



## Use of Pedagogical Apparatus in Teaching Fabrication and Welding Trade Programme in Technical Colleges in Bauchi State, Nigeria.

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### ABSTRACT

The study assessed the use of pedagogical apparatus in teaching Fabrication and Welding Trade programme in technical colleges in Bauchi State, Nigeria. A descriptive survey design was employed to carry out the study. Three research questions were formulated to guide the study. A 36-item questionnaire was the instrument utilized to elicit the required data from the respondents for the study. The developed instrument by the researchers was validated by three experts. The data was collected from 27 Fabrication and Welding trade teachers and 130 students in the Fabrication and Welding Trade programme in all the technical colleges in the area of the study. Cronbach alpha was used to determine the internal consistency of the instrument and it yielded a coefficient of 0.81. Mean was employed to answer the research questions. Based on the findings conclusion were drawn and recommendations made amongst which are that the government and other agencies responsible for running the affairs of the technical colleges should provide adequate Fabrication and Welding Trade instructional materials for effective teaching and learning. There should be regular conferences, seminars, workshops and interactive sessions in order to create awareness on the use and importance of instructional materials in the teaching and learning process.

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### INTRODUCTION

Pedagogical apparatuses are the concrete aids in teaching and learning processes, they are synonymous to instructional materials. These instructional materials assist the learners to comprehend effectively during the teaching learning process. These apparatuses are very important for effective teaching and learning especially to inexperienced teachers who constantly rely on instructional materials will, for sure, deliver their lessons in an effective manner. According to Abdu-Raheem (2014), Instructional materials play a vital role in teaching and learning activities. Abdu-Raheem further described instructional materials as instructional media which has a wide range of resources to provide realistic image that enrich curricular contents and

educational process which include simple things such as living and non-living things in the environment.

Consequently, piece of wood, diagram on papers, metal scraps, stones, printed materials (charts, maps, photographs), models, real objects and sophisticated items like audio and video machines, projecting machines and computers all fall within this category. These materials are equipment which enhances teaching and learning processes by making teaching and learning easier. Oladejo (2011), viewed teaching aids as materials that improve and promote teaching and learning hence, its effective selection provides the teacher with the opportunity to master his subject matter. The importance of instructional materials in teaching Technical Vocational Education and



Training (TVET) has been emphasized in the National Policy of Education.

The Federal Republic of Nigeria in the National Policy on Education (FRN, 2014) revealed that the goals of TVET are to provide trained manpower in the applied sciences, technology and businesses, particularly, at craft, advanced craft and technical level as well as providing the technical knowledge and vocational skills necessary for agricultural, commercial and economic development; thereby giving training and imparting necessary skills to the individuals who shall be self-reliant. These technical knowledge and vocational skills are imparted at technical college level.

Technical college by definition is referred to as post-primary institution established to offer vocational and technical education programmes aiming at establishing, training and equipping students with technical skills to earn a living. Idoko (2014) stated that technical college is equivalent to senior secondary school designed to prepare individuals to acquire practical skills, basic scientific knowledge and attitude required to produce craftsman at sub-professional level. According to Adofu and Ocheja (2015), Technical colleges in Nigeria are established to prepare technical college students to acquire practical skills and basic scientific knowledge charged with the responsibility to produce skilled manpower in the areas of block/bricklaying and concreting, carpentry and joinery, domestic installation, electrical installation, motor vehicle mechanics, radio and television and Fabrication and Welding Trade for the needs of the Nigerian society.

Fabrication and Welding Trade is one of the most popular trade in Bauchi State due to its diversity that leads to producing different types of products needed by the society. Jadas (2015) described Fabrication and Welding Trade as a discipline aimed at training students on general properties and use of Metal in order to help them in selection of material for a particular job, training them on how to grasp different techniques and approaches for a specific work as well as teaching them the basic safety rules and regulation in the workshop to safe guard their lives. He further state that Fabrication and Welding Trade, been one of the complicated courses offered is characterized with the need to employing different and relevant

pedagogical apparatus for better grasping of its theoretical aspects which will pave the way to proper practice and implementation of its applications. Theories without practical aspects will not be of importance in teaching Fabrication and Welding because; different skills to be acquired which prevail therein requires an application of psychomotor. As such, proper selection of pedagogical apparatus –in teaching and learning which include the printed and non-printed materials will help guide both teachers and students deliver appropriate tasks as stipulated in the curriculum of the programme. The objectives of Fabrication and Welding Trade programme at technical college level entailed that, on the completion of the programme, the students should be able to: carryout cutting jobs on all types of metal, produce simple finished structured steel work project with safety, using relevant equipment and techniques, apply protective wetting against corrosion on finished metal projects and market finished metal projects (National Board for Technical Education NBTE, 2014). The components of the Trade programme comprises of 30% general education, 65% technical education and 5% Students' Industrial Work Experience Scheme (SIWES).

It is observed that many teachers do not use instructional materials during teaching and learning of Fabrication and Welding trade programme. As such, they contribute negatively to the poor performance of the students. Therefore, the non-utilization of instructional materials in teaching Fabrication and Welding trade programme by the teachers constitute a problem in technical colleges in Bauchi State, Nigeria. This problem needs proper redressing. Although the State government have tried their best in providing most of the facilities needed in the technical colleges, the technical colleges still lack adequate facilities, this is evident based on students' poor academic performances in Fabrication and Welding trade programme in technical colleges. Also some teachers seem not to be committed to their jobs. All these issues which raise alarm for immediate attention and solutions seem to point to one direction on the use of instructional materials in the technical colleges, which include the printed and non-printed materials. Teachers' utilization of both printed and



non-printed instructional materials in teaching Fabrication and Welding trade programme in technical colleges is of paramount importance for successful transfer of knowledge from the teacher to the learners and likewise for promoting quality learning.

### PURPOSE OF THE STUDY

The purpose of this study is assess the use pedagogical apparatus in teaching Fabrication and Welding trade programme in technical colleges. Specifically, the study is designed to determine:

1. The extent to which teachers utilized printed instructional materials for effective teaching of Fabrication and Welding trade programme in technical colleges.
2. The extent to which teachers utilized non-printed instructional materials for effective teaching of Fabrication and Welding trade programme in technical colleges.
3. The possible strategies that will improve teachers' utilization of instructional materials for effective teaching Fabrication and Welding trade programme in technical colleges.

### RESEARCH QUESTIONS

The following research questions guided the study:

1. To what extent are printed instructional materials utilized by teachers for effective teaching of Fabrication and Welding trade programme in technical colleges?
2. To what extent are non-printed instructional materials utilized by teachers for effective teaching of Fabrication and Welding trade programme in technical colleges?
3. What are the strategies that will improve teachers' utilization of instructional materials for effective teaching of Fabrication and Welding trade programme in technical colleges?

### METHODOLOGY

The study adopted a descriptive survey research design to elicit information from Fabrication and Welding trade teachers and

students in all the eight technical colleges in Bauchi State, Nigeria. Descriptive survey research design in the view of Nworgu (2006) is the study which aims at collecting data on, and describing in a systematic manner the characteristics, features or facts about a given population. The design was deemed appropriate since data was collected to assess the use pedagogical apparatus in teaching Fabrication and Welding trade programme in technical colleges. The population of the study consists of 27 Fabrication and Welding trade teachers and 130 students in Fabrication and Welding trade programme in all the technical colleges in the area of the study. The choice of the population was based on the fact that they are knowledgeable and therefore, in a very good position to give authentic information on the use instructional materials in teaching Fabrication and Welding Trade programme in the technical colleges.

A structured questionnaire was the instrument utilized to elicit the required data from the respondents for the study. This was developed by the researchers from extensive review of literature and based on the objectives of the research. The instrument was face validated by two experts from Department of Vocational and Technology Education, Abubakar Tafawa Balewa University, Bauchi, State Nigeria and one expert from the Department of Industrial and Technology Education, Federal University of Technology Minna, Niger State Nigeria. To determine the reliability of the instrument, it was pilot-tested on 15 respondents from Government Technical College Minna, Niger, and State that were not part of the study. Then, Cronbach alpha was used to determine the internal consistency and it yielded a coefficient of 0.81. Thus the instrument was considered appropriate for use by the researcher. The questionnaires were administered by the researchers and the entire instruments were retrieved and analysed. The questionnaire was designed on a 4-point scale of Very High Extent – VHE, High Extent– HE, Low Extent – LE, and Very Low Extent – VLE, for answering only research questions 1 and 2. Response items such as Strongly Agree - SA, Agree – A, D – Disagree, and SD – Strongly Disagree, were constructed for answering research question 3 respectively. The decision rule was based on theory of true class



limits of numbers with numerical values ranging between 3.50 – 4.49 =Very High Extent – VHE, 2.50 – 3.49 = High Extent– HE, 1.50 – 2.49 = Low Extent – LE, and 0.50 – 1.49= Very Low Extent – VLE, for answering only research questions 1 and 2. Response items such as Strongly Agree – SA = 3.50 – 4.49, Agree – A =2.50 – 3.49, Disagree D = 1.50 – 2.49 and Strongly Disagree SD = 0.50 – 1.49 were constructed for answering research question 3 respectively. Therefore, the mean responses of the respondents were interpreted

based on the true class limits of numbers highlighted.

### PRESENTATION OF RESULTS

Results of the data analyzed for the study were presented in Tables 1 to 3

**Research Question 1:** To what extent are printed instructional materials utilized by teachers for effective teaching of Fabrication and Welding trade programme in technical colleges?

**Table 1:** Mean Responses of the Respondents on the Extent to which Printed Instructional Materials are utilized by Teachers for Effective Teaching of Fabrication and Welding Trade Programme in Technical Colleges. N<sub>1</sub> = 27 N<sub>2</sub> = 130

S/No	Extent to which Printed Instructional Materials are Utilized by Teachers	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_A$	Remark
1.	Magazines and Newspapers articles on Fabrication and Welding trade are made reference to in order to aid and support my teaching in class.	2.06	2.09	2.08	LE
2.	Dictionaries are used to find meaning of some difficult words and concepts in class.	2.00	2.90	2.45	LE
3.	All the topics taught in Fabrication and Welding trade are guided by the scheme of work	3.29	2.67	2.98	HE
4.	Downloaded printed text materials relating to Fabrication and Welding trade from the Internet are utilized for teachings in the classroom	1.88	1.37	1.63	LE
5.	Drawings on cardboard papers are utilized to support the teaching of all Fabrication and Welding trade topics in the classroom.	2.52	2.23	2.38	LE
6.	Teachers use guide material to support the teaching of Fabrication and Welding trade lessons in the classroom.	2.90	2.70	2.80	HE
7.	For every of the Fabrication and Welding trade topics taught in the classroom, lesson notes prepared.	3.06	3.33	3.20	HE
8.	All presentations in the classroom by the teacher are supported with Fabrication and Welding trade textbooks	2.29	2.37	2.33	LE
9.	Students are given assignments on the Fabrication and Welding trade workbook after every teaching in the classroom.	2.12	2.90	2.51	HE
10.	Printed graphic materials on Fabrication and Welding trade are used to support and draw students' attention in the classroom.	2.06	2.86	2.46	LE



11.	Fabrication and Welding trade drawings and charts on prints are always utilized in all teachings in the classroom.	2.06	2.37	2.22	LE
12.	Visual printed pictures to buttress points are used for all presentations in the classroom	2.29	2.23	2.26	LE
13.	Posters relating to various topics are displayed at every Fabrication and Welding trade lesson taught in the classroom.	2.07	2.30	2.19	LE
14.	Published journal articles on Fabrication and Welding trade are used by teachers in order to develop lessons	2.22	2.10	2.16	LE
<b>Grand Mean</b>		<b>2.34</b>	<b>2.46</b>	<b>2.37</b>	<b>LE</b>

**Notation**

$\bar{X}_1$  = Mean of Fabrication and Welding Trade Programme Teachers

$\bar{X}_2$  = Mean of Fabrication and Welding Trade Programme Students

$\bar{X}_A$  = Average Mean of All Respondents

$N_1$  = Number of Fabrication and Welding Trade Programme Teachers

$N_2$  = Number of Fabrication and Welding Trade Programme Students

VHE = Very High Extent, HE = High Extent, LE = Low Extent, VLE = Very Low Extent

The results from Table 1 showed that only items 3, 6, 7 and 9 scored above the 2.50 of the mean score. This result revealed that teachers' utilization of printed instructional materials based on the statement on the items was to a high extent. All the other items from 1, 2, 4, 5, 6, 8, 10, 11, 12, 13 and 14 scored below the mean score of 2.50. This result revealed that teachers' utilization of printed materials was to a low extent. The grand mean of 2.37 also revealed

that teachers' utilization of printed materials instructional materials for effective teaching of Fabrication and Welding trade programme in technical colleges in Bauchi State is to a low extent, which is minimal.

**Research Question 2:** To what extent are non-printed instructional materials utilized by teachers for effective teaching of Fabrication and Welding trade programme in technical colleges?

**Table 2:** Mean Responses of the Respondents on the extent to which Non-printed instructional materials are utilized by teachers for effective teaching of Fabrication and Welding trade programme in technical colleges?

S/No	Extent to which Non-Printed Instructional Materials are Utilized by Teachers	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_A$	Remark
15.	Computers are sometimes brought to teach students in the classroom.	2.10	2.00	2.05	LE
16.	Smart phones are used to search for meaning of difficult concepts during presentations in Fabrication and Welding trade class	1.20	2.13	1.67	LE
17.	Television and video are sometimes improvised to enable the teacher create in-depth understanding of the Fabrication and Welding trade topic discussed in the classroom.	2.03	1.90	1.97	LE



18.	Bulletin and flannel boards, posters, printed graphic materials and charts on Fabrication and Welding trade are displayed for students' learning	1.77	2.10	1.94	LE
19.	Cassette player or radio sets are tape recorded and played to draw students' attention to Fabrication and Welding trade lesson in the classroom	2.20	2.17	2.19	LE
20.	Teachers play DVD cassette players during presentations in Fabrication and Welding trade classes.	1.45	1.27	1.36	VLE
21.	Salient points and examples on the chalkboard/whiteboard are written by teachers to explain the lesson to students in the classroom	2.92	3.10	3.01	HE
22.	Detailed notes are copied by the teacher for students on the chalkboard/whiteboard after every lesson taught in class.	3.18	3.40	3.29	HE
23.	Real objects are often displayed in the classroom for students to experienced reality of the topic taught in the class.	2.45	2.87	2.66	HE
24.	Dioramas, three dimensional objects and models are used to support teaching in most of the lessons taught in the classroom.	2.07	2.43	2.25	LE
25.	Projectors with still and motions pictures are utilized to aid teachings of Fabrication and Welding trade in the classroom.	2.38	2.47	2.43	LE
	<b>Grand Mean</b>	<b>2.16</b>	<b>2.35</b>	<b>2.26</b>	<b>LE</b>

The analysis of results presented in Table 2 revealed that only items 20, 21, 22 and 23 scored above the 2.50 of the mean score. This result revealed that teachers' utilization of non-printed instructional materials based on the statement on the items was to a very high extent for item 20 and high extent for 21, 22, and 23. All the other items from 15, 16, 17, 18, 19, 24 and 25 scored below the mean score of 2.50. This result revealed that teachers' utilization of non-printed instruction materials was to a low extent. The grand mean of 2.26 also revealed that teachers'

utilization of non-printed instructional materials based on the statement on the items was to a low extent for teaching of Fabrication and Welding trade programme in technical colleges in Bauchi State

**Research Question 3:** What are the strategies that will improve teachers' utilization of instructional materials for effective teaching of Fabrication and Welding trade programme in technical colleges?

Table 3: Strategies that will Improve Utilization of Instructional Materials for Effective Teaching and Learning

S/No	Strategies that will Improve Utilization of Instructional Materials for Effective Teaching and Learning	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_A$	Remark
26.	Teachers should be encouraged to show positive attitudes towards utilizing instructional	3.57	3.26	3.42	A



	materials in teaching Fabrication and Welding trade subject.				
27.	Administrators should ensure proper selection of instructional materials in teaching Fabrication and Welding trade in the school.	3.20	3.00	3.10	A
28.	Instructional materials in the school should be supervised and audited constantly to ensure that they are fit to carry out their functions in teaching	3.35	3.29	3.32	A
29.	Government should provide adequate budget for procurement of instructional materials in Fabrication and Welding trade	3.52	3.88	3.70	SA
30.	School board should collaborate with other NGOs, agencies and private individuals to support schools with adequate instructional materials for teaching Fabrication and Welding trade	3.67	3.52	3.60	SA
31.	Parent Teachers Associations (PTA) in schools should assist to improvise most of the instructional materials needed for teaching Fabrication and Welding trade in schools	3.45	3.09	3.27	A
32.	Principals should adopt best management, maintenance culture and strategies that will improve utilization of instructional materials in schools	2.47	3.06	2.77	A
33.	Out-dated and old instructional materials should be replaced with modern ones in the school.	3.58	3.51	3.55	SA
34.	Teachers should always improvise instructional materials within their reach as a means of supporting instructional materials utilization when teaching Fabrication and Welding trade	3.20	3.12	3.16	A
35.	Instructional materials should be adequately available in the school for teaching Fabrication and Welding trade	3.66	3.54	3.60	SA
36.	Continuous training and retraining programmes should be organized for teachers to accord them with the competences in using varieties of instructional materials to teach Fabrication and Welding trade in the classroom.	3.77	3.52	3.65	SA
	<b>Grand Mean</b>	<b>3.41</b>	<b>3.34</b>	<b>3.37</b>	<b>A</b>

The results presented in Table 3 shows that all the items from 26 to 36 scored above the mean score of 2.50. None of the items in the table

scored below the mean score of 2.50. The grand mean of 3.37 also indicated that the respondents strongly supported the adoption of all the possible



strategies that will improve teachers' utilization of instructional materials for effective teaching of Fabrication and Welding trade programme in technical colleges in Bauchi State

## DISCUSSION OF FINDINGS

The importance of instructional material for teaching and learning processes is to enable teachers provide firsthand experience in the classroom. Instructional resources help to provide materials and opportunity for the students to be actively involved in the teaching learning processes. The findings of the results in Table 1 generally revealed the utilization printed instructional materials by Fabrication and Welding trade programme teachers in technical colleges in Bauchi State was minimal and to a low extent. Instructional resources help to provide materials and opportunity for experiment. This ensures students participation in the lesson, which promotes effective learning. The use of instructional materials by teachers's carry out two main broad functions of pedagogical function and motivational functions (Onajite, Olaniyi, Oyerinde, Onyesom & Aina, 2019). The Fabrication and Welding trade programme curriculum used in Nigerian technical colleges is activity-based and emphasizes the acquisition of productive skills for life-long learning. These require creativity on the part of the teacher in sourcing for and using appropriate instructional resources for teaching and learning (Federal Republic of Nigeria - FRN, 2014). The findings in Table 1 further shows that printed materials were limited and utilized to a low extent by Fabrication and Welding trade programme teachers in technical colleges in Bauchi State to teach the subject. This finding agrees with Enaigbe (2009) study which observed that basic materials such as textbooks, chalkboard, graphic materials, charts, posters and writing materials in teaching Fabrication and Welding Trade are readily not utilized in teaching in schools. This will definitely affect the student to comprehend what the teacher is teaching them in the classroom

Findings from Table 2 shows that non-printed materials were utilized to a low extent by Fabrication and Welding trade programme teachers in technical colleges in Bauchi State to teach the subject. This finding agrees with study

of Enaigbe (2009) whose results revealed that essential equipment like computer, projector, television and video are not readily utilized in many schools. To achieve instructional objectives in the Fabrication and Welding trade classroom situation in Bauchi State, teachers must effectively utilize instructional materials to a high extent in their teachings and presentations. But given the current situation of students' performance and teachings in Fabrication and Welding trade programme it is as if teachers are yet to realize the importance of utilizing some of the important printed and non-printed instructional materials in Fabrication and Welding trade programme. This has resulted in students' negative attitude and withdrawal in further learning the subject at technical college level. Supporting this statement, Obanya (2004) stated that several studies carried out in some areas in Nigeria indicated that the results of Senior School Certificate Examinations were completely bad in nearly all subjects offered by the students and this was related to teachers' poor utilization of instructional materials in the classroom to a low extent. Obanya further stressed that only about 10% of candidates 'meaningfully passed' the examination. This was also echoed and reported in Kadzera (2006) who found out that classroom materials were not available for teachers' use. Kadzera further found out that lack of instructional material resources is one of the reasons contributing to minimal utilization of instructional technology in teachers training in Malawi. This was also confirmed by Njoki (2014), whose study found that instructional materials were lacking in schools.

The results of the findings in Table 3 revealed the possible strategies that will improve teachers' utilization of instructional materials for effective teaching of Fabrication and Welding trade programme at technical college level in Bauchi State. This included that the State Government should provide adequate budget for procurement of instructional materials in Fabrication and Welding trade programme. The Science and Technical College School Board should collaborate with other NGOs, agencies and private individuals to support technical colleges with adequate instructional materials for teaching Fabrication and Welding trade programme. The PTA in schools should assist to improvise most of





the instructional materials needed for teaching Fabrication and Welding trade programme. Principals should adopt best management, maintenance culture and strategies that will improve utilization of instructional materials in schools among others. This finding agrees with Saxena (2014) study which also indicated that effective strategies should be adopted to improve the use of instructional materials in teaching of business studies in the at technical college level. Utilization of instructional materials in effective teaching of Fabrication and Welding trade programme could be realized through adequate funding and improvisation, staff training, effective management and maintenance, proper selection of these materials in the subject area, among others. Supporting the above findings, the studies of Enaigbe (2009); Effiong and Igiri (2015) indicated some of these strategies to include government improvement in teachers' utilization of instructional materials through provision of funds, procurement of the requisite instructional materials in schools and monitoring of instructional materials in schools through constant auditing. In addition, State government who by rite of constitution should always finance technical college education cannot afford the expensive learning facilities because of the present austerity measures. For this reason, many educators have suggested improvisation as a viable alternative. One fact that cannot be disputed is that most of the Fabrication and Welding trade programme students are experiencing a great deal of difficulties in learning with the teaching aids in the technical college level (Ogbonnah, 2008). From all the foregoing, this calls for adequate attention and concentration to be given to teachers' utilization of instructional materials for effective teaching of Fabrication and Welding trade programme at technical college level in Bauchi State.

## CONCLUSION

The importance of pedagogical apparatus or instructional materials in the teaching learning process cannot be overemphasized. However, the findings of this study revealed that Fabrication and Welding trade programme teachers' utilization of instructional materials in their teaching was to a low extent and minimal. Both the printed and non-printed materials were

utilized to a low extent, which calls for immediate action to be taken in order to save the current situation of things in Bauchi state. Failure to highly utilize the printed and non-printed instructional materials in Fabrication and Welding trade programme has negative consequence on teachers' promoting quality learning and rendering effective services in teaching Fabrication and Welding trade programme at technical college level. This calls for effective strategies that will improve teachers' utilization of instructional materials in order to promote students' learning and academic performance. In this regards, Fabrication and Welding trade programme teachers should be provided with the printed and non-printed instructional materials be encouraged in the utilization of these instructional materials for effective teaching of Fabrication and Welding trade programme.

## RECOMMENDATIONS

Based on the findings the following recommendations were made:

1. Fabrication and Welding trade programme teachers should develop positive attitude towards utilization of printed and non-printed materials in order to aid effective teaching and learning in the classroom.
2. Government and other agencies responsible for running the affairs of the technical education schools should provide enough Fabrication and Welding Trade instructional materials for effective teaching and learning.
3. There should be regular conferences, seminars, workshops and interactive sessions in order to create awareness on the use and importance instructional materials in teaching and learning process.
4. School administrators and teachers should improvise the required printed and non-printed instructional materials for use by the teachers that will aid effective teaching in the classroom.



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