

Strategies for Improving Students' Acquisition of Practical Skills in Electrical Installation and Maintenance Work Trade in Technical Colleges in Kano State

Ishaya Tumba¹, Halliru Shuaibu²

¹Department of Technology Education, Modibbo Adama University of Technology, Yola-Nigeria

²Department of Electrical/Electronics Technology Education, Federal College of Education (Technical) Bichi Kano-Nigeria

ABSTRACT

The purpose of the study was to identify strategies for improving students' acquisition of practical skills in Electrical Installation and Maintenance Work Trade in technical colleges of Kano State with a view to finding out ways of optimizing practical skills acquisition among students. The study was guided by three research questions and three null hypotheses. A descriptive survey was used as the design of the study. The population of the study comprised 24 school administrators, 22 trade teachers, and 208 final year students making a total of 254. The entire population of 254 was used as the sample for the study. A structured questionnaire named "Strategies for Improving Students' Acquisition of Practical Skills in Electrical Installation and Maintenance Work Trade in Technical Colleges in Kano State Questionnaire (SISAPSETCKSQ)" was used for data collection. The questionnaire has 28 items with four sections. The validated instrument was tested on 15 respondents for internal consistency reliability using Kurder Richardson (RK-21) method. The reliability coefficient for the four sections of the instrument ranges between 0.76 and 0.82. The reliability coefficient of the entire instrument was 0.79. The researchers with the help of two research assistants administered the instrument. The data for the study were analyzed using Mean, Grand Mean, Standard Deviation, and t-test statistical methods. The findings of the study include among others; Demonstration, assignment, drill and practice, and apprenticeship strategies as much appropriate for enhancing practical skills acquisition by students. It was found out in the study that there was no significant difference between the mean responses of trade teachers and students on supervisory strategies for students' practical skills acquisition in Electrical Installation and Maintenance Work Trade in technical colleges of Kano State. It was also discovered that there was no significant difference between the mean responses of trade teachers and school administrators on assessment strategies for students' practical skills acquisition in Electrical Installation and Maintenance Work Trade in technical colleges of Kano State. It was concluded among others, that teachers in Electrical Installation and Maintenance Work Trade used seven (7) out of eight (8) categories of practical teaching strategies; and ten (10) strategies for supervising students' practical activities in Electrical Installation and Maintenance Work Trade were much appropriate and enhanced acquisition of practical skills by students in the technical colleges. Based on the findings of the study the following recommendations were made; Teachers of Electrical Installation and Maintenance Work Trade should continue to adopt appropriate teaching strategies identified in the study for improving acquisition of practical skills by the students in technical colleges; and identified strategies for assessing practical skills of students in Electrical Installation and Maintenance Work Trade should be continuously used by teachers in technical colleges.

Date of Submission: 17 May, 2016



Date of Acceptance: 18 October, 2016

I. INTRODUCTION

The ultimate goal of vocational technical education training is for the acquisition of knowledge, attitude and practical skills for sustainable development. The training of vocational technical education students is based on the production of goods and services that are not only relevant to themselves but to the society. [1] stated that the acquisition of life-long practical skills calls for effective and efficient teaching strategies, appropriate evaluation methods and utilization of standard teaching materials; tools, machines, and equipment to ensure the production of desired graduates with practical skills. Other requirements include training manuals and availability of qualified teachers with experiences. However, such categories of staff are also in high demand in the labour market, but could be suitably motivated for part time teaching in technical colleges [2].

[3] posited that one of the philosophies of occupational education is pragmatism which stresses practical skill acquisition at vocational technical college level of education. For this to be achieved, a more serious approach of instruction and exposure are desired to improve the present trend in Vocational Technical Education (VTE). The

government of Kano State shares the above view in its policies reviewed in 2008. The purpose of such review as it stated was to meet the targets of the National Economic Empowerment and Development Strategy (NEEDS) which are expressed as; value re-orientation, poverty eradication, job creation, wealth generation, and using education to empower the citizenry. Part of the [4] reviewed policy stated thus:

Review technical and vocational education curriculum in consultation with industry to ensure a demand driven approach and increase the relevance of programmes to the needs of industry, ensure that practical skills are assessed as part of all science and technical education examinations, initiate and articulate appropriate technology programmes that will enhance the capacity of vocational centres to support and service cottage industries, broaden and localise the vocational education curriculum to make formal crafts more relevant to immediate communities, mandate technical colleges to develop products and provide services to their immediate communities on a commercial basis, establish small scale enterprises managed by staff and students in technical colleges, solicit private sector sponsorship to supplement government subventions to technical colleges, encourage government patronage of goods and services offered by technical colleges (p.35).

However, students' acquisition of practical skills is necessary for the attainment of the above mentioned purposes which cannot be realized in a non-supportive school environment. This is supported by [5] who asserted that practical teaching materials available in most technical colleges in Kano State are obsolete and not functional and consumable materials do not commensurate with students' population, as a result of this, technical graduates deficient in practical skill were produced over the years.

In a similar perspective, [6] also reported that wrong approach to teaching and evaluation of practical subjects in technical colleges rather than impart skills to students, produce students who are ill-equipped with practical skills, inadequate creative power and unable to secure employment. EIMW departments in technical colleges of Kano State are no exception to this problem of learning resources that hamper with career education. A teacher of vocational and technical subject must not only teach but must use activity-based strategies (such as project and field trip methods) that will enhance students' acquisition and sustenance of knowledge, skills and self-concept formation as well as interest [7]. In the opinion of the researchers students in EIMW departments receive ineffective instruction and become weak in practical skills due to wrong approach to teaching, supervising, and assessment of students.

A teacher of Electrical Installation and Maintenance Work (EIMW) is the one who gives instructions and communicates knowledge, skills and attitudes to EIMW students. He is the conduit through which knowledge and practical skills of EIMW could be transmitted as such he should use appropriate teaching and supervisory strategies together with learning resources, and he must use relevant pedagogy that will enhance students' acquisition of practical skills through activity-based instruction where students are given opportunities to be more active in the class. The teacher is expected to plan his lesson properly by carefully choosing the objectives of the lesson, devising on making the learners participate in the learning process in a more responsible way, selecting the appropriate strategies of teaching, appropriate strategies for supervision as well as determining the appropriate strategies for assessment.

Inadequate supervision of practical activities also impede acquisition of practical skills especially where practical projects are inspected at the end of the process whereas adequate supervision on the whole practical process has a major influence on the overall performance and efficiency of skills acquisition. [8] stated that supervision as an element of administrative process is concerned with effort of the administration by stimulating, directing and coordinating the students and their efforts, cultivating good personal relationship that moves collectively towards a more efficient performance of all the functions that lead to goal achievement. [9] also stated that teachers must be able to establish good rapport with the students and their parents and involve students in the processes of establishing ground rules for behaviour so that students will be accountable for their actions, manage transitions during practices, and motivate students to maximize time-on-task, supervise students in their learning activities and lastly deal with students' misbehaviour effectively. This is expected so as to help the students to master key skill areas. It will also equip the students with the ability to be open-minded and creative about the application of techniques to their challenges.

Similarly, [10] stated that assessment is the process of seeking, obtaining and quantifying data with a view to making value judgment about objects, events or their characteristics. [11] viewed assessment as a process which involves passing judgment on how adequate are marks or scores obtained through measurement. He further commented that assessment enables teachers provide proper guidance to students, determine students' understanding of what they are being taught and provide feedback to them on how well they are going academically. Contributing on the importance of assessment in education programmes, [12] looked at assessment in a school setting as the process which includes research activities, the systematic testing of data, clarifying discrepancies between goals and objectives and a decision making function. Achievement test attempts to assess the relative weakness and strengths of a learner to determine the areas where the individual needs remedial work, or as readiness indication of an individual's possession of skills needed to learn the material at the next higher level [13]. Hence, strategies for improving students' acquisition of practical skills in

Electrical Installation and Maintenance Work trade in technical colleges are important factors for acquiring high quality practical skills.

It is therefore important to investigate strategies that will bring forth appreciable improvement in the acquisition of practical skills among the students of EIMW trade in the eight technical colleges of Kano State.

1.1 Statement of the Problem

Electrical Installation and Maintenance Work programme in technical colleges is designed to produce skilled craftsmen who will be able to perform basic functions in electrical installation and maintenance work both in private and public sector [13]. This calls for the necessity of acquiring high quality practical skills through the use of appropriate teaching and assessment strategies to be complemented with competent and experienced teachers, well-equipped workshops, adequate supply of teaching materials, adequate supervision of practical lessons and proper linkages between technical colleges and local industries [14].

Unfortunately, practical skills acquisition in Nigerian technical colleges are battling with numerous problems among which are poor teaching strategies. The teaching of technical subjects has been too theoretical that many students prefer subjects in Arts and Social Sciences because there is no longer much emphasis on the learners' practical skills acquisition in technical colleges. Teachers in most cases use lecture method only in a programme instead of applying a variety of strategies like demonstration and discussion or guided discovery and discussion [15].

Another problem is inadequate supervision of practical activities.[16]observed that the usual practice is that students' practical projects are inspected at the end of the process, but adequate supervision on the whole practical process has a major influence on the overall performance and efficiency of skills acquisition.

This observation still persists as supported by [6] who reported that wrong approach to teaching, supervisory and assessment strategies of practical subjects in technical colleges rather than impart practical skills to students, produce students who are ill-equipped with practical skills, inadequate creative power and unable to secure employment. [17] also observed that the inability to put into practice what is taught to students in technical college cause relative backwardness of most societies. Many scholars maintained that if knowledge is acquired in school and is not used for the betterment of the society, then such knowledge is meaningless.

However, the researchers also observed that inspite of many years of teaching EIMW trade subjects in technical colleges of Kano State and inspite of the lucrative nature of the trade and low capital requirement for establishing a trade centre, not many graduates of the trade possessed adequate practical skills that will enable them to effectively fit into the world of work. This may be caused by poor acquisition of practical skills by the students consequent upon obsolete and inefficient practical teaching materials, ineffective teaching and assessment strategies in EIMW trade in technical colleges of Kano State. Another important factor could be poor supervision of practical lessons in EIMW trade in technical colleges of Kano State.

In view of the above therefore, there is need to carry out a study to determine strategies for improving students' acquisition of practical skills in electrical installation and maintenance work trade in technical colleges. This could improve on the existing strategies associated with EIMW trade students' practical skills acquisition in technical colleges of Kano State.

1.2 Purpose of the Study

The main purpose of the study was to identify strategies for improving students' acquisition of practical skills in Electrical Installation and Maintenance Work (EIMW) trade in the technical colleges of Kano State. Specifically, the study determined:

1. The appropriate strategies for teaching practical skills in EIMW trade in technical colleges of Kano State.
2. The supervisory strategies for practical skills acquisition of students in Electrical Workshop in technical colleges of Kano State.
3. The strategies for assessing practical skills of students in EIMW trade in technical colleges of Kano State.

1.3 Research Questions

The study was guided by the following research questions:

1. What are the appropriate teaching strategies to be used for teaching practical skills in Electrical Installation and Maintenance Work (EIMW) trade in technical colleges of Kano State?
2. What are the strategies for supervising student's practical work activities in Electrical Installation and Maintenance Work trade in technical colleges of Kano State?
3. What are the strategies for assessing students' practical skills acquisition in EIMW trade in technical colleges of Kano State?

1.4 Hypotheses

The following null hypotheses were tested at 0.05 level of significance to guide the study.

H₀₁: There is no significant difference between the mean responses of EIMW trade teachers and students on appropriate teaching strategies for teaching practical skills in EIMW.

H₀₂: There is no significant difference between the mean responses of EIMW trade teachers and students on supervisory strategies for practical skills acquisition in EIMW.

H₀₃: There is no significant difference between the mean responses of EIMW trade teachers and school administrators on the assessment strategies for practical skills acquisition in EIMW.

1.5 Significance of the Study

The findings of this study are of benefit to employers of labour, teachers of electrical installation and maintenance work trade, students of electrical installation and maintenance work trade and curriculum planners such as National Board for Technical Education. The knowledge of the level of practical skills acquired by students of electrical installation and maintenance work trade will assist employers of labour in attaching values to those skills already acquired by students at college for promoting a specialist work force. The results of this study will enable teachers of electrical installation and maintenance work trade to understand their roles better and enhance their effectiveness in selecting suitable teaching strategies for different topics in imparting practical knowledge on the students. Teachers will also be better informed to determine whether skills taught to students are acquired or not by using the right strategy of assessment. The study will provide the teachers with information on areas of strength and weaknesses of students for correction and improvement. Other beneficiaries are the students who will discover the level of practical skills they acquired in technical college and plan for remedial programme where necessary in order to face the challenges in industries and other places of work. On the other hand, curriculum planners such as National Board for Technical Education will find the results of the study relevant especially in planning by integrating the identified strategies into EIMW curriculum so that teachers will find them helpful during delivery of instruction.

1.6 Scope of the Study

The study was restricted to strategies for improving students' acquisition of practical skills in accredited EIMW departments of technical colleges that will enable them to function effectively in Kano State. EIMW teachers, students and school administrators were involved in this study. The study covered practical teaching strategies, supervisory strategies and assessment criteria in vocational and technical education. Teaching materials were also a part of the study as needed compliments that would motivate skill acquisition of students in EIMW trade in technical colleges of Kano State.

II. LITERATURE REVIEW

The review of related literature was organized under the following sub-headings:

- 2.1 Theoretical Framework
- 2.2 The Concept of Skill Acquisition
- 2.3 Teaching Materials: Tools, Machines and Equipment in Electrical Installation and Maintenance Work Trade in Technical Colleges
- 2.4 Strategies for Teaching Practical Skills in Electrical Installation and Maintenance Work Trade in Technical Colleges
- 2.5 Strategies for supervising Skills Acquisition Practices in Electrical Installation and Maintenance Work Trade in Technical Colleges
- 2.6 Strategies for Assessing Practical Skills of Students in Technical Colleges
- 2.7 Review of Related Empirical Studies
- 2.8 Summary of Literature Reviewed

III. RESEARCH METHODOLOGY

3.1 Design of the Study

The researchers adopted descriptive survey research design. A descriptive survey research design according to [18] is a systematic and unbiased investigation which is concerned with collection of data for the purpose of describing and interpreting existing conditions, prevailing practices, beliefs, attitudes and procedures. The design is suitable for this study since data were collected through questionnaire from school administrators, EIMW trade teachers and students on Strategies for Improving Students' Acquisition of Practical Skills in Electrical Installation and Maintenance Work trade in technical colleges of Kano State.

3.2 Area of the Study

This study covered eight Government Technical Colleges (GTCs) in Kano State where EIMW programmes have been duly accredited by the National Board for Technical Education. Kano State is located in the north-west geopolitical zone of Nigeria having coordinates of 12⁰ 00' N and 8⁰ 31' E with a land area of 499km² (193 sq. mi.) [19]. The population of Kano metropolitan was 2,828,861. Kano State was created from the old Northern Region on May 27, 1967 and it was having boarders with Katsina State to the north-west, Jigawa State to north-east, and Bauchi and Kaduna States to the south [20].

3.3 Population of the Study

The population of the study comprised 24 school administrators, 22 trade teachers and 208 final year students of the eight accredited government technical colleges as shown on Appendix IV. The whole population of 254 was manageable; hence there was no sample for the study.

3.4 Instrument for Data Collection

A structured questionnaire named Strategies for Improving Students' Acquisition of Practical Skills in Electrical Installation and Maintenance Work (EIMW) trade in the eight accredited technical colleges of Kano State was used to collect data for the study. The instrument contained 28 items and was divided into four sections lettered 'A', 'B', 'C' and 'D'. Section 'A' was on general information of the respondents. Section 'B' comprised 8 items which solicited responses from trade teachers and students on appropriateness of teaching strategies to be used for teaching practical skills. Section 'C' consisted of 10 items which also solicited responses from trade teachers and students on the supervisory strategies for improving acquisition of practical skills by students in EIMW trade. While the responses in Section 'D' having 10 items were obtained from school administrators and trade teachers because this section addressed strategies for assessing acquisition of practical skills by students in technical colleges. The questionnaire was structured on a five-point rating scale format with response options of Very Much Appropriate (5), Much Appropriate (4), Inappropriate (3), Much Inappropriate (2), and Very Much Inappropriate (1).

3.5 Validation of the Instrument

A draft of the instrument for data collection of this study was face validated by three experts. Two experts from School of Technology and Science Education, Modibbo Adama University of Technology, Yola and one expert from Government Technical College Kano. The experts were requested to scrutinize each item of the questionnaire for clarity of statement. They also examined the appropriateness and suitability of all items on the instrument. The suggestions and corrections of the experts were used in modifying the instrument. The validated instrument was then used for data collection.

3.6 Reliability of the Instrument

Kurder Richardson (KR-21) formula was used to determine the reliability of the instrument. The choice of the KR-21 formula was to determine the internal consistency of items within the instrument. The reliability test of the validated instrument was obtained by administering the questionnaires on 15 teachers from EIMW trade who were not part of the population for the study. Kurder Richardson (KR-21) formula is given by:

$$\begin{aligned} \text{Where, } r &= \text{reliability of the whole test} \\ K &= \text{the number of items in the test} \\ d &= \text{the standard deviation of the scores} \\ \bar{x} &= \text{the mean of the scores} \end{aligned}$$

The reliability coefficient of section B = 0.82, section C = 0.76, and section D = 0.80. The overall reliability coefficient of the questionnaire = 0.79.

3.7 Method of Data Collection

The questionnaire was administered to the respondents with the help of two research assistants. The research assistants were given instructions on how to administer the questionnaire. The copies of the questionnaire were collected by the research assistants and the researchers as soon as the respondents finished responding to the questionnaire.

3.8 Method of Data Analysis

Manual computation and Statistical Package for Social Science (SPSS) Statistics version 21 were used to analyse the data. The research questions were analysed by using mean, grand mean and standard deviation. While t-test analysis was used to test the null hypotheses at 0.05 level of significance. The decision rule for the research questions was as follows: Any item with a mean response of 3.50 and above was considered as much

appropriate while any item with mean value of 3.49 and below was regarded as inappropriate. For testing the null hypotheses (H_0); if the calculated t-value was equal or greater than the t-table (t-critical), the null hypotheses were rejected. If the calculated t-value was less than the t-table (t-critical), the null hypotheses were accepted.

Table 1: Mean Responses and Standard Deviations on Appropriate Teaching Strategies to be used for Teaching Practical Skills in EIMW Trade in Technical Colleges of Kano State

S/No	Item Statement	t n=22	\bar{x}_s n=208	G	σ	Decision
1	Guest lecture method.	3.36	3.63	3.60	1.09	Much Appropriate
2	Demonstration method.	4.55	4.10	4.14	.74	Much Appropriate
3	Field trip method.	3.32	3.51	3.49	.95	Inappropriate
4	Project method.	2.96	3.59	3.53	1.10	Much Appropriate
5	Assignment method.	3.46	3.84	3.80	1.04	Much Appropriate
6	Guided discovery method.	3.50	3.67	3.65	1.04	Much Appropriate
7	Drill and practice methods.	3.91	3.73	3.75	1.07	Much Appropriate
8	Apprenticeship (local attachment) method.	3.77	3.51	3.54	1.08	Much Appropriate

Key:

Mean Response of Students; t = Mean Response of Teachers; G = Grand Mean; σ = Average Standard Deviation; n = Number of Respondents

Table 2: Mean Responses and Standard Deviations on Supervisory Strategies for Students' Practical Work Activities in Electrical Installation and Maintenance Work Trade in Technical Colleges of Kano State

S/No	Item Statement	t n=22	s n=208	G	Σ	Decision
9	Taking attendance by workshop attendants at the beginning of every practical session.	4.36	3.95	3.98	.99	Much Appropriate
10	The workshop attendants should guide the students in selection of tools and materials for every practical session.	4.23	4.09	4.10	.95	Much Appropriate
11	The teacher should encourage students to be open minded and creative about the applications of techniques to their challenges during practical session.	3.86	3.98	3.97	.85	Much Appropriate
12	The teachers must make sure each individual is provided with needed materials at the beginning of the practical.	4.27	4.15	4.16	.87	Much Appropriate
13	The teachers should make sure that each student undertaking practical activities is well dressed during the practical lesson.	4.22	4.04	4.06	.92	Much Appropriate
14	The teacher s should interact with students and ask for their opinions where necessary during the practical activities.	3.50	3.88	3.84	1.03	Much Appropriate
15	The teachers should give room for improvisation and seek for alternatives from students when difficulty arises during practical activities.	4.09	3.58	3.63	1.07	Much Appropriate
16	The workshop attendants should always encourage team work among students undertaking practical activities.	4.05	3.81	3.83	1.16	Much Appropriate
17	Teachers must enforce safety rules and regulation with regards to use of workshop tools and equipment.	4.09	4.02	4.03	.87	Much Appropriate
18	The workshop attendants must ensure that each student participates in the process of practical projects.	3.68	3.91	3.89	.93	Much Appropriate

Key: t = Mean Response of Teachers; s = Mean Response of Students; G = Grand Mean
 σ = Average Standard Deviation; n = Number of Respondents.

Table 3: Mean Responses and Standard Deviations on Strategies for Assessing Students' Practical Skills Acquisition in Electrical Installation and Maintenance Work Trade in Technical Colleges of Kano State

S/NO	Item statement	n=24	n=22	\bar{G}	σ	Decision
19	Assessing students' practical lesson using checklist assessment strategy.	4.21	3.59	3.91	.96	Much Appropriate
20	Allowing students to participate in assessment process.	3.54	3.50	3.52	.73	Much Appropriate
21	Using psycho-productive test to measure students' practical ability in the workshop.	3.71	3.00	3.37	.94	Inappropriate
22	Using psycho-productive test to measure students' practical ability after instruction monthly.	3.79	3.59	3.69	.73	Much Appropriate
23	Giving different assignment to each student at the end of each lesson.	4.08	3.23	3.67	1.15	Much Appropriate
24	Giving oral examinations to students at the end of each lesson.	3.96	3.77	3.87	0.76	Much Appropriate
25	Measuring students' ability with standardized test every week.	4.38	3.64	4.03	.72	Much Appropriate
26	Giving project work to students every week.	2.17	3.73	2.92	1.05	Inappropriate
27	Administering written examinations to students every two weeks.	3.38	3.64	3.50	1.11	Much Appropriate
28	Interviewing and rating each student immediately after practical work.	3.25	3.45	3.35	1.05	Inappropriate

Key: \bar{G} = Mean Response of Administrators; t = Mean Response of Teachers; G = Grand Mean; σ = Average Standard Deviation; n = Number of Respondents.

Hypothesis 1

There is no significant difference between the mean responses of Electrical Installation and Maintenance Work (EIMW) trade teachers and students on appropriate teaching strategies for teaching practical skills in EIMW trade in technical colleges of Kano State.

Data presented in Table 4 shows that the t_{cal} (-1.86) was less than the p_{-value} (0.06) at 0.05 level of significance and at 228 degree of freedom. Hence, the null hypothesis H_{01} was accepted indicating that there is no significant difference between the mean scores of trade teachers and students on appropriate teaching strategies for teaching practical skills in Electrical Installation and Maintenance Work trade in technical colleges of Kano State.

Hypothesis 2

There is no significant difference between the mean responses of EIMW trade teachers and students on supervisory strategies for practical skills acquisition in EIMW.

Data presented in Table 5 shows that the t_{cal} (-0.52) was less than p_{-value} (0.61) at 0.05 level of significance and at 228 degree of freedom. Hence, the null hypothesis H_{02} was accepted indicating that there is no significant difference between the mean scores of trade teachers and students on supervisory strategies for practical skills acquisition in Electrical Installation and Maintenance Work trade in technical colleges of Kano State.

Hypothesis 3

There is no significant difference between the mean responses of EIMW trade teachers and school administrators on the assessment strategies for practical skills acquisition in EIMW. Data presented in Table 6 shows that the t_{cal} (-0.57) was less than p_{-value} (0.57) at 0.05 level of significance and at 44 degree of freedom. Hence, the null hypothesis H_{05} was accepted indicating that there is no significant difference between the mean scores of Electrical Installation and Maintenance Work trade teachers and school administrators on assessment strategies for practical skills acquisition in EIMW trade in technical colleges of Kano State.

Table 4: t-test Analysis of Mean Responses of Electrical Installation and Maintenance Work Trade Teachers and Students on Appropriate Teaching Strategies for Teaching Practical Skills in EIMW Trade in Technical Colleges of Kano State

Respondents	N	SD	Std. error mean	df	t_{cal}	p_{-value}	Remark	
Teachers	3.55	22	0.91	0.19	228	-1.86	0.06	NS
Students	3.94	208	0.94	0.07				

Key: \bar{M} = Mean; N = Number of respondents; SD = Standard Deviation; $Std. Error Mean$ = Standard Error Mean; df = Degree of Freedom; t_{cal} = Calculated t-value; p_{-value} = 2-tailed sig.; NS = Not Significant; EIMW= Electrical Installation and Maintenance Work.

Table 5:t-test Analysis of Mean Responses of Electrical Installation and Maintenance Work Trade Teachers and Students on Supervisory Strategies for Students' Practical Skills Acquisition in EIMW Trade in Technical Colleges of Kano State

Respondents	N	SD	Std. error mean	Df	t _{cal}	p-value	Remark	
Teachers	4.09	22	0.79	0.17	228	-0.52	0.61	NS
Students	4.19	208	0.81	0.06				

Key: = Mean; N = Number of respondents; SD = Standard Deviation; Std. Error Mean = Standard Error Mean;df = Degree of Freedom; t_{cal} = Calculated t-value; p-value = 2-tailed sig.; NS = Not Significant; EIMW= Electrical Installation and Maintenance Work.

Table 6:t-test Analysis of Mean Responses of Electrical Installation and Maintenance Work Trade Teachers and School Administrators on Assessment Strategies for Students' Practical Skills Acquisition in EIMW Trade in Technical Colleges of Kano State

Respondents	N	SD	Std. error mean	df	t _{cal}	p-value	Remark	
Teachers	3.59	22	0.73	0.16	44	-0.57	0.57	NS
Administrators	3.75	24	1.11	0.23				

Key:= Mean; N = Number of respondents; SD = Standard Deviation; Std. Error Mean = Standard Error Mean;df = Degree of Freedom; t_{cal} = Calculated t-value; p-value = 2-tailed sig.; NS = Not Significant; EIMW= Electrical Installation and Maintenance Work.

IV. FINDINGS OF THE STUDY

Based on the results obtained from the analyzed data, the findings of the study are summarized as follows:

1. Teaching strategies for teaching practical skills acquisition in Electrical Installation and Maintenance Work (EIMW) trade courses in technical colleges in Kano State include guest lecture, demonstration, assignment, project, and guided discovery methods.
2. Appropriate supervisory strategies discovered for supervising students practical activities include taking attendance by workshop attendance at the beginning of every practical lesson, guide the students in selection of tools and materials for every practical session, encouraging students by the teachers to be open minded and creative about the applications of techniques to their challenges during practical session, ensuring that each individual is provided with needed materials at the beginning of the practical.
3. Appropriate strategies for assessing students' practical lesson in EIMW trade in technical colleges in Kano State include using checklist assessment strategy, allowing students to participate in assessment process, using psycho-productive test to measure students' practical ability in the workshop, and giving different assignment to each student at the end of each lesson were discovered to be much appropriate for assessing students' practical skills acquisition in EIMW trade in technical colleges of Kano State.
4. It was found out that there was no significant difference between the mean responses of trade teachers and students on appropriate teaching strategies for teaching practical skills in Electrical Installation and Maintenance Work trade in technical colleges of Kano State.
5. It was discovered that there was no significant difference between the mean responses of trade teachers and students on supervisory strategies for students' practical skills acquisition in Electrical Installation and Maintenance Work trade in technical colleges of Kano State.
6. It was also found out that there was no significant difference between the mean responses of trade teachers and school administrators on assessment strategies for students' practical skills acquisition in Electrical Installation and Maintenance Work trade in technical colleges of Kano State.

4.1 Discussion of Findings

The findings of this study on practical teaching strategies indicated that trade teachers and students accepted the teaching strategies in this section as appropriate teaching strategies for teaching students acquisition of practical skills in Electrical Installation and Maintenance Work trade in technical colleges. Items agreed upon include; guest lecture and inquiry/problem solving methods, demonstration and discussion methods, project and discussion methods, assignment and discussion methods, guided discovery and discussion methods, drill and practice and discussion methods, apprenticeship (local attachment) and discussion methods. The finding is in agreement with the findings of [21] who reported that teaching strategies such as guest lecture, demonstration, project, experiment, assignment, discussion, and field trip are appropriate for teaching vocational and technical education courses. However, the findings differ with the findings of [21] in that field trip and discussion methods were rejected by the respondents. [22]also pointed out that students benefit more when variety of teaching methods is applied within a lesson. [23]stipulated that teaching success depends on skilled application of teaching methods and stressed that field trips enable students to study industrial processes and also see the

relevance of laboratory and workshop practical activities. A careful study of the findings in this section indicate that trade teachers and students believed that adopting the practical teaching strategies will definitely improve students' acquisition of practical skills in Electrical Installation and Maintenance Work trade in technical colleges. Rejection of field trip and discussion methods by the respondents as appropriate strategy for teaching practical skills in vocational and technical education was contrary to the opinion of [23] and [21].

The findings on supervisory strategies revealed that the trade teachers and students agreed on all the 10 items in this section. The supervisory strategies include; Taking attendance by teachers at the beginning of every practical session, guiding the students in selection of tools and materials for every practical session, encouraging students to be open minded and be creative about application of techniques to their challenges during practical session, making sure students are provided with the needed materials at the beginning of every practical session, making sure all students are systematically assessed during and at the end of every practical session, interacting with students and asking for their opinion where necessary, encouraging team work among students, enforcing safety rules and regulation with regards to use of workshop facilities. These supervisory strategies are in agreement with the view of [24] who viewed supervision as a process of operating in a close range by actually overseeing, controlling dealing with situation as they arise. On the other hand, [25] found out that to supervise means to direct, oversee, guide or make sure that expected standards are met. The findings in this section indicate that the supervisory strategies are in line with the assertion of [26] who emphasized that the teacher is expected in the course of his duty, to initiate several activities that will lead to a successful acquisition of required skills. The findings in this section also indicate that the trade teachers and students believed that adopting the supervisory strategies in this section will improve students' acquisition of practical skills in Electrical Installation and Maintenance Work trade in technical colleges of Kano State.

The findings on assessment strategies showed that both trade teachers and school administrators accepted the strategies for assessing students' acquisition of practical skills in Electrical Installation and Maintenance Work trade in technical colleges of Kano State. The assessment strategies accepted by the respondents include: assessment of students during practical using checklist assessment strategy, allowing students to participate in the assessment process, measuring students' ability with standardized test every week, using psycho-productive test to measure students' practical ability after instruction monthly, giving different assignment to each student at the end of each lesson, giving oral examinations to students at the end of every lesson and administering written examinations to students every two weeks. While the assessment strategies rejected by the respondents include: using psycho-productive test to measure students' practical ability in the workshop, giving project work to students every week, and interviewing and rating each student immediately after practical work. The findings in this section were in agreement with that of [11] who opined that performance test should be used in assessing achievement of objectives in the psychomotor domain and practical performance test which involves setting students on a task and rating them as they work is the best for assessing psychomotor skills.

Findings on hypothesis one indicated that both trade teachers agreed that appropriate teaching strategies improve students' acquisition of practical skills in Electrical Installation and Maintenance Work trade in technical colleges of Kano State. This test was found to be statistically non-significant because the mean responses of the respondents obtained indicated that teaching strategies identified to teach practical aspect of Electrical Installation and Maintenance Work trade in technical colleges are much appropriate for improving students' acquisition of practical skills. This finding is in agreement with the findings of [6] who found out that there was strong influence of teaching methods on students' acquisition of practical skills. [15] also buttressed that appropriate teaching strategies should be employed in teaching practical subjects in technical colleges so as to achieve the National goals of education in Nigeria.

Findings on hypothesis two showed that trade teachers agreed that supervisory strategies for students' practical skills acquisition in Electrical Installation and Maintenance Work trade in technical colleges of Kano State were much appropriate for improving practical skills acquisition by students. This test was found to be statistically non-significant because the mean responses of the respondents obtained showed that the supervisory strategies identified to supervise practical activities of students in Electrical Installation and Maintenance Work trade in technical colleges are much appropriate for improving students' acquisition of practical skills. This finding agreed with the view of [16] who reported that adequate supervision on the whole practical process has a major influence on the overall performance and efficiency of students' acquisition of practical skills. The finding is also in line with the finding of [26] who found out that a teacher in the course of his duties must initiate several activities that will lead to successful acquisition of required skills. He further explained that supervision allows the supervisor to help improve the effectiveness of students through advice and assistance so that the students can contribute maximally towards the attainment of objectives.

Findings on hypothesis three revealed that the mean responses of trade teachers and school administrators on assessment strategies for students' acquisition of practical skills in Electrical Installation and Maintenance Work trade in technical colleges of Kano State were much appropriate for improving acquisition of practical skills. This test was found to be non-significant because the mean responses of trade teachers and school

administrators obtained indicated that relevant assessment strategies identified to assess practical activities of students in Electrical Installation and Maintenance Work trade in technical colleges are much appropriate. This finding is in agreement with the findings of [14] who discovered that teachers use various strategies to assess the students outcome. The strategies include process, product, systematic observation, and rating scales. Assessment plays an important role in teaching and learning process because it points out areas of weaknesses and strength of the learners and also indicates how effective a particular teaching strategy is.

V. CONCLUSION

Based on the results of this study it can be concluded that appropriate strategies for teaching practical skills acquisition are used in Electrical Installation and Maintenance Work (EIMW) trade in technical colleges of Kano State. Appropriate strategies for supervising and assessing students' practical work in technical colleges of Kano State are also being used to improve acquisition of practical skills by the students. EIMW trade in technical colleges is all about teaching skills to students for employment and wealth creation. In order for the students to acquire practical skills, teachers are required to teach relevant skills to students by adopting appropriate teaching, supervisory, and assessment strategies.

ACKNOWLEDGEMENTS

The researchers are grateful to Almighty God for giving them energy throughout the period of the study. The researchers are also grateful to the authorities of Federal College of Education (Technical) Bichi, friends and family for their patience and understanding during the period of this study. The researchers appreciate the efforts of the Dean, School of Technology and Science Education Modibbo Adama University of Technology Yola-Nigeria, Prof. C. A. John as well as the Head of Department, Technology Education, Prof. D. K. Diraso along with Dr. D. Moses, Dr. M. U. Cyril, and Dr. J. Zambwa for academic guidance that led to the completion of this work. Lastly, the researchers are also thankful to the following personalities: Dr. N. A. Nwankwor and Dr. E. B. Enoch for validating the research instrument used for the study.

REFERENCES

- [1]. M. P. Udoutin, Individualizing pre-vocational education programme in secondary school, *International Journal of Educational Development*, 4 (11), 2001, 1-5.
- [2]. R. K. Johnson & A. V. Adams, *Skills development in Sub-Saharan Africa* (Washington DC, World Bank, 2004).
- [3]. N. A. Saviour, A. O. Ezekiel & W. S. Patrick, Instructional strategies and students' skill acquisition in vegetable crop production, *Pakistan Journal of Business and Economic Review*, 3 (1), 2012, 126-128.
- [4]. KSGN, Kano State Government of Nigeria, *Education strategic plan: Technical and vocational education and training; Policy and strategy framework*. (Kano Printing Press. Retrieved from: <http://www.esspin.org/.../11/kano-education-sector-plan, 2008, 2009-2018>).
- [5]. Y. Salihu, Strategies for improving teaching and learning practical skills in motor vehicle mechanics trade in technical colleges in Gombe State, *Journal of Vocational and Technical Educators*, 2 (2), 2010, 47-54.
- [6]. A. E. Udofia, A. B. Ekpo, S. O. Nsa & E. O. Akpan, Instructional variables and students' acquisition of employable skills in vocational education in Nigerian technical colleges, *International Journal of Engineering and Social Science*, 2 (7), 2012, 13-15.
- [7]. B. A. Ogwo & R. N. Oranu, *Methodology in formal and non-formal technical and vocational education* (Enugu, University of Nigeria Press, 2006).
- [8]. B. O. Ukeje, G. C. Akabogu & A. Ndu, *Educational administration* (Enugu, Fourth Dimension Publishers, 1992).
- [9]. M. Boynton & C. Boynton, Developing positive teacher-student relations, in M. Boynton & C. Boynton (Eds.), *Educator's Guide to Preventing and Solving Discipline Problems*, (USA: ASCD Publishers, 2005).
- [10]. B. G. Nworgu, *Educational measurement and assessment: Theory and practice* (Nsukka, University Trust Publishers, 2003).
- [11]. O. M. Okoro, *Measurement and evaluation in education*, (Uruowulu-obosi, Pacific Publishers, 2002).
- [12]. J. A. Ajala, Research and evaluation practice in curriculum development, in J. Ajala (Ed), *Designing content of the curriculum: a guide to practice*, (Ibadan: Maybest Publishers, 2002).
- [13]. H. N. Mohammed, *Construction and validation of an achievement test in Metal Machining Practices NCE (Technical) Level*, Unpublished PhD thesis, Abubakar Tafawa Balewa University, Bauchi-Nigeria, 2006.
- [14]. M. I. Odo, S. O. Adenle & R. O. Okwori, Enhancing mastery of practical skills in students of vocational and technical education through activity based instruction, *Journal of Technical Education and Training*, 4 (2), 2012, 22-24.
- [15]. K. O. Odu, Improving the quality of technology education in Nigerian Secondary School, *African Journal of Education and Development*, 5 (1), 2006, 88-94.
- [16]. M. P. Isah, Effective management of workshop resources in vocational technical education for National development, *Journal of Nigeria Association of Teachers of Technology*, 5 (6), 2003, 146-146.
- [17]. O. Richard, *Strategies for improving skill acquisition of building technology students in technical colleges in Ebonyi State*, (Unpublished Master's thesis, Department of Vocational Teacher Education, University of Nigeria, Nsukka, 2011).
- [18]. A. Ali, *Conducting research in education and the social sciences* (Enugu, TashiwaNetwone, 2006).

- [19]. U. Yunusa, *Implementation of curriculum of technical and vocational education and training in technical colleges of Kano and Jigawa States of Nigeria*, (Unpublished doctoral thesis, Department of Curriculum Education, Bayero University Kano, 2013).
- [20]. NPC, National Population Commission, *Demography of Kano State*, (Abuja-Nigeria, NPC, 2006).
- [21]. O. M. Okoro, *Principles and methods in vocational and technical education*, (Nsukka-Nigeria, University Trust Publishers, 1999).
- [22]. I. M. Ningi, *Factors militating against effective teaching and learning of metal Work in Bauchi, Gombe, Jigawa and Taraba States technical colleges* (Unpublished M. Ed. thesis, Nsukka university of Nigeria, (2001).
- [23]. J. L. Levinson-Rose & R. J. Menges, Improving college teaching, *Review of Educational Research*, 51 (3), 1981, 403-434.
- [24]. L. Ajayi& S. Lee, Perceptual difference between intern teachers and university supervisors on the expectations and preferences for the fieldwork program, *Education*, 126 (2), 2006, 259-274.
- [25]. S. O. Igwe, *Supervision, evaluation and quality control in education in Nigeria* (Benin City, Ambik press, 2001).
- [26]. B. Bukar, Research supervision and student research project in technical education. *Journal of Natural Science and Technology Forum*, 1, (2), 2000, 44-50.