

## Determination of Teaching Methods for Improving Students' Interest in Automobile Technology Education Subjects in Colleges of Education in South East, Nigeria

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### Abstract

*The study was conducted to determine teaching methods for improving students' interest in automobile technology education programme in colleges of education in South East, Nigeria. Two research questions and two null hypotheses guided the study. Descriptive survey research design was adopted. The entire population of 68 automobile technology educators in the eight public colleges of education in South East, Nigeria was studied without sampling. A validated four-point rating scale questionnaire containing 17 items was used for data collection. Cronbach alpha co-efficient used to establish the reliability of the instrument yielded an overall coefficient of 0.78. Mean and standard deviation were used to answer the research questions while t-test was used to test the null hypotheses at 0.05 level of significance. Findings of the study revealed that activity-based teaching methods and interactive teaching methods can improve students' interest in automobile technology education programme in colleges of education in South East, Nigeria. The study concluded that the utilization of activity-based methods such as (project-based method, group investigation method, internship method, experiential method and apprenticeship method) and interactive teaching methods like (think-pair share method, group discussion method, guest speaker presentations method, brainstorming method and interactive whiteboard method) will not only improve students' interest in automobile technology education programme but can also equip them to diagnose and repairs automobiles effectively in the society. Among others, it was recommended that curriculum planners should incorporate activity-based and interactive teaching methods into the curriculum of automobile technology education in colleges of education to equip teacher-trainees with the instructional competencies to appropriately use them in teaching automobile technology education courses.*

**Keywords:** Colleges of education, teaching methods, automobile technology education, interest, activity-based teaching methods and interactive teaching methods

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### Introduction

Tertiary institutions are citadels of knowledge that produce highly skilled specialists required to serve the needs of the society. In Nigeria, tertiary institutions cover higher learning institutions such as

universities, polytechnics, vocational schools, colleges of agriculture, schools of health and technology including colleges of education. Onokpaunu (2023) postulated that colleges of education, irrespective of their conventional, technical and ownership status (federal/state)

are principally established to produce professional and competent teachers with satisfactory mastery of primary and secondary school subjects. In addition, Onokpaunu and Ezenwafor (2023) professed that colleges of education offer specialized vocational and technical educational programmes that usually run for three years leading to the award of the Nigeria Certificate in Education (NCE). One of the specialized areas of vocational and technical educational programmes offered in colleges of education in Nigeria is automobile technology education.

Automobile technology education is a specialized vocational and technical education programme that covers the design, construction, maintenance and repairs of automobiles with engines. Caixia, Xiaowei, Feng and Neng (2024) claimed that automobile technology education is connected with scientific principles and knowledge applied in the design and construction of old and modern vehicles. Ezeama (2016) remarked that graduates of automobile technology education are expected to test, diagnose, service and completely repair any fault relating to the old and modern vehicles and also assemble main units and systems of automobiles by following the manufacturers' specifications. Upon graduation, Babayo, Babawuro, Adamu and Umar (2021) avowed those graduates of automobile technology education are equipped with relevant skills and knowledge to be able to efficiently carry out maintenance work and repairs on highly automated engines and computerized automobiles.

Automobile technology education exposes students to the necessary skills needed to start-up maintenance and repair workshops in the society. Students can only be proficient in handling the maintenance and repairs of cutting-edge automobiles when automobile technology educators employ appropriate teaching methods capable of increasing the awareness and understanding of

students to the development trends of the automobile industry. Teaching is a process of imparting knowledge within and outside the classroom for students to learn effectively. Eze and Nwaukwa (2018) argued that teaching methods are set of strategic activities employed by teachers for transferring knowledge, skills and positive attitudes intended at transforming learners into enterprising individuals. Some of the common methods of teaching vocational and technical subjects as identified by Ahmad, Nordin, Ali, Nabil and Latip (2017) include traditional teaching methods such as demonstration method, lecture method, case studies and programmed instruction (Anwer, 2019); activity-based strategies and specialized workshops strategies (Sarpong, Sarpong & Asor, 2020); and interactive teaching methods (Giorgdze & Dgebuadze, 2017).

The researchers focused on activity-based teaching methods and interactive teaching methods because they provide lifelong learning value for students to succeed in their careers upon graduation. In a classroom where activity-based teaching methods are implemented, the students must think, create and solve problems rather than passively listen to lectures provided by their educators (Anwer, 2019). Ajayi (2017) averred that internship, flipped classroom, group investigation, Field trip and apprenticeship among others are various forms of activity-based teaching methods. When activity-based teaching methods are implemented in the classroom, the students participate absolutely by learning by doing. Learning by doing is the fundamental focal point of activity-based teaching methods, and the more a student knows, the longer he/she retains knowledge (Siaw, 2019). Activity-based teaching methods are based on the core premise that learning should be based on doing some hands-on experiments and activities rather than just listening to instructional contents of

educators in the classroom (Sarpong, Sarpong & Asor, 2020).

Activity-based teaching methods are anchored on action learning where students are encouraged to be self-guided in conducting experiments and projects while interactive teaching methods offer students the instructional opportunities to discover, imagine, build and redefine the meanings through the engagement, interaction, and feedback in the classroom. In a classroom where interactive teaching methods are applied, students actively participate in any educational activity, simulate professional situations, perform creative and research tasks, engage in discussions with fellow students, and learn to substantiate their point of view using arguments (Xhemajli, 2016). According to Amaechi and Thomas (2016), think-pair-share, guest speaker presentation, buzz session, brainstorming and roundtable teaching among others are various forms of interactive teaching methods. Hence, Atanasescu and Dumitr in Omojiriemu (2024) submitted that interactive teaching methods are instructional settings which allow confrontation of intelligent ideas and creative arguments between educators and learners on academic subjects.

The instructional engagements embedded in activity-based teaching methods and interactive teaching methods will not only make the classroom atmosphere active but will also increase students' thinking, enthusiasm and interest for knowledge about automobiles and automotive industry. According to George (2016), interest plays a major role in any undertaking as it influences devotion to firmness, honesty, endurance and discipline. Undeniably, students will achieve significantly in areas of learning they have interest, and achieve poorly in the areas they lack interest. The interest of students in automobile technology education in colleges of education plays a crucial role in the value they attached to the programme. Therefore, it

is up to automobile technology educators to make the course interesting, authentic and stimulating for students with the use of appropriate teaching methods.

Over the years, the lecture method of instructional delivery has been dominantly used in teaching automobile technology education courses in colleges of education in Nigeria. The lecture method focuses on the intellectual domain of learning while neglecting experiential learning aspect (Umar & Abdulmutallib, 2017). Although, the lecture method is effective in clarifying contextual information on subject matters, Adegunle (2016) posited that it is a one-way traffic of instruction which facilitate passive learning among students in the classroom. No wonder, Amos, Abdulkadir and Raymond (2022) professed that there is a poor psychomotor skill development, poor academic performances and low interest of students in automobile technology education programme. This has led to the production of auto-mechanics struggling to properly maintain and repair modern vehicles in different mechanic villages in Nigeria. This situation motivated the researchers to investigate teaching methods that can improve students' interest in automobile technology education programme in colleges of education in South East, Nigeria.

### **Statement of the Problem**

It is a common practice in colleges of education in South East, Nigeria for educators to stand by the chalkboard and deliver lessons through verbal instruction without students' active participation in the creation of knowledge. This instructional setting encourages rote memorization and it is not suitable to the practical nature of automobile technology education programme as students will not be able to acquire the requisite

industrial skills needed in the workplace. The incompetence of the graduates of automobile technology education programme in the workplace and poor academic achievement in the classroom may be attributed to the type of instruction received in the classroom.

It is not surprising that the researchers observed that some automobile technology education graduates cannot effectively carry out maintenance and repairs of automobiles on their own in workshops in South East, Nigeria. Hence, the clarion calls for new teaching methods that will help automobile technology education students to acquire the necessary knowledge and practical skills of the automobile workplace. It is with this understanding, the researchers posed to ask, if activity-based teaching methods and interactive teaching methods can improve students' interest in automobile technology education programme in colleges of education in South East, Nigeria? This is the problem that this study sought to solve.

### **Purpose of the Study**

Specifically, this study determined teaching methods for improving students' interest in automobile technology education programme in colleges of education in South East, Nigeria.

### **Research Question**

The following research questions guided the study:

1. What is the activity-based teaching methods for improving students' interest in automobile technology education programme in colleges of education in South East, Nigeria?
2. What are the interactive teaching methods for improving students' interest in automobile technology education programme in colleges of education in South East, Nigeria?

### **Hypotheses**

The following null hypotheses were tested at 0.05 level of significance

1. Automobile technology educators in Federal and State colleges of education do not differ significantly in the mean ratings on activity-based teaching methods for improving students' interest in automobile technology education programme in South East, Nigeria
2. Automobile technology educators in Federal and State colleges of education do not differ significantly in the mean ratings on interactive teaching methods for improving students' interest in automobile technology education programme in South East, Nigeria.

### **Method**

The study adopted descriptive survey research design. Descriptive survey research design makes it possible for the researchers to have a broad view from a sample of automobile technology educators on the teaching methods for improving students' interest in automobile technology education programme in colleges of education in South East, Nigeria. The population of the study comprised 27 automobile technology educators in three Federal colleges of education and 41 automobile technology educators in five State colleges of education in South East, Nigeria. There was no sampling because the entire population was studied. A structured and validated questionnaire containing 17 items on a four-point rating scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) was used for data collection. The reliability of the instrument was determined through a pilot test. Copies of the instrument were administered to 15 automobile technology educators in South South, Nigeria State who were not part of the research population. Data collected were analyzed using Cronbach alpha reliability method to determine the internal consistency of the instrument and co-efficients of 0.71 and 0.84 for clusters B1 and B2 respectively were obtained.

Copies of the questionnaire were administered to the respondents in their offices personally by the researchers with four research assistants. Out of the 68 copies of the questionnaire administered, only 61 copies (representing 90 percent) were successfully retrieved and used for data analysis. Mean and standard deviation were used to answer the research questions and determine the homogeneity or otherwise of the respondents' views. Decisions on the research questions were based on the grand mean in relations to the real limits of numbers. Therefore, items with mean ratings of 1.00 - 1.49 are rated Strongly Disagree, those with 1.50 - 2.49 are Disagree, items with mean ratings of 2.50 -

3.49 are rated Agree and those with 3.50 - 4.00 are rated Strongly Agree. In testing the null hypotheses at 0.05 level of significance, t-test was used. A hypothesis was accepted where the p-value is equal to or greater than the alpha level of 0.05 ( $p > 0.05$ ), at a degree of freedom; otherwise, the null hypothesis was rejected. The analysis was carried out using SPSS version 23.0.

**Results**

**Research Question 1**

What are the activity-based teaching methods for improving students' interest in automobile technology education programme in colleges of education in South East, Nigeria?

**Table 1: Respondents' mean ratings on activity-based teaching methods for improving students' interest in automobile technology education programme in colleges of education in South East, Nigeria**

S/N	Activity-based teaching methods	$\bar{X}$	SD	Remarks
1	Project-based method	3.97	.56	Strongly Agree
2	Group investigation method	3.80	.73	Strongly Agree
3	Flipped classroom method	3.14	.49	Agree
4	Internship method	3.90	.61	Strongly Agree
5	Discovery-based method	2.85	.52	Agree
6	Field trip method	2.76	.80	Agree
7	Experiential method	3.98	.62	Strongly Agree
8	Problem-based method	3.02	.44	Agree
9	Apprenticeship method	3.91	.86	Strongly Agree
<b>Cluster Mean</b>		<b>3.48</b>		

Data in Table 1 show that the respondents strongly agree with five items (item 1, 2, 4, 7 and 9) with mean scores ranging from 3.80 to 3.98 while the remaining four items with mean ratings ranging from 2.76 to 3.14 were agree by respondents as activity-based teaching methods for improving students' interest in automobile technology education programme. The cluster mean score of 3.48 indicates that the items listed were activity-based teaching methods for improving students' interest in automobile technology

education programme in colleges of education in South East, Nigeria. The standard deviations for the items are within the same range which shows that the respondents are homogeneous in their opinions.

**Research Question 2**

What are the interactive teaching methods for improving students' interest in automobile technology education programme in colleges of education in South East, Nigeria?

**Table 2**  
**Respondents’ mean ratings on interactive teaching methods for improving students’ interest in automobile technology education programme in colleges of education in South East, Nigeria**

Interactive teaching methods	$\bar{X}$	SD	Remarks
10 Think-pair share method	3.75	.52	Strongly Agree
11 Group discussion method	3.64	.88	Strongly Agree
12 Guest speaker presentations method	3.83	.41	Strongly Agree
13 Brainstorming method	3.79	.60	Strongly Agree
14 Buzz session method	2.71	.93	Agree
15 Roundtable classroom method	3.02	.75	Agree
16 Interactive whiteboard method	3.67	.46	Strongly Agree
17 Round robin method	2.88	.82	Agree
<b>Cluster Mean</b>	<b>3.41</b>		

Data in Table 2 show that the respondents strongly agree with five items (item 10, 11, 12, 13 and 16) with mean scores ranging from 3.64 to 3.83 while the remaining three items with mean ratings ranging from 2.71 to 3.02 were agree by respondents as interactive teaching methods for improving students’ interest in automobile technology education programme. The cluster mean score of 3.41 indicates that the items listed were interactive teaching methods for improving students’ interest in automobile technology

education programme in colleges of education in South East, Nigeria. The standard deviations for the items are within the same range which shows that the respondents are homogeneous in their opinions.

**Hypothesis 1**

Automobile technology educators in Federal and State colleges of education do not differ significantly in the mean ratings on activity-based teaching methods for improving students’ interest in automobile technology education programme in South East, Nigeria

**Table 3 Summary of t-test analysis of respondents’ mean ratings on activity-based teaching methods for improving students’ interest in automobile technology education programme based on institution ownership**

Ownership	N	$\bar{X}$	SD	df	t-value	p-value	Decision
State COEs	39	55.01	4.2559	.104	.166	Not Significant	
Federal COEs	22	41.78	3.69				

Result in Table 3 shows that the p-value is 0.166, which is greater than the significance level of 0.05 (p-value > 0.05). This indicates that there is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of education on the activity-based teaching methods for improving students’ interest in automobile technology education programme in South East, Nigeria. The null hypothesis of

no significant difference between the two groups is, therefore, not rejected.

**Hypothesis 2**

Automobile technology educators in Federal and State colleges of education do not differ significantly in the mean ratings on interactive teaching methods for improving students’ interest in automobile technology education programme in colleges of education in South East, Nigeria.

**Table 4** Summary of t-test analysis of respondents’ mean ratings on interactive teaching methods for improving students’ interest in automobile technology education programme based on institution ownership

Ownership	N	$\bar{x}$	SD	df	t-value	p-value	Decision
State COEs	39	60.49	5.16	59	.145	.137	Not Significant
Federal COEs	22	51.83	4.79				

Result in Table 4 shows that the p-value is .137, which is greater than the significance level of 0.05 (p-value > 0.05). This indicates that there is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of education on the interactive teaching methods for improving students’ interest in automobile technology education programme in South East, Nigeria. The null hypothesis of no significant difference between the two groups is, therefore, not rejected

**Discussion of findings**

Result of the study disclosed that automobile technology educators agree that the listed activity-based teaching methods can improve students’ interest in automobile technology education programme in colleges of education in South East, Nigeria. The study clearly shows that project-based method, group investigation method, internship method, experiential method and apprenticeship method improves students’ interest in automobile technology education programme in colleges of education. This finding is consistent with Obulor and Ndu (2019) who reported that relating lessons to real life situations and students personal experiences which are embedded in activity-based teaching methods improve students’ interest and participation in automobile technology education programme. The study reported that flipped classroom method, discovery-based method, field trip method and problem-based method improves students’ interest in automobile technology education programme in colleges of education. The finding of this study agrees with Amaechi and Thomas (2016) that the application of activity-

based teaching methods improve students interest on subject matters because these methods call on students to perform authentic tasks that emulate the kinds of work they will be expected to do after graduation.

In addition, the study revealed that there is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of education on the activity-based teaching methods for improving students’ interest in automobile technology education programme in South East, Nigeria. This finding means that automobile technology educators, irrespective of their institutional ownership shared the same position that the listed activity-based teaching methods can improve students’ interest in automobile technology education programme in colleges of education in South East, Nigeria. This finding supports, Anwer (2019) who discovered that educators collectively agree that activity-based teaching methods can improve students’ interest in the classroom because students are evaluated on the basis of what they do and the deliverables they produce rather than on memorization. Perhaps, this could be the reason why both automobile technology educators in Federal and State colleges of education believed that activity-based teaching methods greatly improve students’ interest in automobile technology education programme.

Outcome of the study disclosed that automobile technology educators agree that the listed interactive teaching methods can improve students’ interest in automobile technology education programme in colleges of education in South East, Nigeria. The study clearly reports that think-pair share method,

group discussion method, guest speaker presentations method, brainstorming method and interactive whiteboard method improves students' interest in automobile technology education programme in colleges of education. This finding is in tandem with Obulor and Ndu (2019) who discovered that the grouping of students for sharing of knowledge during instruction which is the philosophy of interactive teaching methods improve students' interest and participation in automobile technology education programme. The study reported that buzz session method, roundtable instructional method and round robin method improves students' interest in automobile technology education programme in colleges of education. The finding of this study agrees with Babayo, Babawuro, Adamu and Umar (2021) that the application of interactive teaching methods improve students interest on subject matters because these methods help students to develop creative thoughts and teamwork skills in identifying and finding solutions to faulty automobiles in workshops.

Additionally, the study disclosed that there is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of education on the activity-based teaching methods for improving students' interest in automobile technology education programme in South East, Nigeria. This finding means that automobile technology educators, irrespective of their institutional ownership shared the same position that the listed interactive teaching methods can improve students' interest in automobile technology education programme in colleges of education in South East, Nigeria. The findings corroborate the findings of Giorgdze and Dgebuadze (2017) who discovered that educators collectively agree that interactive teaching methods can improve students' interest in the classroom because learning is achieved through effective communication and collaboration. Perhaps,

this could be the reason why both automobile technology educators in Federal and State colleges of education believed that interactive teaching methods greatly improve students' interest in automobile technology education programme.

### **Conclusion**

Technological advancements in the automobile industry demands that automobile technology educators must use suitable teaching methods and techniques for improving students' interest and skill development in order to maintain and repair old and modern automobiles. Based on the findings of the study, the researchers concluded that the utilization of activity-based methods such as (project-based method, group investigation method, internship method, experiential method and apprenticeship method) and interactive teaching methods like (think-pair share method, group discussion method, guest speaker presentations method, brainstorming method and interactive whiteboard method) will not only improve students' interest in automobile technology education programme but can also equip them to diagnose and repairs automobiles effectively in the society.

### **Recommendations**

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

1. Professional conferences and in-service seminars should be organized for automobile technology educators to update their instructional competency on the utilization of activity-based and interactive teaching methods. This would increase automobile technology educators efficacy and to adopt activity-based and interactive teaching methods for teaching automobile technology courses in colleges of education.
2. Curriculum planners should incorporate activity-based and interactive teaching methods into the curriculum of automobile technology education in colleges

of education to equip teacher-trainees with the instructional competencies to appropriately

use them in teaching automobile technology education courses

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