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Effects of constructivist approach on students' interest in automobile transmission system in tertiary institutions of north-eastern, Nigeria

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Abstract
This study investigated the effects of constructivist instructional approach on students' academic achievement in automobile transmission system in tertiary institutions of North- Eastern Nigeria. The study was guided by four objectives, four research questions. Quasi experimental research design non randomize control group was used for the study. The population of the study was 592 NCE I students that offered Auto-mechanic 1 (automobile transmission system) students in the seven tertiary institutions 2021/2022 academic session. The study used an intact class from two institutions out of seven with 143 students that participated in the study. The instrument for data collection was multiple choice test titled Automobile Technology Achievement Test (ATAT). Split-half method was used to determine the reliability of the instrument. The validation of the instruments took the form of face and content validation by three experts. The pre-test (Achievement) were administered before the treatment and post-test (Achievement) were administered after the treatment. The results collected were analyzed using descriptive statistics to answer the research questions at the 0.05 level of significance. The result revealed among others that constructivist teaching approach has significant effects on students' academic achievement and interest in automobile transmission system. It was concluded that adoption of constructivist instructional approach will help towards addressing the low achievement and enhance the interest of students in automobile transmission system. Based on the result automobile teaching should be encourage by using constructivist instructional approach in their teaching.

Keywords: Constructivist, automobile transmission, Nigerias

Introduction

The demands for automobiles in Nigeria have continued to increase following the collapse of the rail transport system in the midst of undeveloped inland water ways and a very high cost of air transport which is also plagued by high rate of mishaps Molenda and Pershing (2018) in its bid to meet up with these demands Nigeria in 1970 to 1985 established about six automobile car manufacturing industries which include Peugeot Automobile Nigeria limited (PAN), Anambra Motor Manufacturing (ANAMMCO), Volkwagen Nigerian Ltd (VWN), Steyr Nigeria Ltd, National Trucks Manufacturers, and Leyland Nigerian Ltd (Shehu, Birniwa, Audu, Eric, Jibrin, & Abubakar 2016).

According to the former minister of trade and investment Aganga automobile industry is an engine of growth and stimulus to other economic activities like creation of employment opportunities, growth of the satellite industries, and enhanced technology transfer of skill acquisition (Punch Newspaper, 2011). Due to the establishment of the automobile industries in the country, the economy of the country has been improving tremendously.

It was recorded that there has been decline in the production of automobile, some of the automobile industries that were established between 70s and 80s are no longer in operation, as a result of challenges that has befell on them. About 75% existing automobile companies in Nigeria today deal only with car sales, also about 80% of these automobiles today are fairly used cars imported from other countries popularly known as Tukumbo (Murphy, 2017). This made the country to be totally dependent on foreign countries for the production of cars which reduced the zeal, interest and determination of most of our students and stake holders in making effort towards automobile technology in Nigeria.

Automobile transmission system is one of the technical education courses offered in the university and NCE (T) awarding institutions. Technical teachers graduating from these institutions are expected to teach basic technology in either senior secondary schools or junior technical colleges, and specialized in a specialization such as Automobile, Construction, Electrical/electronic, metal work or wood working Ttechnology education. This is also in line with the philosophy of the Nigeria Certificate in Education (NCE) technical programme, to provide technical teachers with the intellectual and professional background adequate for teaching technical subjects and to make them suitable for any changing situation in technological development, not only in the country, but in the world at large (NCCE, 2008).

To ensure the realization of the automobile technology trade objectives, the curriculum of automobile technology in colleges of education is made up of five components namely; general education subjects, trade, theory, relative studies and workshop (Aganga, 2013).

The aims of the Nigeria certificate in education technical (NCE) Technical programme, is to provide technical teachers with the intellectual and professional background adequate for teaching technical subjects (NCCE 2008). According to Gallagher (2017) academic achievement is the outcome of education; is the extent to which a student, teacher or instructor achieved their educational goals. Thus, achievement is characterized by outcome of test associated with course or group of courses obtained by the student and expressed in terms of grades (Gatlin, 2018).

Various studies have been carried out on the factors that affect students' academic achievement in schools. Some of

the factors reported to have been affecting the academic achievement of students are: students' effort, previous or prior educational achievement, self-motivation, social-economic status of parents, the students' age, number of hours of study per day, admission requirement and entry qualification, tuition fees and the students' accommodations (Adesoji, 2015). This Indicated that in order to bring desirable changes in the students' academic achievement the teaching method used by teachers should be based on the subject matter. Furthermore, Brown, Green and Lauder (2017) stated that teaching methods work effectively when every learner interprets and responds to questions in a unique way. As such, alignment of teaching methods with students' needs and preferred learning influence students' academic achievement (Colburn, 2013).

Aappropriate strategy for teaching automobile technology related subjects may foster the academic achievements of automobile technology students in Nigerian Certificate in Education (Technical). It is observed that students' achievement can note achieve in school subjects as symbolized by a score on an achievement test. Furthermore, the achievement is quantified by a measure of the student's academic standing in relation to those of other students of his/her age (Collins, 2015), therefore poor academic achievement by the majority students is fundamentally linked to application of ineffective teaching methods by teachers that impact knowledge to the learners. Substantial research on the effectiveness of teaching methods such as Fox (2001) have indicated that the quality of teaching is often reflected by the achievements of learners.

Teaching is a process that involves bringing about desirable changes in learners so as to achieve specific outcomes. In order for the method used for teaching to be effective, he maintains that teachers need to be conversant with numerous teaching approach that take recognition of the magnitude of complexity of the concepts to be covered.

It is hope that teachers should use teaching approach which will ensures active involvement and participation of student in the teaching and learning, therefore need to have better strategy that will assist student in automobile transmission system work and improve their academic achievement has become most important to automobile technology teachers and provide suitable learning environment to improve achievement of the automobile students in tertiary institutions of north-eastern Nigeria.

1. Problem Statement

The most popular and cheapest means of transport in Nigeria is road transport, its automotive motor vehicle to be specified. It has been observed by Dogru and Suna (2017) that many automobile technology courses are very difficult for students to offer in the institutions offering NCE (Technical). The students are expected to acquire the skills for self-reliance or join other institution to further their studies. Lack of interest by automobile students on that trend has resulted to a situation where by most of the NCE awarding institutions admits students in their choosing career while the few that were admitted achieve below average in the examinations 2018/2019 academic session result. Feden (2014) also pointed out that majority of the student are not interested in automobile technology. He further stated that, one of the reason why student have negative attitude toward the trade, was that in the automobile work, the students are being taught using an approaches which will neither develop their interest nor improve their academic achievement similarly, Henson (2014) Identify lack of interest, right, attitude and behavior of automobile technology graduates as one of the challenge facing the trade, This however due to in appropriate use of unsuitable approaches in teaching and learning of automobile transmission system. learning of automobile will be relevant and challenging. The students will work harder and make deeper connections between and within component (Hobden, 2017). Base on above statement, this study therefore intends to focus on constructivist instructional approach with the view to ascertain its effect on the student's achievement in Automobile transmission system at NCE (Technical) awarding institutions of North-Eastern Nigeria.

Literature Review

Constructivist is a psychological theory of knowledge which argued that human construct Knowledge and meaning from their experiences. It is a set of beliefs about knowledge that begins with the assumption that reality exists but cannot be known as a set of truth (Gergen, 2015). Constructivist is not accepting what you are told but your prior knowledge about what you are taught and your perceptions about it. Active involvement of students is emphasized in constructivist, hence knowledge gained last long in their memory.

It is also not a new concept; it has it roots in philosophy and has been applied to sociology and anthropology as well as cognitive psychology and education. Perhaps the first constructivist philosopher, Giambatista Vico, commented in a treatise in 1710 that "one only knows something if one can explain it" Iroegbu (2017) further elaborated this idea by asserting that human beings are not passive recipients of information. Learners actively take knowledge, connect it to previously assimilated knowledge and make it they're by constructing their own interpretation (Feenberg, 2016). Five basic themes pervade the diversity of theories expressing constructivist. These themes are (1) active agency, (2) order, (3) self, (4) social-symbolic relatedness, and (5) lifespan development.

1. Nigeria Automobile industry

Nigeria is one of the populous economies in the world and with economic growth the demand for vehicle will grow significantly. The effect of this on the balance of payment will be significantly and potentially destabilizing. Other large economies tend to have automotive industries and can there by mitigate the balance of payment effect of this large industry by providing a large part their automotive needs through domestic production as well as as export to compensate for import (NAC, 2014). It will be difficult for man to go to work place, school, market, mosque, and churches or convey loads to long distances without the use of automobile, one can say that automobile has become part of our living (Yager, 2016). This is in line with the opinion of Young and Colin (2016) establishment of fundamental automobile industries in Nigeria will boost the economic activities and improve considerably in in many areas. The transportation of petroleum product, agricultural produce and will make people travel with ease from one location to another.

2. Type of automobile transmission system

While manual transmissions have remained relatively unchanged over the years, electronically controlled automatic, semi-automatic, and continuously variable transmissions (CVTs) have become increasingly complex, but also easier to use than ever before. However, modern transmissions of all types have become more prone to failure, primarily because of this higher level of complexity. The following guide outlines the inner workings and differences between the most common types of transmissions and list the primary advantage and disadvantage of each.

1. Manual transmission system
2. Fully automated transmission system
3. Semi-Automatic Transmission system

3. Concept of Achievement

Achievement has to do with successful completion of a given task. Academic achievement on the other hand, has to do with successful completion of an academic task by a student in a school. In other words, it has to do with students' achievement in school subjects determined by a score or an achievement test. Academic achievement is commonly measured by examination or continuous assessment. Molenda and Pershing (2018) is of the view that goal achievement might be focused on the task or end result. A student who performs well in school can be said to record high academic achievement and a student whose results are not good can be said to have recorded poor academic achievement. In other words, academic achievement can be either high or low, depending on the achievement of students.

Methodology

1. Design of the Study

The research design adopted in this study was quasi-experimental non-randomized control group design. Quasi-experimental design can be used when it is not possible for the researcher to randomly sample the subject and assign them to treatment groups without disrupting the academic programmes of the schools involved in the study (Alant, 2014). The broken lines in the diagram separating the two groups indicated that no randomization was employed in order to assure the equivalence of the two groups.

The reason for adopting the quasi-experimental design was that intact classes was used by the researcher; quasi-experimental design did not involve randomization of participating units as applied in the true experimental designs. If random selection in true experimental design was used, the school principal or head teacher may not allow the splitting of classes, since it was likely disrupting normal school programme. The type of quasi experimental design used was pre-test post test non-equivalent control group which involves two groups described in Table 1.

Table 1: Quasi Experimental non-equivalent control group

S/no	Group	Pre-Test	Treatment	Post-Test
1	EG	01	X	02
2	CG	03	-	04

Source: (Sambo, 2014).

EG = Experimental Group and
CG = Control Group.
01 and 03 = Pre-test administered to EG and CG respectively.
02 and 04 = Post-test administered to EG and CG respectively.
X = Treatment.
- = No Treatment

2. Area of the Study

The area of the study will be North-east geopolitical zone of Nigeria. It was created on the 27 May 1967 from part of the northern region. Its capital was the city of Maiduguri. It is also full of Agriculture and food and now one of the geopolitical zones of Nigeria, consisting of the following states Bauchi, Adamawa, Gombe, Borno, Taraba and Yobe it occupied slightly less than one third of Nigeria`s total area per square and had a projected population of 23,558,674 representing 13.5% of the
country population (NPC, 2011). The study will be carried out in all the tertiary institution offering Nigeria certificate of education (Technical) within the region, only duly accredited NCE programme was considered.

3. Population for the Study

The population of this study comprise of 592 NCE one students offering Auto-Mechanics I (Transmission System, TED 125) in the seven selected Nigeria Certificate of Education, (Technical) awarding institutions. The breakdown of the populations will be presented in Table 2

Table 2: The population of NCE I (Technical) students according to institutions in the North – Eastern Nigeria below

S/n	name of institutions	States	location	Students
1	federal college of education (technical) gombe	Gombe	Gombe	76
2	Federal College of Education (Technical) Patiskum	Yobe	Potiskum	67
3	Adamawa State College of Education, Hong	Adamawa	Hong	97
4	College of Education, Jalingo	Taraba	Jalingo	89
5	Aminu Saleh College of Education, Azare	Bauchi	Azare	78
6	Abubakar Tatari Ali Polytechnic, Bauchi	Bauchi	Bauchi	102
7	Ramat Polytechnic, Maiduguri	Borno	Maiduguri	83

3.4 Design of the Study

The research design adopted in this study will be quasi-experimental non-randomized control group design. Quasi-experimental design can be used when it is not possible for the researcher to randomly sample the subject and assign them to treatment groups without disrupting the academic programmed of the schools involved in the study (Alant, 2014). The broken lines in the diagram separating the two groups indicated that no randomization was employed in order to assure the equivalence of the two groups.

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X = Treatment.
- = No Treatment

5. Instruments for Data Collection
The instruments used for this study will be Automobile Technology Achievement Test (ATAT) The Automobile Technology Achievement Test (ATAT) contained 30 multiple choice questions. The instrument covers the content areas of the topic that will be selected for the study.

6. Method of Data Collection
In the first phase of the data collection, the researcher trained the research assistants, creates rapport with the subjects and administered the pre-test to the respondent. then second, the students will be taught separately guided by the lesson plans. The experimental group will be thought using constructivist instructional approach while the other group (control), will be thought with conventional approaches for a period of five weeks with the revision of one week guided by lesson plan. After the exercise, the researcher assisted by research assistants administered the post-test achievement test and the interest scale. The scripts of the test will be mark by the researcher guided by the marking scheme and the exercise will last for seven weeks.

Method of Data Analysis
Data collected were coded into Statistical Package of Social Science (SPSS, 23). The package used to run descriptive statistics of mean and standard deviation which will be use to answer the research questions. The null hypotheses will be tested using t-test analysis at 0.05 level of significant. According to Uzoagulu (2011) t-test is traditionally use to compare the means of two or more groups or event investigated through experimental design procedure**.**
Effect of constructivist instructional approach on class participation of automobile transmission system students in tertiary institutions in the north eastern Nigeria.
The finding of research question one and revealed that there was no significant difference in the pre-test mean achievement scores of automobile transmission system students in experimental groups and that of the control group. Therefore, the constructivist instructional approach has no or less effect on the academic achievement of students in automobile transmission system and the conventional.

1. Research Question One
What is the difference between the pre-test mean achievement scores of automobile transmission system students in experimental groups and those in control group in tertiary institutions of north-eastern, Nigeria?

The outcome of the descriptive statistics in Table 3 below, shows that the pre-test means achievement score of automobile transmission system students in experimental groups (M = 13.45, SD = 2.283) is greater than the pre-test means achievement of automobile students in control group (M = 13.42, SD = 3.818). The different in the mean result is given by (D = 0.03). The finding suggested that there is no much difference in the pre-test mean achievement scores of automobile transmission system students in experimental groups and that of the control group.

Table 4: Descriptive statistics of pre-test scores of experimental and control groups

Group	N	Mean	Std. Deviation	Difference
E.	76	13.45	2.283	
Cont.	67	13.42	3.818	
Total	143			0.03

2. Research Question Two
What is the difference between the post-test mean achievement scores of automobile transmission system students in experimental groups and those in control group in tertiary institutions of north-eastern, Nigeria?
The result in Table 4 below, shows that there was a difference in the post-test mean achievement scores of experimental group students (M = 22.78, SD = 3.546) and control group students (M = 13.44, SD = 3.621). The differentnt in the mean result is given by (D = 9.34). The finding This indicates that, the students of constructivist instructional approach performed better in automobile transmission system than of their counterparts in the control group.

Table 6: Descriptive statistics of post-test scores of experimental and control groups

Group	N	Mean	Std. Deviation	Difference
EXp.	76	22.78	3.546	
Cont.	67	13.44	3.621	
Total	143			9.34

3. Findings of the Studies
The finding of research question one and revealed that there was no significant difference in the pre-test mean achievement scores of automobile transmission system students in experimental groups and that of the control group. Therefore, the constructivist instructional approach has no or less effect on the academic achievement of students in automobile transmission system and the conventional
instructional approach.
The finding of research question two indicated that there was a significant difference between the post-test mean achievement scores of experimental and that of control group. In that the constructivist instructional approach has positive in fact on the academic achievement of students in automobile transmission system than the conventional instructional approach.

Conclusion
Prior to the treatment there was no significant difference between the academic achievement and interest of the students in automobile transmission system in experimental and that of the control groups. The result indicated that there was significant difference in the post-test of the students

after the treatment. The results demonstrate that the constructivist instructional approach has positive effects on the academic achievement of students in automobile transmission system. It is therefore concluded that the adoption of constructivist instructional approach will help to address the low achievement and enhance the interest of students in the automobile transmission system. This will help to facilitate the graduation period in the course.

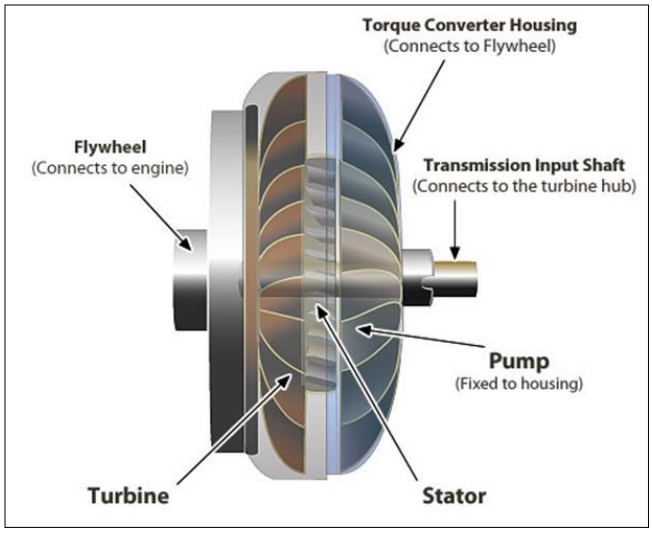

Fig 2: Torque Converter

Fig 3: Continuously Variable Transmissions (CVT)

1. Recommendations

Based on the outcome of the study, it was recommended that:

1. Students should be taught automobile transmission system using constructivist instructional approach.
2. Automobile teachers should create enabling environment for students to actively participate in the class while teaching automobile transmission system.
3. Automobile teachers should create rapport with the students that will help them to develop interest in the automobile transmission system.
4. The school environment should create enabling environment for the use of constructivist instructional approach in the teaching automobile transmission system.

2. Suggestions for Further Studies

The following Suggestions recommended for further studies

1. The study should be replicated in other zones, this will give room for generalization
2. Effect of constructivist instructional approach on academic retention of automobile transmission system students in tertiary institutions in the north eastern Nigeria.
3. Effect of constructivist instructional approach on class participation of automobile transmission system students in tertiary institutions in the north eastern Nigeria.

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