



# Comparative Effects of Structured and Guided Inquiry Instructional Techniques on Students' Academic Achievement in Basic Electricity in Kwara State Technical Colleges

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## Authors' contributions

*This work was carried out in collaboration between all authors. Authors ISA and ASO designed the study, performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript and managed literature searches. Author HWB managed the analyses of the study and literature searches. All authors read and approved the final manuscript.*

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## ABSTRACT

The study was designed to determine the effects of Structured and Guided Inquiry Instructional Techniques on Technical College students' academic achievement in Basic Electricity. Four research questions raised and 3 Null hypotheses guided the study. Quasi-experimental research design involving pre-test, Post-test, non-equivalent control group was used in this study. The population of the study was 233 Electrical/Electronics Vocational Year 2 students from Kwara State technical colleges. This consisted of 134 students as the subjects in the experimental group I and 99 students as the subjects in the experimental group II. The instrument used for data collection was Basic Electricity Academic Achievement Tests (BEAT). The instrument was subjected to face

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and content validity by two experts (Lecturers) in Industrial and Technology Education and one expert in Science Education, from Federal University of Technology Minna. Using Pearson's Product Moment Correlation technique, a reliability coefficient of .88 was obtained. Mean was used to answer the research questions, while t-test and ANCOVA were employed to test the hypotheses at .05 level of significance. The findings of study among others revealed that: (i) students taught Basic Electricity using the guided inquiry instructional techniques had a higher mean score than students taught using the structured inquiry technique in Basic Electricity achievement test. (ii), the mean score of boys taught Basic Electricity using guided inquiry instructional technique was higher than the mean score of girls taught using the same guided inquiry instructional technique in the academic achievement test. Consequently, it was recommended among others that, (i) technical college teachers should adopt the use of the guided inquiry instructional technique for the teaching of Basic Electricity and (ii) the Ministry of Education and Administrators of technical colleges should always organize seminars, conferences and workshops to sensitize Basic Electricity and other technical teachers on the use of the guided inquiry instructional techniques in the Technical Colleges.

*Keywords: Guided inquiry; structured inquiry; instructional techniques; academic achievement and basic electricity.*

## 1. INTRODUCTION

The Vocational and Technical teacher is expected not only to be expert in what to teach but also to teach learners in a proper manner. Students often are of the expectation that learning materials and methods of teaching be easy to transfer to reality. Thus, teacher's task in class room includes provision of relevant materials and teaching experiences needed to facilitate knowledge and attain the expectations of learners [1]. The teacher needs to make use of different strategies, techniques, media and methods to enhance the acquisition of knowledge in the classroom or laboratory. One of such modern methods or techniques that teacher can use to facilitate learning in the classroom is inquiry-based method.

Inquiry method has its root in the scientific ways of investigating issues in a structured arrangement. When it is related to learning, the strategy is a model for processing information that enables learners to discover relevance to give information following laid-down steps that enable them to conclude or reflect a newly attained set of knowledge. While it is important that instructors are familiar with, and work towards attaining desirable standard in their teaching, instructors are also expected to use strategies for the evaluation of curriculum materials that have inquiry orientation.

Inquiry-based teaching entails any teaching strategy that stimulates students to construct knowledge, explain the way scientists or technologists investigate the nature of the world. [2] opined that inquiry strategy projects beyond

findings and experiments, to incorporate laboratory experiences that include model development, classroom explanation, revision, and critique. Inquiry approach has variety for field experiences, investigations and classroom treatments which depend on the developed contents practices, the quantity of scaffolding skills or content, the degree to which instructors are involved in the scaffolding and the preparedness of students [2].

Experts refer to some teaching strategies as inquiry. Such include the Suchman's Model that incorporates (i) guided inquiry, (ii) structured inquiry, (iii) the learning cycle, (iv) open inquiry [2]. Inquiry teaching is classified by the autonomy offered to learners; it also incorporates a wide spectrum of techniques that range from tutor-controlled structured or guided inquiry, to student-centered open discovery. According to [3], structured inquiry process presents students with problems to solve, methods to be used in solving the problem, and needed facilities, but not the desired outcomes. This prompts students to source for a relationship from the data available and generalize. Guided inquiry equips learners with competencies and abilities to tackle the challenges of the world. When team of instructors guides inquiry process to allow learners gain personal perspective and an in-depth understanding through a broad range of information sources, the process is called Guided Inquiry. Guided inquiry strategy are usually employed by teachers to enhance learning materials and channel the inquiry towards specific goals of learning in guided inquiry laboratory, the learners determine the concept by themselves through their laboratory data. The

teacher doesn't teach, instead, learners function under group containing four students typically, to fill worksheets. The worksheets incorporates three components: (1) background information material; (2) thought provoking questions that are designed to guide the learners to understand the concepts represented through the available data; and (3) applicable exercises, which present learners with methods for solving problems using the derived approach. The teacher is required to provide necessary guidance/supervision to the learners, moving round the classroom and probing learners with relevant queries/questions to evaluate their comprehension [4,5].

Basic Electricity is one of the Electricity/Electronic courses offered in Nigerian Technical Colleges [6]. It is a fundamental subject in the field of electrical and electronics technology at secondary and technical colleges in Nigeria. It is concerned with basic issues that have to do with electrical and electronic engineering/technology by introducing the principles, concepts and practices of electrical and electronic in the lowest and simplest terms. It provides students with basic conceptual understanding of basic electrical concepts including basic electrical measurements, basic electrical theory and understanding of how common electrical components work.

Academic Achievement is defined as a way of measuring behavior using a standardized series of tests [7]. Academic Achievement test is often constructed and standardized with a view to measure proficiency of learners in different subjects. [7] opined that academic achievement test is designed to quantify systematic training channeled towards accepted pattern of skills and knowledge. A number of scholars; for instance, (AD, Epunah, University of Nigeria, Unpublished M.Ed Thesis) and [8] have opined that there is correlation between academic achievement and the methods of teaching. In the same vein, [1] asserts that methods of teaching adopted by instructors influence the learners' learning styles and the acquisition of skills, which is greatly needed for science and technology academic achievement in the society.

The issue of gender and learners' academic achievement in science and technology has been of interest to researchers. Gender implies the values, attitudes and roles attributed by society and culture to men and women. The said values, attitudes and roles describe the behaviors of men and women and the relationship that exist

between them [9]. Social institutions like media, churches, schools, and communities create and maintain values, attitudes, and roles. Gender ensures the assignment of certain traits, roles and characteristics distinctly to men or women [10]. In addition, the affinities and links between students' gender and academic achievement when they are taught using inquiry method have also been of interest to scholars and researchers. Several research findings have shown the apparent discrepancies among female and male learners in science and technology academic achievements. For instance, [9] reports that, boys were found to have excelled in science and technology reasoning than girls. [11] also reports that, male students have higher creativity skills than female. Comber and Keeves (1973) cited by [12] found out that female students performed better than male students in science subject in thirteen different countries. However, some studies observed that male learners outperformed female learners in the sciences [13,14], while [15] and [12] argued that females performed better. Other group of researchers submitted that sex has no noticeable impact on learners' academic achievement [16,17] and see sex factor as an area of educational research that has generated conflict and inconclusive findings. Hence, sex disparities on learners' academic achievement in science and technology subjects are inconclusive. Despite the frequently reported positive findings on the effectiveness of inquiry methods in enhancing students learning outcomes in the literature, the efficacy of guided and structured inquiry instructional strategies on technical students' academic achievement to the best of the researcher's knowledge might have not been carried out in Basic Electricity.

### 1.1 Statement of the Problem

Despite the importance of Basic Electricity to national development, it is clear from research findings that the result of students in Basic Electricity has been consistently poor over the years [18,19]. National Business and Technical Examination Board (NABTEB) reports reveal that average failure rate of learners in Basic Electricity in years 2009, 2010, 2011, 2012 and 2013 were 45%, 35%, 56.3%, 48% and 42.4% respectively. This position was further clarified by the [20] Chief Examiner's report that: (i) generally, the overall performance of candidates did not show any remarkable improvement over those of the previous years; and (ii) there is a deteriorating performance trend of candidates in

technical subjects especially in Basic Electricity. The persistent poor performance in technical subjects (generally) has been very disturbing, while that of Basic Electricity is worrisome.

The problem of high failure rates in Basic Electricity at the National Business and Technical Examinations, and in school examinations of the Nigerian Technical Colleges has remained unsolved, in spite of the various antidotes applied in the past to address the problems. Available literature suggested that the poor performance of the Technical College students in Basic Electricity might not be unconnected with the methods used in teaching the students. It is based on this that the present study was designed to investigate the comparative effects of structured and guided inquiry instructional techniques on technical college students' academic achievement on Basic Electricity.

## 1.2 Purpose of the Study

The purpose of this study was to compare the effects of structured and guided inquiry techniques on students' academic achievement in Basic Electricity in Kwara State technical colleges. Specifically, the study was done to determine the effect of:

1. Structured and guided inquiry techniques on Technical College students' academic achievement in Basic Electricity;
2. Gender on Technical College students' academic achievement when taught Basic Electricity using structured and guided inquiry instructional techniques;

## 1.3 Research Questions

The study was guided by the following research questions:

1. What is the pretest and posttest mean scores of students taught Basic Electricity through guided and structured inquiry instructional techniques in Basic Electricity achievement test?
2. What is the pretest and posttest mean scores of male and female students taught basic electricity through guided and structured inquiry instructional techniques in Basic Electricity achievement test?

## 1.4 Research Hypotheses

The following hypotheses guided the study at .05 level of significance:

**HO<sub>1</sub>:** There is no significant difference between the mean scores of students taught Basic Electricity using structured inquiry and those taught using guided inquiry instructional technique.

**HO<sub>2</sub>:** There is no significant difference between the mean scores of male and female students taught Basic Electricity using structured inquiry instructional technique and those taught using guided inquiry instructional technique.

**HO<sub>3</sub>:** There is no significant interaction effect of treatment on the students and their gender difference with respect to their achievement in Basic Electricity.

## 1.5 Theoretical Framework

This research is based on constructivists' view of learning. Constructivism sees learning as a dynamic and social process in which learners construct their own knowledge. The central idea of constructivism is that human learning is always constructed, that learners always build new experience on the foundation of former learning or actively construct meaning from their experiences in connection with their prior understandings and the social setting [21]. This view contrasts with one which states that learning is passively transmitted from one person to another, an opinion which reception but not construction, is the key. In the view of constructivists, students should no longer be passive recipients of knowledge supplied by teachers and teachers should no longer be purveyors of knowledge and classroom managers [22].

The main activity in a constructivist classroom is solving problems which are also applicable in inquiry methods of teaching. Students use inquiry methods to ask questions, investigate a topic, solve problems, and use a variety of resources to find solutions and answers. In Basic Electricity where inquiry methods are used, students explore the topic, draw conclusions, and, as exploration continues, they revisit those conclusions. Exploration of questions leads to more questions.

Most classroom instructions that are based on constructivist learning theory rely on some form of guided discovery where the teacher avoids most direct instruction and attempts to lead the student through questions and activities to discover, discuss, appreciate, and verbalize the new knowledge. Therefore, in Basic Electricity

classroom where constructivist theory is applied, the teacher's role is to prompt and facilitate discussion. Thus, the teacher's main focus should be on guiding students by asking questions that will lead them to develop their own conclusions on the subject. In using constructivist basic electricity classroom, students learn how to learn by giving them the training to take initiative for their own learning experiences. Basic Electricity teachers pose questions and problems, and then guide students find their own answers. The teacher prompt students to formulate their own questions (inquiry) allow multiple interpretations and expressions of learning (multiple intelligences) and encourage group work.

## 2. RESEARCH METHODOLOGY

### 2.1 Research Design

This research design is quasi-experimental design. Specifically, the pre-test, posttest, non randomized group design was adopted. The design is symbolically represented as follows:

	Pre-test	Treatment	Post-test
Treatment group I	$O_1$	$X_1$	$O_2$
Treatment group II	$O_3$	$X_2$	$O_4$

Key:  $X_1$  = treatment with structured inquiry  
 $X_2$  = treatment with guided inquiry  
 $O_1$  = pre- test scores of group treated with structured inquiry  
 $O_2$  = post- test scores of group treated with structured inquiry  
 $O_3$  = pre- test scores of group treated with guided inquiry  
 $O_4$  = post- test scores of group treated with guided inquiry

### 2.2 Population and Sample

This research work was conducted in all National Board for Technical Education (NBTE) accredited technical colleges in Kwara State. The number of experimental subjects for the research work comprises 233 students in Technical College II students in 5 technical colleges who study Basic Electricity in Kwara State. Simple balloting technique was used to select two schools (Government Technical College Ilorin and Government Technical College Pategi) with a population of 134 (116 male and 18 female) students assigned to structured inquiry treatment and two schools (Government Technical College

Amodu-Asungbolu, and Government Technical College Erin-Ile) with a population of 99 (85 male and 14 female) students assigned to guided inquiry treatment. Therefore, the sample size for the study is 233.

### 2.3 Instrument

The Instrument used for gathering data for this research was the Basic Electricity Academic Achievement Test (BEAT). BEAT which was used to test the academic achievement of learners in basic electricity and was developed based on the test blueprint table developed by the researcher. The pre-test and post- test items were developed based on NBTE Curriculum for basic electricity. It is 40 – multiple choice items with four response options. A set of the lesson plan was also written based on structured inquiry technique which was used to teach the experimental group one, while the experimental group two was taught using guided inquiry set of lesson plans.

The validity of the study instrument and lesson plan was ascertained by two lecturers in Industrial and Technology Education and a lecturer in Science Education Department, Federal University of Technology, Minna. The recommendations and suggestions given by these experts were used to modify the, test instrument and lesson plan. The results of pilot test obtained in the two administrations were correlated, Pearson's Product Moment Correlation Co-efficient was used to compute results and the reliability coefficient of the instrument was found to be 0.88.

### 2.4 Method of Data Collection

A week induction training programme was organised for the teachers that used the inquiry lesson plans. The instructors were given detail explanation on the use of structured and guided inquiry instructional techniques and other research expectations. The training exercise was based on the aim and objectives of the research, the topic to be tutored, use of lesson plans, and the use of Basic Electricity instrument and general conduct of the study.

The conduct of the study took place during the normal school lesson periods. The normal time table of the schools used for the study was followed. The regular school Basic Electricity teachers were used. On the first day, before the

lesson commences, the instruments BEAT was administered as pretest to both the two groups after which proper teaching commenced by using the prepared lesson plans. The two experimental groups were taught the selected topics by the research assistants using structured instructional technique and guided inquiry. The two groups were taught using researcher-designed lesson plans. The experimental groups were taught using structured and guided inquiry respectively. The treatment lasted for six weeks. After teaching for six weeks, the two groups were post-tested. The scores obtained from both groups were compared to determine if there was any significant difference in the performance of the two groups.

### 2.5 Method of Data Analysis

Mean was used to answer all the research questions. The pre-test, - post-test mean gain of each group were compared to determine the group that performed better to answer the research questions, hypotheses I and II were tested using t-test while Analysis of Covariance (ANCOVA) was used to test hypothesis III.

## 3. RESULTS AND DISCUSSION

### 3.1 Research Question 1

What is the Pretest and Posttest Man Scores of Students Taught Basic Electricity through Guided and Structured Inquiry Instructional Techniques in Basic Electricity Achievement Test?

In Table 1 guided inquiry group had a mean score of 6.17 in the pre- test and 33.40 in the post- test, which made a pre- test-post- test mean gain score to be 27.23. Structured inquiry group had a mean score of 6.23 in the pretest and 26.80 in the post- measurement, making a pre- test, post- test mean gain to be 20.57. With this result, it could be deduced that both techniques improved students' academic

achievement as shown in their mean difference scores. However, guided inquiry group had higher mean score than that of structured inquiry group, suggesting that, possibly guided inquiry had more positive effect on academic achievement of students in Basic electricity.

### 3.2 Research Question 2

What is the Pretest and Posttest Man Scores of Male and Female Students Taught Basic Electricity through Guided and Structured Inquiry Instructional Techniques in Basic Electricity Achievement Test?

From Table 2, it was revealed that male students in the guided inquiry group had a mean score of 6.55 in the pretest and 34.44 in the post- test, making a pre- test-post- test mean gain score to be 27.89. Female students of same group had a mean gain score of 5.78 in pre- test and 30.97 in the post- measurement, making a pre- test-post- test mean score to be 25.19. Furthermore, male students in structured inquiry group had a mean score of 6.25 in pre- test and 32.42 in the post- measurement, making a pre- test-post- test mean score to be 26.17, while Female students of the same group had a mean gain score of 6.04 in pre- test and 25.95 in the post- test, making a pre-test-post- test mean gain to be 19.91. With these results, it could be deduced that both techniques improved male students' academic achievement as shown by their mean difference scores. However, guided inquiry team had higher mean score than that of structured inquiry team, suggesting that possibly guided inquiry had more positive effect on the academic achievement of male students.

### 3.3 Hypotheses

**Ho<sub>1</sub>:** There is no significance difference in the mean academic achievement scores of students taught Basic Electricity using guided and those taught using structured inquiry instructional techniques.

**Table 1. Pretest and post-test mean scores of students taught basic electricity through guided and structured inquiry instructional techniques in basic electricity achievement test**

Group	N	Pretest score	Posttest score	Mean gain
Guided group	99	$\bar{X}$ 6.17	$\bar{X}$ 33.40	$\bar{X}$ 27.23
Structured group	134	6.23	26.80	20.57

Key: N = Number of subjects,  $\bar{X}$  = Mean

Table show the calculated t-value is 0.6540 which is less than the t-table of 2.00 at degree of freedom 231 and 0.05 level of significance. As a result, the hypothesis was accepted. In other words, Students in Experimental I and II did not differ significantly in their scores in the Basic Electricity achievement test.

**Ho<sub>2</sub>:** There is no significance difference in the mean academic achievement scores of male and female students taught Basic Electricity with guided and those taught with structured inquiry instructional techniques.

The t-test analysis on Table 4 showed that there was no significant difference between the mean scores of Male and Female students on the achievement test. This was indicated by overall calculated t-value of 0.2326 which is less than the t-table of 2.00 at degree of freedom 231 and 0.05 level of significance. As a result, the

hypothesis was accepted. In other words, Male and Female students did not differ significantly in their mean scores on the Basic Electricity Achievement test.

**Ho<sub>3</sub>:** There is no significant interaction effect of treatment on the students and their gender difference with respect to their achievement in Basic Electricity.

Table 5 show F-calculated values for th interaction effect of treatments and gender on students' academic achievement in Basic Electricity. The interaction effects of treatments and gender has F-calculated value of 1.008 with a significance of F of .781. Thus .781 is greater than .05; the null hypothesis for interaction effects of treatments and gender is upheld. Hence, there is no statistically interaction effect of treatment given to students and their sex difference with respect to their mean scores on the Basic Electricity Achievement Test.

**Table 2. Pretest and post-test mean scores of male and female students taught basic electricity through guided and structured inquiry techniques in basic electricity achievement test**

Gender	Guided group				Structured group			
	N	Pretest	Posttest	Mean gain	N	Pretest	Posttest	Mean gain
Male	85	$\bar{X}$ 6.55	$\bar{X}$ 34.44	$\bar{X}$ 27.89	116	$\bar{X}$ 6.25	$\bar{X}$ 32.42	$\bar{X}$ 26.17
Female	14	5.78	30.97	25.19	18	6.04	25.95	19.91

Key: N = Number of subjects,  $\bar{X}$  = Mean

**Table 3. t-test analysis for test of significance between the mean scores of experimental group I and II in the academic achievement test**

Category	N	$\bar{X}$	SD	Df	t-value	t-cal	Std. error	Sig.	Decision
Experimental group I	134	3.06	0.76	231	2.00	0.6540	0.015	0.000	Accepted
Experimental group II	99	2.96	0.71						

Key: N = Number of respondents; SD = Standard Deviation;  $\bar{X}$  = Mean of respondents; Df = Degree of Freedom

**Table 4. t-test analysis for test of significance between the mean scores of male and female students in the academic achievement test**

Category	N	$\bar{X}$	SD	Df	t-value	t-cal	Std. error	Sig.	Decision
Male students	201	2.95	0.79	231	2.00	0.2326	0.019	0.000	Accepted
Female students	32	2.91	0.88						

Key: N = Number of respondents; SD = Standard Deviation;  $\bar{X}$  = Mean of the respondents; Df = Degree of Freedom

**Table 5. Analysis of Covariance (ANCOVA) for test of significance interaction effect of treatments given to students and their gender with respect to their mean scores in the basic electricity achievement test**

Source	Sum of squares	Df	Mean square	F	Sig.
Corrected model	789.243 <sup>a</sup>	7	215.097	33.763	.000
Intercept	1505.008	1	1505.008	275.406	.000
Pretest	5.657	1	5.657	0.582	.385
Group	697.534	1	697.534	123.934*	.000
Gender	24.066	1	24.066	3.635*	.025
Group * gender	4.333	1	4.333	1.008	.781
Error	567.331	225	8.871		
Total	67895.000	233			
Corrected Total	1475.645	232			

*\*Statistically relevant at sig of  $F < .05$*

### 3.4 Discussion of Findings

The data presented in Table 1 provided answer to research question one, finding revealed that the main effects of guided inquiry strategy on students' academic achievement in Basic Electricity is greater than the main effects of structured inquiry. T-test analysis was utilized to test the hypothesis one, Table 3, at a calculated t-value of (0.6540), t-table of (2.00) at level of confidence of .05, there was a statistically significant difference between the main effect of guided and structured inquiry strategies on students academic achievement in Basic Electricity which confirms that the disparity between the main effect of guided and structured inquiry techniques was statistically significant. The implication of this finding is that guided inquiry strategy is more effective than structured inquiry in promoting students' academic achievement in Basic Electricity. The finding that guided inquiry strategy has more impact on students' academic achievement than structured inquiry is related to the finding of [23] who in their study discovered that guided inquiry activities are more complex although more efficient in respect of students' interest, analytical thinking development and probing than verification exercises thus can effectively enhance students' academic achievement. In a similar vein, [24] carried out a study on Effects of Guided Inquiry Method on Students Academic Achievement in Logic at Taraba State and discovered that the students who were taught logic using the Guided inquiry teaching method had better academic achievement scores than subjects who were taught using conventional method. This finding is similar to the current research finding that revealed a significant disparity between the mean academic achievement scores of student taught Basic Electricity using guided and structured inquiry in favour of the guided inquiry

team. An explanation on how effective guided inquiry techniques is as the collaborative in which learners work together to determine the procedure to follow and the solutions to target in problem solving. [25] argued that students can learn to think better if schools concentrate on teaching how to do so, through the use of appropriate instructional techniques, which will promote intellectual growth and fosters academic achievement gains in our rapid technological changing world. This study is also in conformity with the findings of [26] that carried out a study on effect of guided inquiry strategy on students' academic achievement and retention and discovered that guided inquiry learning strategy enhances students' academic achievement and retention in Biology more than the expository (lecture) method.

The data in Table 2 provided answer to research question 2. It was revealed that male students had a greater mean score in the Basic Electricity academic achievement test than female students. Also, t-test was utilized to test the second hypothesis, Table 4, at the calculated t-value of (0.2326), t-table of (2.00) and level of confidence of .05, there was a significant difference between the main effect of gender on students' academic achievement in Basic Electricity which confirmed that the difference between the academic achievement of male and female students in Basic Electricity was significant in favour of boys. This finding is similar to the findings of [27] who conducted a study on the effect of Guided inquiry Method on Secondary students' Performance in Physics in Anambra State. The research also indicated that male students taught with Guided Inquiry Method performed significantly better. (P. E., Mbah, University of Benin, Unpublished PhD thesis) also affirms that, it has been established that differences exist between male and female

students' performance in sciences and technology and other related fields; it was also proven that few situation showed that male possessed certain advantages ahead of female gender in school performances. In spite of this, the test of covariance was applied to analyze the third hypothesis, Table 5. The calculated F-value which was 1.008, significance difference of F (.781) and alpha value of 0.05 showed that no relationship was observed on the effect of treatment attributed to the students as well as their gender in comparison to their mean scores on Basic Electricity Achievement analysis.

#### 4. CONCLUSION

The desire to get a method that can help students in learning Basic Electricity is paramount since Basic Electricity is essential in the study of electrical/electronic engineering profession and other related fields. The research therefore, sought to examine the effects of structured and guided inquiry techniques on technical college students' academic achievement and retention in Basic Electricity. The research has discovered that guided inquiry technique is indeed more efficient than structured inquiry technique in the improvement of students' academic achievement in Basic Electricity. The research also uncovered that, there exist an effect that is attributable to gender on students' academic achievement in Basic Electricity. The research however discovered no interaction impact of guided and structured inquiry techniques and gender on academic achievement in Basic Electricity. This however implies that the efficacy of guided and structured inquiry techniques on students' academic achievement in Basic Electricity is not dependent on the category of sex. Hence, regardless of kind of gender, students will secure performance improvement on their academic achievement on Basic Electricity if guided and structured inquiry techniques are used for teaching Basic Electricity. This outcome therefore, uncovered that guided inquiry strategy is efficient in teaching Basic Electricity.

#### 5. RECOMMENDATIONS

These recommendations are proffered based on the reports of this research, various discussions, and their impacts:

1. Vocational/Technical instructors should engage the usage of the guided inquiry strategy in teaching Basic Electricity.

2. Conferences, seminars, and workshops should be organised through Education Ministry and Technical Colleges' Administrators to sensitise technical teachers with a view to improving their skills and experiences on the usage of guided inquiry strategy aimed at developing students' academic achievement in Basic Electricity.
3. The teachers must always expose Male and Female students of every ability levels, to a variety of guided tasks, activities and interaction patterns in classrooms so as to inspire and improve student's performance in Basic Electricity.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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