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RESEARCH ARTICLE

EFFECTS OF TEACHER CONSTRUCTIVIST MODEL AND INTEREST ON STUDENTS' ACADEMIC ACHIEVEMENT IN FABRICATION AND WELDING IN TECHNICAL COLLEGES IN LAGOS STATE

Dr. Ogunbote Shefiu, Dr. Dawodu Rasheed Adegbenro and Dr. Okeowo Rebecca Oyenike
Department of Technology Education, Lagos State University of Education, Oto/Ijanikin, Lagos.

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Abstract

The study determined the effects of teacher constructivist model and interest on students' academic achievement in fabrication and welding in technical colleges in Lagos state. The study is a pre-test, post-test involving students in two groups:namely; Experimental and control groups. Two research questions and two hypotheses guided the study and tested at 0.05 level of significance. The population and sample of the study consists of all the 80 National Technical Certificate (NTC) 11 students offering fabrication and welding in the four technical colleges selected. The instruments used for data collection were the Fabrication and Welding Achievement Test (FWAT) and Fabrication and Welding Interest Inventory (FWII). The reliability co-efficient using Cronbach alpha for interest and Kuder-Richardson for achievement yields 0.76 and 0.74 respectively. Mean and Standard deviation were used to answer the research questions, while Z-score was used to test the hypotheses. Based on the findings, students thought with teacher constructivist model performed better than those taught with conventional teaching method, and also have higher interest in fabrication and welding. Recommendation were made pertaining to the findings of the study.

Introduction:-

Technical colleges are the institutions where students are trained to acquire relevant skills and knowledge in different occupational area for employment either self-employed or white-collar job. National Policy on Education (NPE,2013) defined technical colleges as a segment of Vocational and Technical Education (VTE) as a programme designed to produce craftsmen at junior and senior secondary level of education. The goals of technical colleges are to produce and provide trainedlow-level manpower in the applied sciences, technology and business especially at craft, advanced craft and business; provide technical knowledge and vocational skills needed for agricultural, commercial, economic development, and to impact necessary skills, and training to individual who will be self-reliance economically.

According to Umandi (2019), technical colleges are vocational institutions in Nigeria which are primarily designed to prepare individual to acquire skills, attitude and knowledge at sub-professional level and principally established to train craftsmen in various occupation such as block laying, carpentry, and joinery, metalwork, fabrication and welding, electrical/electronics, vehicle body repair, automobile mechanic works among others. Therefore, it can be

Corresponding Author:- Ogunbote Shefiu
Address:- Department of Technology Education, Lagos State University of Education, Oto/Ijanikin, Lagos.

asserted that technical colleges are institutions where trades learnt are to produce competent craftsmen and master craftsmen for self-reliance in the world of work and, also for industrial and technologically advancement in Nigeria.

Many people refer to fabrication and welding as if they are of two different words for the same process. While both processes require working with metal; the terms are not interchangeable because fabrication can be said as the process of creating a product out of metal whilst welding is often part of that process. Fabrication and Welding are two essential processes in metalworking and they are skill based programme which are designed to carry out work, and, all sorts of welding, cutting on metals and, produced good finished structural work projects (NBTE,2014). Consequently, fabrication and welding are the processes used to shape, cut, and join metals to produce different products.

Teacher constructivist model is a model where learners interpret new experience with already existing knowledge. It is a method that foster active leaners participation during teaching and learning process. It shifts teaching from telling-listening to complex and interactive relationship where the learners own efforts to understand is the main focus. Chang (2019), opined that constructivist learning model is an interactive building on what the students have known and the teacher role is directive rooted on negotiation. Also, Royles (2013) affirmed that constructivist leaning model involves mastery of task in a meaningful and realistic environment that will enable students to build knowledge based on interpretation and significance of experience gained. Thereby, every student has his own way of understanding as they are not conveyed nor copied by the mind of the teacher to the students but based on understanding of meaning. It implies that learning through interpretation of experience gained bridge the gap about difficulty in learning of the task often associated with the conventional teaching which sometimes made students easily forget what they are taught.

Interest here, can be described as act of showing sense of concern with activities that arouse an individual either to like or dislike an activity (Okoro,2016). Also, Georgia & Maria (2011) opined that the result provides reasonable reason of academic achievement which depends on interest advancement in subject matter, In the words of O'keefe; Horberg&Plante (2017), they asserted that intercession of students is directly linked to academic achievement in content-specific activities. Interest can therefore, be defined as positive mind in developing and responding to the learning process or activities which depends on likes and dislikes depending on the individuals involved.

Academic Achievement represent the outcome that includes the extent to which a student accomplished specific goal based on the focus of activities in school. Eze,Ezenwafor&Molokun (2015) stressed that academic achievement is used to determine student's accomplishment in educational institution or how the students are able to successfully meet the standard set-out by the examining bodies or institutions. In their own assertion, Eze, Ezenwafor&Obidile (2016), says that a student academic achievement is dependent and measure on some factors such as, teacher attitudes, interest and involvements, instructional methods as well as students'academicbackground. In supporting this view, Olori&Igbosanu (2016), posited that students' academic achievement depends on instructional techniques used by the teacher, working at higher altitudes, interestand, retention. Therefore, the outcome of what the students learned is an indicators of the effects of the teaching method, as it is procedurally measure according to the resultant of the result obtained by the students.

Conventional Teaching Method is the method where teacher plays the primary roles in teaching,while the students remain passive.In this method, the teacher presents his topic, ask questions, use textbook and other teaching aids, if any for the purpose of classroom evaluation. Here, the learning is based on repetition, teacher roles is directive, and rooted in authority.

Statement of the Problem

The methods of teaching and learning today have significantly changed from the style that were originally designed. Today's students think, work, and learn differently but most of our schools still based on conventional mode of teaching, memorization, and contents-based test which has been ascribes as out of contexts in today teaching environments. National Board of Technical Education (NBTE) accredit the programmes in the technical colleges while the National Business and Technical Education Board (NABTEB) conducts the final examination and award certificate. They are awarded either National Technical Certificate (NTC) at craft level and Advanced National Technical Certificate (ANTC) at advanced craft level.

However, based on report of NABTEB examination in technical colleges in November/December,2019, results revealed that students recorded poor performance in fabrication and welding technology (NABTEB,2019). This high rate of failure of technical colleges students in fabrication and welding in final NABTEB examination is very alarming and gradually increasing every year (Ogundola, Popoola& Oke,2010). The deficiencies have been linked to failure of technical college products to secure employment and also, affect them in furthering their education. Many of them have now turned to cybercrimes, kidnappers, robbersand all sorts of atrocities in the country.

One of the reasons that caused the continualpoor academic achievement of technical college students in the final NABTEB Examination has been poor method of teaching fabrication and welding arising from the conventional teaching method which is teacher centred style. This view was supported by Diraso& Olive (2021), they stressed that mastery of subject matter could or might not be fully reachable without the use of innovative teaching methods and instructional materials. This prompted the researcher to investigate the effects of teacher constructivist model and interest on students' academic achievement in fabrication and welding in technical colleges in Lagos state.

Purpose of the Study

The purpose of the study sought to:

1. Ascertain if differences exist in the mean achievement scores of students' taught fabrication and welding using Teacher Constructivist Model (TCM) and those taught using Conventional Teaching Method (CTM).
2. Ascertain if differences exist in the mean interest scores of students' taught fabrication and welding using Teacher Constructivist Model and those taught using Conventional Teaching Method.

Research Questions

The following research questions guided the study:

1. What are the mean achievement scores of students' taught fabrication and welding using Teacher Constructivist Model (TCM) and those taught using Conventional Teaching Method (CTM).
2. What are the mean interest scores of students' taught fabrication and welding using Teacher Constructivist Model and those taught using Conventional Teaching Method.

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There is no significant difference between the mean achievement scores of students' taught fabrication and welding using Teacher Constructivist Model (TCM) and those taught using Conventional Teaching Method (CTM).
2. There is no significant difference in mean interest scores of students' taught fabrication and welding using Teacher Constructivist Model (TCM) and those taught using Conventional Teaching Method (CTM).

Significance of the Study:-

The findings of this study would have immersed benefits to the following groups: Students, Teachers, Curriculum planners and Education policy makers and further research.

Students

The study will enhance their academic achievement, arouse their interest and retention thereby acquiring skills and competencies needed in fabrication and welding in the world of work.

Technical teachers

The study will guide them how to effectively and efficiently utilize teacher constructivist model in teaching and learning of fabrication and welding in order for the students to attain higher level in their academics.

Curriculum planner and education policy maker

This study will provide them with the best and effective teaching method to be used in fabrication and welding and made recommendations accordingly.

Further Research

The findings of this study will provide pre-knowledge and data for further inquiry in related or aligned areas of research. This would significantly improve knowledge.

Methods:-

The study was conducted in four out of six technical colleges in Lagos state.The researcher obtained permission from the colleges for the administration and participation of the selected students and teachers. Orientation was given in the first week with the research assistants.The teachers in the experimental group were trained on how to conduct the test and were given prepared lesson plan and verified the extent to which items were effective for testing the topic thatwas meant to test, and was validated by these experts in the field of fabrication and welding. Each lesson lasted 80 minutes and the teaching was conducted using normal school timetable period.The population and sample of the study was Eighty (80) all Year Two National Technical Certificate (NTC) Students offering Fabrication and Welding.

Simple random sampling was used to assigned the students to the two class which are experimental and control classes and it comprises of 40 students in each class. The instruments for data collection are Fabrication and Welding Achievement Test (FWAT) adapted from NABTEB past question between 2018 and 2021 and contained 40 multiple questiontest items with four options A-D and Fabrication and Welding Interest Inventory (FWII) items of 20 items constructed using table of specification and was developed based on literature review.

The pre-test was administeredto the students with the help of researchassistants in orderto determine the initial abilities of the students prior to the experiment.Teaching commence in the second week and ended in the fifthThe instruments were re-arranged after the pre-test. In the sixth week, post-test was administeredby the selected teachers to both students in experimental group and control group and data was provided for the each of the variables.

The pre-test and post-test data were obtained and were analysed using mean and standard deviation to answer researchquestions and Z-testwas used to test the hypotheses. Where the p-value is less or equal to 0.05 level of significance, the null hypotheses will be rejected but if p-value is greater than the level of significance (0.05) the null hypotheses will be accepted.

Results:-

Research Question 1:

What are the mean achievement scores of students' taught fabrication and welding using teacher constructivist model and those taught with conventional method of teaching?

Table 1:- Mean and Standard Deviation of fabrication and welding achievement test on students taught using teacher constructivist model and those taught using conventional teaching method.

Group	No of Students(N)	Mean Score (x)	Standard Deviation (SD)
Teacher Constructivist Model	40	58.6	7.92
Conventional Teaching Method	40	39.8	22.28

The data above indicates that the teacher constructivist fabrication and welding model group have a higher mean score of 58.6 and standard deviation 7.92 than their counterpart taught using conventional teaching method with a mean of 39.8 and standard deviation of 22.28.

Hypothesis 1:

There is no significant difference ($P< 0.05$) between the mean achievement scores of fabrication and welding achievement test on Students' taught using teacher constructivist model and those taught using conventional teaching method.

Table 2:- Z-Test Analysis of the mean achievement scores of students' taught fabrication and welding using Teacher Constructivist Model (TCM) and those taught using Conventional Teaching Method (CTM).

Group	No of Students	Mean (x)	SD	Z-Cal	Z-table
Teacher Constructivist Model	40	58.6	7.92		
				4.81	1.67
Conventional Teaching Method	40	39.8	22.28		

The results in table indicates that Z-calculated (4.81) was greater than Z-table value (1.96) at 78 df. This implies that there is a significant difference between the group of students taught using the teacher constructivist model and those taught using conventional teaching method (CTM). Therefore, the hypothesis that says there is no significant difference in themean achievement scores of fabrication and welding on Students' taught using teacher constructivist model and those taught using conventional teaching method.is hereby rejected.

Research Question 2: Whatare the mean interest scores of students' taught fabrication and welding using Teacher Constructivist Model and those taught using Conventional Teaching Method.

Table 3:- Mean and Standard deviation of the mean interest scores of students' taught fabrication and welding using Teacher Constructivist Model and those taught using Conventional Teaching Method.

Group	No of Students (N)	Mean Interest (x)	Standard Deviation (SD)
Teacher Constructivist Model	40	30.03	30.99
Conventional Teaching Method	40	18.58	16.78

Table 3: Indicates that the Teacher Constructivist model group had a mean interest score of 30.03 and SD of 30.79 while Conventional Teaching Method group have a mean interest of 18.58 and SD of 16.78. this implies that fabrication and welding students taught with teacher constructivist model have higher interest than those taught using the conventional teaching method.

Hypothesis 2: There is no significant difference between the mean interest score of students taught fabrication and welding using teacher constructivist model and those taught using the conventional teaching method.

Table 4:- Z-test analysis of mean interest scores of students' taught fabrication and welding using Teacher Constructivist Model and those taught using Conventional Teaching Method.

Group	Mean (x)	Standard Deviation (SD)	Z-Cal	Z-table
Teacher Constructivist Model	30.03	30.79	2.06	1.67
Conventional Teaching Method	18.58	16.78		

Based on the calculated Z-value (2.06) which is greater than Z-table value (1.67) at 78df, it means that the null hypothesis that states there is no significance interest in mean scores of students' taught fabrication and welding using Teacher Constructivist Model and those taught using Conventional Teaching Method is hereby rejected. Therefore, there is a significant difference between mean interest scores of students' taught fabrication and welding using Teacher Constructivist Model and those taught using Conventional Teaching Method.

Discussion:-

The analyses of the two groups (students taught with teacher constructivist model and those taught with convectional Teaching Method) indicates that the experimental groups have a higher mean than the control group. Also, Z-test analysis of both groups in hypothesis 1 and 2 shows that there is a significant difference with students taught with students taught with teacher constructivist model and those taught with convectional Teaching Method and having positive effects of academic achievement in fabrication and welding students. The findings is in line with Matijevic,Topolovcan&Rajc (2017); Diraso,Abdullahi&Olive (2021) and Zhang (2019).

Also, the analysis of the interest of the experimental group and control group indicate positive mean interest score in favour of the Teacher constructivist model. The findings are in line with O'keefe,Horberg&Plate (2017) and Akanwa&Ovute (2014).

Therefore, the use of teacher constructivist model enhances learning and performance as well as interest in fabrication and welding in technical colleges.

Conclusion:-

The study investigates the effects of teacher constructivist model and interest on students' academic achievement in fabrication and welding in technical collegesin Lagos state. The findings indicate that teacher constructivist model in teaching and learning fabrication and welding in technical colleges, with higher academic achievement and interest achieved. Also, since teacher constructivist model is innovative, creative and effective in teaching fabrication and welding, teacher in technical colleges are enjoined to adopt the method so as to let the students be more active and have interest in fabrication and welding.

Recommendations:-

Based on the findings of this study, the following recommendations are made:

1. Teacher constructivist model should be used in teaching fabrication and welding in order to produce efficient and effective higher achievement in technicalcolleges.
2. Regular workshop,conferences, and seminar should be organised in upgrading the teacher knowledge of using constructivist model in teaching.
3. 3. Field trips, practical and excursion should be adopted in improving the interest of students in fabrication and welding.
4. 4. Availability of teaching aids and resources for effective teaching and learning of fabrication and welding which will thereby increase the interest of the students.
5. There is need for curriculum planner and educational policymakers to re-structure the mode of teaching fabrication and welding in a way to accommodate and suits teacher constructivist model

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