
TOWARDS IMPROVING TEACHING OF BASIC ELECTRICITY/ELECTRONICS IN TECHNICAL COLLEGES IN BAUCHI STATE

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ABSTRACT

This study focuses on the teaching of Basic electricity/Electronics in Technical Colleges in Bauchi State. Objectives of the study were to ascertain the teaching methods teachers' employed to facilitate effective teaching of Basic Electricity/Electronics in technical colleges of Bauchi State. Identify the teachers' level of training, qualification and industrial experience in the field of Electrical/Electronics technology. Identify the strategies for improving the teaching and learning of Basic Electricity/Electronics. Three research questions were posed to guide the Study. A self-designed questionnaire was used to collect data from 120 students and 12 teachers randomly selected from 4 technical colleges in Bauchi State through purposive sampling techniques. The findings of the study revealed that most concepts in Basic Electricity/Electronics are best assimilated by the students when the teacher uses suitable teaching materials. Based on the findings, recommendations were made in that teachers should be sensitive to individual difference and give each student the attention required despite the students to teachers ratio.

INTRODUCTION

Teaching is an act common among people everywhere in the world. It is geared towards the transmission of knowledge. The role of teaching is basically to impart knowledge and develop skills required for changing the learners' behaviour in acceptable ways. The helping or making a person or group of persons to acquire knowledge referred to as teaching. One way of producing competent manpower in electricity/electronics is through effective teaching. Okoro (1999) Observed that teaching of Basic electricity/electronics is expensive in nature in terms of equipment and tools etc.

The impact of Electrical/Electronics technology on the life of individuals is significant because most homes and offices employ the services of electrical appliances (e.g. fans, air-conditioners, refrigerators) and electronic gadget (e.g. computer, telephone/fax machines, television sets, satellite dish decoders and radio sets etc.) for maximum comfort and satisfaction. The need to train highly skilled manpower in the area of Electrical/Electronics technology becomes imperative.

Basic Electricity/Electronics is one of the technical education subjects taught in year I, II, and III as stipulated by the National Policy on Education (FGN, 2004). Then technical education aims at give training

and imparts the necessary skills leading to the production of craftsman, technicians and other skilled personnel who will be enterprising and self-reliant.

Suleiman (1992) noted that the teaching of Basic Electricity/Electronics in Nigerians technical schools is not impressive; it faced with a lot of problems which among others include lack of funding, equipment, tools, infrastructures, inadequate teaching materials and unqualified manpower. Apagu (1997) observed that the objectives of technical education can only be achieved if there are availability of teaching materials, equipment, tools, infrastructures, qualified manpower, funding, and adequate planning of technical education curriculum. In addition Suleiman (1992) opined that Basic Electricity/Electronics is the aspect of technical education which deals primarily with electricity and magnetism, forces of nature and material for the benefit of mankind. Moreover it encompasses the study and application of motion of carries (electrons, holes and ions) under the influence of externally applied voltage or current or in relation to incidence or production of radiant energy.

The Electricity/Electronics curriculum for Nigerians Technical schools is made up to two broad areas. The first area is the Electrical installation and maintenance practice and its subject components include Basic electricity, Domestic and Industrial installation, cable joining and Battery charging and winding of Electrical machines (NBTE, 1987a; NBTE 2001 and NBTEB, 2004). The second area which is Electronics

based is known as radio, television and electronics works and it comprise aspects such as Basic Electricity, Radio communication, television and electronics devices/currents (NBTE, 1987b; NBTE, 2001 and NABTEB, 2004).

Saba (2003) noted with concern that the above mentioned curriculum of Electricity/Electronics which teachers are expected to implement with proficiency and effectiveness is more practically detailed than the Electricity/Electronics teachers' education curriculum. Consequently, this makes it very difficult for Electricity/Electronics teachers to implement the Nigerians technical schools curriculum effectively and that brings the performance of students very low in the subjects. Abbas (2004) who reported that most teachers teaching Basic electricity/electronics in Nigeria are either not professional or not qualified. However, these problems may lead to failure of many students in the final examinations. In view of the realization of constraints' confronting the teaching of Basic Electricity/Electronics it is too difficult for the students to learn and understand. Therefore there is need to map out strategies for improving the teaching of Basic Electricity/Electronics in technical colleges in Bauchi State, Nigeria.

OBJECTIVES OF THE STUDY

The objectives of this study were to:-

- 1 Ascertain the teaching methods teachers' employed to facilitate effective teaching of

- Basic Electricity/Electronics in technical colleges in Bauchi State.
- 2 Identify the teachers' level of training, qualification and industrial experience in the field of Electrical/Electronics technology.
 - 3 Identify the strategies for improving the teaching and learning of Basic Electricity/Electronics.

RESEARCH QUESTIONS

The following questions were posed to guide the study:

- 1 What are the teaching methods teachers' employed to facilitate effective teaching of Basic Electricity/Electronics in technical colleges in Bauchi State?
- 2 What are the teachers' level of training, qualification and industrial experience in the field of Basic Electricity/Electronics technology?
- 3 What are the strategies for improving the teaching and learning of Basic Electricity/Electronics in technical colleges of Bauchi State?

RESEARCH DESIGN

This study used survey research designed in order to seek and document information regarding strategies for improving the teaching of Basic

Electricity/Electronics in technical colleges in Bauchi State.

POPULATION OF THE STUDY

The population for this study comprised all students and teachers' teaching Basic Electricity/Electronics in six (6) technical colleges of Bauchi State. Out of six (6) technical colleges four (4) schools were randomly selected from each of the northern and southern parts of the state.

SAMPLE AND SAMPLING TECHNIQUES

From the population, a sample of one hundred and thirty six (136) respondents was obtained through purposive sampling techniques. Thirty (30) students and three (3) teachers' were drawn out from each of the four (4) randomly selected sample schools making a total of one hundred and twenty (120) students and sixteen(16) teachers' teaching Basic Electricity/Electronics respectively.

INSTRUMENT FOR DATA COLLECTION

The instrument used for data collection was self-designed questionnaire developed and validated by the researcher. The reliability index of the instrument was 0.71. The questionnaire items centre on the guiding research questions for the study. Responses to the 23 questionnaire items followed the likert 4 point scale of Strongly Agree (SA), Agree (A), Disagree (D) and

Strongly Disagree (SD). The scale was assigned the values of 4, 3, 2 and 1 respectively.

VALIDATION OF THE INSTRUMENT

The questionnaire was validated for internal consistency by experts in the field of Science and Technology Education before it was used.

METHOD OF DATA COLLECTION

The instrument was administered by the researcher who employed the services of four (4) research assistants with the help of principals of the selected sample schools. Out of one hundred and twenty (120) copies of the questionnaire administered to the students one hundred and seventeen (117) were returned, forming 97.5% of the returned rate and out of sixteen (16) copies of the instrument administered to the teachers' teaching Basic Electricity/Electronics twelve (12) were returned, forming 75% of the returned rate. A total of 129 copies of the questionnaire were collected back and subjected for analyses.

METHOD OF DATA ANALYSIS

Mean statistics were used to analyze the responses to each of the three research questions. Two groups were involved, and the mean of each item in each

group was interpreted in relation to the real limits (lower and upper limits) of the values assigned to the responses categories of the instrument as follows:

Responses	Values	Lower limit	Upper limit
SA	4	3.5	4.49
A	3	2.5	3.49
D	2	1.5	2.5
SD	1	0.5	1.49

The grand mean method was used for the two groups to be able to draw a decision on each item of the instrument. In order to determine the acceptance or rejection level of each item on the questionnaire, a decision rule based on real limits of numbers was used, any item with a mean score of 2.5 and above was considered as accepted, while any item with a mean below 2.5 was rejected.

RESULTS

Research Question 1

What are the teaching methods teachers' employed to facilitate effective teaching of Basic Electricity/Electronics in technical colleges of Bauchi State?

Table I: Mean Ratings of Respondents opinion on the Teaching methods Teachers' employed to Facilitate Effective Teaching of Basic Electricity/Electronics in Technical Colleges of Bauchi State.

S/No	Item Statement	TBE/E $X_1N=12$	SBE/E $X_2N=117$	X_G	Decision
1.	Most concepts in Basic Electricity/Electronics cannot be easily assimilated by the students without the use of suitable teaching materials.	3.15	3.30	3.22	Agree
2	Demonstration and lecture method during practice enhance teaching and learning	3.10	3.45	3.28	Agree
3	Teachers always demonstrate by displaying charts, posters and models of the concepts taught in the class	2.20	1.49	2.09	Disagree
4	When teaching topics that requires teaching aids that are not available, the teachers always improvise	2.45	2.16	2.30	Disagree
5	Limited Basic Electricity/Electronics materials because of its expensive	1.86	2.15	2.01	Disagree

KEY:

TBE/E – Teachers of Basic Electricity/Electronics

SBE/E – Students of Basic Electricity/Electronics

X – Mean score

 X_G – Grand Mean score

N - Number

Table I above revealed that teachers and student agree that most concepts in Basic Electricity/electronics cannot be easily assimilated by the students without the use of suitable teaching materials by the teacher and that demonstration and lecture methods of teaching enhance teaching and learning. The table further revealed that the respondents (teachers and students) disagreed with items 3, 4 and 5

that teachers are not demonstrating by displaying any charts, posters and models of the concepts taught in the class and teachers' do not improvise teaching materials.

Research Question 2

What are the teachers' level of training, qualification and industrial experience in the field of Basic Electricity/Electronics technology?

Table 2: Mean Ratings of Respondents opinion on the Teachers' level of Training, Qualification and industrial experience in the Field of Basic Electricity/Electronics Technology

S/No	Item Statement	TBE/E X ₁ N=12	SBE/E X ₂ N=117	X _G	Decision
6	Basic electricity/electronic teachers are adequately trained to teach the course	3.17	3.40	3.29	Agree
7	Industrial experience makes the teachers to prefer training the practical aspects than the theoretical	1.16	2.45	2.11	Disagree
8	Teachers are sensitive to individual difference and give each student the attention required despite the students to teachers ratio.	2.42	1.88	2.15	Disagree
9	Both industrially experienced and inexperience teachers teach the course effectively	1.98	2.49	2.24	Disagree
10	Present educational qualification attained by the teachers is sufficient for the effective teaching of the course but still needs improvement.	3.26	3.35	3.31	Agree

From the analysis of data Table 2 above showed that the respondents agree with items 6 and 10 meaning that, Basic Electricity/Electronics teachers are adequately trained to teach the course. In addition, present educational qualification attained by the teachers is sufficient for the effective teaching of the course but still needs improvement while items

7, 8 and 9 disagree that both industrially experienced and inexperience teachers do not teach the course effectively and teachers are not sensitive to individual difference and therefore do not treat the students equally

Research Question 3:

What are the strategies for improving the teaching and learning of Basic Electricity/Electronics in technical colleges of Bauchi State?

Table 3: Mean Ratings of Respondents opinion on the Strategies for improving the Teaching and Learning of Basic Electricity/Electronics in Technical Colleges of Bauchi State

S/No	Item Statement	TBE/E X ₁ N=12	SBE/E X ₂ N=117	X _G	Decision
11	Relevant Basic materials should be made available	2.50	2.49	2.50	Agree
12	Industrial experienced teachers should handle only the practical aspect of the course	3.27	2.66	2.97	Agree
13	Educational qualification of the teachers should determine the class to teach	2.75	2.65	2.70	Agree
14	There should be increase in the time allocated for the course on the time table.	2.40	3.10	2.75	Agree
15	Students should be allowed to make choice	1.76	2.26	2.01	Disagree
16	Parents should regularly check their children's performance	3.98	1.66	2.82	Agree
17	Methods of teaching to be employed by the teacher should depend on the topic to be taught.	3.90	1.75	2.83	Agree
18	Teachers should improvised teaching materials	3.13	3.12	3.12	Agree
19	Higher educational qualifications of the teachers should be a priority to make for better teaching	2.75	2.86	2.81	Agree
20	Each student should be given the required attention so that the slow learners will also be carried along.	3.17	3.10	3.14	Agree
21	Transfer of teachers from one school to another should be reduced	1.77	2.27	2.02	Disagree
22	Teachers and of Basic electricity/Electronics needs to be properly motivated through regular promotion, special allowances e.t.c.	2.38	2.75	2.57	Agree
23	Students with high performance should be given accelerated promotion (double promotion)	2.88	3.01	2.96	Agree

Table 3 above showed that the two groups of respondents agreed that all the items listed are strategies for improving the teaching of Basic Electricity/Electronics except items 15 and 21 disagree that students should not be allowed to make choice and transfer of teachers" from one school to another should not be reduced.

FINDINGS

The followings are the findings of this study:

- 1 That most concepts in Basic Electricity/Electronics are best assimilated by the students when the teacher uses suitable teaching materials.
- 2 That learning is made easier when the teachers employ both demonstration and lecture methods in teaching.

- 3 Teachers do not always demonstrate or display charts, posters and models when the need arise and they do not improvise teaching aids as required.
- 4 That teachers are not sensitive to individual difference and therefore do not treat the students equally.
- 5 Each student should be given the required attention so that the slow learners will also be carried along.
- 6 Relevant Basic materials should be made available for teaching of Basic electricity/electronics
- 7 Educational qualification of the teachers should determine the class to teach, and parents should regularly check their children's performance.

DISCUSSION

The finding of this study in respect to research question one showed that limited teaching materials due to its expensive nature has negative effect on the teaching and learning of Basic Electricity/Electronics. This finding is in line with previous studies conducted by Suleiman (1992) who reported that inadequate teaching material is one of the constraints confronting the teaching of Basic Electricity/Electronics. Okoro (1999) Observed that teaching of Basic Electricity/Electronics are expensive in nature.

The result of this study in respect to research question two revealed that the available Basic Electricity/Electronics teachers are adequately trained for the job and their present educational qualification is sufficient but needs improvement for more effectiveness. This finding is in disagreement with previous studies conducted by Abbas (2004) who found that most teachers' teaching technical subjects in Nigeria are either not professional or not qualified.

The finding of this study to answer research question three indicated that teachers' of Basic Electronics/Electrical need to be properly motivated through regular promotion and a special allowance, industrial experienced teachers should handle only the practical aspect of the course and teachers should improvised teaching materials to the students for effective teaching and learning. Apagu, (1997) observed that the objectives of technical education can only be achieved if there are availability of teaching materials, equipment, tools, infrastructures, qualified manpower, funding, and adequate planning of technical education curriculum.

CONCLUSION

From the findings of this study, it could be observed that the teaching of basic electricity/electronics in government technical schools in Bauchi state has been adversely affected by a number of factors these include among others inadequate teaching materials, equipment, tools, poor motivation of teachers of Basic

electricity/electronics and constant transfer of teacher from one school to another. These factors have been found to have negative effects on teacher's morale and learners attitudes to the subject.

The analysis of data collected also showed that Basic Electricity/Electronics required more teaching periods and complete time devotion on the parts of both the teachers and the students, if the proposed contents are to be covered and learned properly by the students, constant use of suitable teaching materials is mandatory to facilitate the understanding of abstract concepts of the subject.

RECOMMENDATIONS

The following recommendations were made based on the findings of this study:

Teachers should improvised teaching materials to the students so that to ensure effective teaching and learning of Basic electricity/electronics.

- 1 Government should provide suitable teaching materials, equipment, tools, facilities, to technical schools to minimized the problems confronting both students' and teachers' in the subject.
- 2 Constant transfer of teachers from one school to the other should be avoided.
- 3 Government should train and retrained the industrially experience and inexperienced teachers to handle both the practical and theory aspect of the course because lack of

qualified man power affects the development of the subject in the state and Nigeria at large.

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