secondary school certificate examinations (WASSCE, NECO-SSCE and NABTEB)
ii. Schools that have at least one professional physics teacher and have been teaching physics consistently for the past three years
iii. Schools that have at least one professional introductory technology teacher and have been teaching intro-tech consistently for the past three years
iv. Schools with professional technologists and technicians to run the physics laboratory and introductory technology workshop respectively
v. Schools which the concept of House hold wiring have not yet been taught to the SS1 2017/2018 session students
vi. Schools with functional physics laboratory and introductory technology unit

From the preliminary survey of the schools, only five schools were found to have met the above criteria. Two schools among those that met the above criteria were selected by random sampling technique. In the second stage stratified random sampled methods was used to select the students using the schools and their class arm as stratum. In the final stage random sampling technique was used to select the actual number of students (240) used for the analysis.

The following instruments and treatment packages were used to gather data for the study:

i. Electrical Circuit Sketch and Wiring Skills Test (ECSWST).
ii. Two lesson packages on the concept electrical circuit sketch and wiring skills (One each for guided-discovery and demonstration methods)

Electrical Circuit Sketch and Wiring Skills Test (ECSWST). A total of seven different electrical circuits were given to the students to skillfully design and connect as follows:

i. Simple one lamp controlled by a switch
ii. Two lamps controlled by one switch
iii. Multiple lamps controlled by one switch
    - series
    - parallel
iv. One lamp and socket with switch
v. One lamp, multiple sockets and two-way switch control
vi. Several lamps control by separate switches
vii. Multiple lamps, sockets and separate switches for each lamp.

Note, the assessment of the students' skills here was on-the-spot. The test was used to determine the ability of the students to correctly design and skillfully connect simple household electrical circuits. The pretest and posttest carry the same circuits.

The lesson packages and instrument were faced and content validated by the Head of Department Electrical Engineering, a lecturer in Science Education Department both of Akwa Ibom State University, Uyo, and two physics teachers in the secondary schools selected for the study. The

validity verdict from the four validates who were expected to assessed the appropriateness of the lesson packages and the items in the instruments for the suitability of the contents of the lesson packages in the training and items in the instruments providing correct responses on household wiring skills were incorporated into the final production of the lesson packages and instruments.To further strengthen the validity of the above instruments, the items in each of the above instruments were administered to a trial testing group of ten students who were not part of the main subjects for the study but who were found to be equivalent in all respects to the subjects in the study.

The researcher made use of one of the schools that met the criteria for sampling but was not used for the main study. The results obtained in this administration using a test-retest method were subjected to Pearson Product Moment (PPM) correlation coefficient (r). The result showed a reliability coefficient of 0.81. On the basis of the above reliability index, the instrument was deemed suitable for used in conducting the study

Two lesson packages (One based on Guided-discovery and the other based on Demonstration teaching methods) were prepared by the researcher and used with the trained research assistants in training the students on the concepts of household electrification base on the objectives of the study. The packages are lesson package on electrical circuit sketch and wiring skills using Guided-discovery teaching method and lesson package on electrical circuit sketch and wiring skills using Demonstration teaching method.

Scoring of Household electrical circuit sketch and wiring skill tests: The tests consists of twenty observable steps each which the students were expected to perform to indicate their skills and knowledge of household electrical circuit sketch and wiring skills. The researcher and trained research assistants in a conference evaluation scored each of the steps on the spot. Each correct step was scored using a range of 1 - 5 marks depending on the accuracy of performance. The total (maximum) marks for all the twenty steps in the instrument was 100marks while the minimum all twenty steps in the instrument poorly performed was 20marks.

The following procedures were followed during the training and administration of the instrument:

i. Relevant permission was obtained from the Director of schools, Abak Local Education Committee (LEC) for use of the two selected schools in the LEC for the conduct of the study.
ii. The approval from the Director of schools was conveyed to the Principals of the selected schools for proper arrangement for use of the physics students, physics teachers, technicians and relevant facilities in the school for the conduct of the study, having briefed them of the purpose of the study and the benefit of the study to the students, school and the Ministry of Education.
iii. At least two professional physics teachers and two technicians from each of the two selected schools were recruited and trained on the packages, test administrations and evaluations. At the end of the training, the teachers and technicians were evaluated. Those found to perform below average were dropped while those whose performance was considered satisfactory were used as research assistants in the two selected schools for the proper conduct of the study.
iv. In order to predict the effects of the treatment (test instrument) pretest was administered to the students (intact classes) at the beginning of the study and the result used to test a possible effect of the treatment and as covariates in subsequent analysis.

v. Though intact classes were used for the training, each of the arms of the class serve as a stratum from where 30 students were randomly selected and given tag as the actual experimental group for the study.
vi. The actual teaching and training of the students on the concepts of household electrical circuit sketch and wiring skills was done by the researcher under the assistance of the trained research assistants (team teaching) using the standardized lesson packages developed by the researcher for four weeks. The used of standardized or pre-prepared lesson packages by the team was to standardize the contents and quality of instructions and training given to the students.

A week of review was allowed for the participants after which the posttests: Household Electrical Circuit Sketch and Wiring Test was administered. The data collected in the course of the study were analyzed using descriptive statistics and Analysis of covariance (ANCOVA), using pretest and posttest scores as covariates. All hypotheses were tested at 0.05 alpha level of significance.

Results

Table 1: Summary of descriptive statistics of the mean scores of physics students in Household Electrical Circuit Sketch and Wiring Skills when taught using guided-discovery and demonstration methods

Teaching methods	Gender	Mean	Std. Deviation	N
Demonstration Method	Male	73.58	13.53	60
	Female	73.16	13.24	60
	Total	73.37	13.33	120
Guided Discovery Method	Male	74.08	13.26	60
	Female	73.66	13.46	60
	Total	73.87	13.30	120
Total	Male	73.83	13.34	120
	Female	73.41	13.29	120
	Total	73.62	13.29	240

As shown in Table 1 above, the calculated mean value for guided-discovery teaching method is 73.87 while the calculated mean value for demonstration teaching method is 73.37. The difference between them (guided-discovery and demonstration methods) is 73.87 – 73.37 = 0.05. From the analysis there exist a difference between the mean scores of physics students in Household Electrical Circuit Sketch and Wiring Skills when taught using guided-discovery and demonstration methods with a calculated value of 0.05.

Table 2: Summary of analysis of covariance (ANCOVA) of the performances of Physics students in Household Electrical Circuit Sketch and Wiring Skills when taught using guided-discovery and demonstration methods

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	133.91[a]	4	33.47	.18	.94
Intercept	66544.62	1	66544.62	371.34	.00
Pretest scores	108.49	1	108.49	.60	.43
Teaching methods	22.13	1	22.13	.12	.72
Gender	7.68	1	7.68	.04	.83
Teaching methods * Gender	.06	1	.06	.00	.98
Error	42112.33	235	179.20		
Total	1343200.00	240			
Corrected Total	42246.25	239			

a. R Squared = .003 (Adjusted R Squared = -.014)

As shown in Table 2 above, the calculated value of $F_{1, 118} = 0.12$ with associated probability value of value of 0.72. The associated probability value was higher than 0.05 level of significance set by the researcher; therefore, the null hypothesis was upheld. This implies that there is no significant difference between the mean scores of physics students in Household Electrical Circuit Sketch and Wiring Skills when taught using guided-discovery and demonstration methods.

As shown in Table 1, the calculated mean value for male using guided-discovery teaching method is 74.08 while the calculated mean value for male using demonstration teaching method is 73.58. The difference between them (guided-discovery and demonstration methods) is 74.08 – 73.58 = 0.50. Again the calculated mean value for female using guided-discovery teaching method is 73.66 while the calculated mean value for female using demonstration teaching method is 73.16. The difference between them (guided-discovery and demonstration methods) is 73.66 – 73.16 = 0.50. From the analysis there exist a difference between the mean scores of male and female physics students in Household Electrical Circuit Sketch and Wiring Skills when taught using guided-discovery and demonstration methods with a calculated value of 0.50 for both groups (male and female).

As shown in Table 2, the calculated value of $F_{1, 118} = 0.04$ with associated probability value of value of 0.83. The associated probability value was higher than 0.05 level of significance set by the researcher; therefore, the null hypothesis was upheld. This implies that there is no significant difference between the mean scores of male and female physics students in Household Electrical Circuit Sketch and Wiring Skills when taught using guided-discovery and demonstration methods.

As shown in Table 2, the calculated value of $F_{1, 118} = 0.00$ with associated probability value of value of 0.98. The associated probability value was higher than 0.05 level of significance set by the researcher; therefore, the null hypothesis was upheld. This implies that there is no significant difference in the interaction effect in mean scores of physics students using teaching methods and

gender in Household Electrical Circuit Sketch and Wiring Skills.

Discussion of Findings

The findings of this study in Table 1 shows that the method of teaching (guided-discovery and demonstration) does not affect the extent of Household Electrical Circuit Sketch and Wiring Skills acquired by the students. This implies that hypothesis one is upheld. Although the mean achievement score between those taught with guided-discovery and demonstration method seems to differ by some value, it was not found to be significant when subjected to hypothesis testing. The findings also validate the recommendation of the Federal Ministry of Education in the NPE, 2004 that physics concepts which household electrification is a part should be taught using guided-discovery method. This result shows further that both methods which are activity based are very good in the teaching of physics.

The findings of this study in Table 2 shows that the method of teaching (guided-discovery and demonstration) does not affect the extent of Household Wiring Practical Skills acquired by the students. This implies that hypothesis two is upheld. Although the mean achievement score between those taught with guided-discovery and demonstration method seems to differ by some value, it was not found to be significant when subjected to hypothesis testing. The findings also validate the recommendation of the Federal Ministry of Education in the NPE, 2014 that physics concepts which household electrification is a part should be taught using guided-discovery and demonstration methods. This result shows further that both methods which are activity based are very good in the teaching of physics.

The findings of this study in Table 2 shows that the method of teaching (guided-discovery and demonstration) does not affect the extent of Household Electrical Circuit Sketch and Wiring Skills acquired by the male and female students. This implies that hypothesis two is upheld. Although the mean performance score between those taught with guided-discovery and demonstration method seems to differ by some value, it was not found to be significant when subjected to hypothesis testing. The findings also validates the recommendation of the Federal Ministry of Education in the NPE, 2014 that physics concepts which household electrification is a part should be taught to students of both gender using guided-discovery and demonstration methods. This result shows further that both methods which are activity based are very good in the teaching of physics to students irrespective of their gender.

Summary

The main aim of this study was to determine the effects of guided-discovery and demonstration methods on senior secondary physics students' acquisitions of entrepreneurial skills in household electrical circuit sketch and wiring skills in Akwa Ibom State. This study adopts an experimental multi-stage design using students from two purposely selected schools to form the two experimental groups. This study was conducted in Abak Local Government Area of Akwa Ibom State.

The population for the study was all the Senior Secondary one (SS1) physics students for 2017/2018 session in the 19 public secondary schools in Abak Local Government Area of Akwa Ibom State. Three null hypotheses were formulated to guide the study. Two instruments namely: Electrical circuit sketch and wiring skill test and lesson notes in the concepts of electrical circuit sketch and wiring were used for the collection of data for the study. The data collected in the course of the study were analyzed using descriptive statistics and Analysis of covariance (ANCOVA). All

the hypotheses were upheld when tested at 0.05 alpha level of significance.

Recommendation

Based on the results of the study, it was recommended that guided-discovery and demonstration methods are highly recommended for used in teaching physics students the concept of household electrical circuit sketch and wiring skill since it guarantee equal performance to every student irrespective of gender.

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