



## Assessment of Material Resources for Instructional Delivery of Fabrication and Welding in Technical Colleges in Delta State

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### ABSTRACT

*This study assessed the material resources for instructional delivery of fabrication and welding in technical colleges in Delta State. Three research questions guided the study and three hypotheses were formulated and tested at 0.05 level of significance. The study used descriptive survey research design. The population for study was from six technical colleges in Delta State, which comprised 18 instructors and teachers and 72 NTC III students total 90 respondents. There was no sampling because the population was manageable in size. The questionnaire was a check list used to collect data on Adequacy, Functionality and Usability of Material Resources for Instructional Delivery in Technical Colleges (AFUMRIDTC). The instrument was validated by three experts. The reliability of instrument was determined using inter-rater reliability (Kendal Co-efficient of Concordance (W) which yielded a reliability co-efficient of 0.82 for adequacy, 0.78 for functionality and 0.73 for usability respectively. The data were analyzed using percentage for adequacy, mean and standard deviation for functionality and usability of material resources. t-test was used to test the hypotheses at 0.05 level of significance. Findings of the study revealed that majority of the material resources for instructional delivery of fabrication and welding were available but inadequate, all are functional and usable expect one in the technical colleges. Based on the findings of the study, it was recommended among others, that fabrication and welding workshop in technical colleges should be well equipped with tools and equipment by the government from time to time as required for teaching and learning of fabrication and welding.*

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### INTRODUCTION

Technical colleges provide secondary level education in Technical and Vocational Education and Training (TVET). They are described as the specialist institutions established with the specific aim of training and retraining artisans, craftsmen, and technicians for acquiring fabrication, welding and other technical skills. Eze, et al. (2020) defined technical colleges as institutions where students are trained to acquire relevant knowledge and skills in different trades for employment in the world of work. Therefore, technical colleges are institutions aimed at preparing students for the acquisition of relevant

knowledge and skills in different trades at crafts level.

Furthermore, the curricula activities for technical colleges is structured in foundation and trade modules. According to National Board For Technical Education (2019), the curriculum of technical colleges are grouped into trades, these include Agricultural trades, Automobile trades, Building and Woodwork trades, Business trades, Computer trades, Electrical/Electronics trades, Hospitality trades, Mechanical trades, Printing trades, Textile trades and General Education subjects. Mechanical trades include; Fabrication and Welding, Foundry Craft, Marine Engineering,

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Mechanical Engineering Craft Practice, Plumbing and Pipe fitting and Refrigeration and Air Conditioning Work.

Fabrication and welding at technical college level is expected to equip students to a large extent with skills, basic and scientific knowledge and attitudes required as craftsmen in mechanical trade. According to Eze, et al. (2020) fabrication and welding is a practical skill based programme designed to equip the trainees with knowledge, attitude and skills to carryout metalwork, gas welding, welding and cutting jobs on all types of metals and produce simple finished structural steel work projects. On the same note, Ubanwa, et al. (2022) saw fabrication and welding as the forming and bonding of metals to obtain available objects or structure. Therefore, fabrication and welding has to do with a process requiring material resources such as machines, tools and equipment in the various categories to produce metal parts, components, large scale structures and assemblies. However, fabrication and welding trade at technical colleges are offered at two levels, leading to the award of National Technical Certificate (NTC) and Advanced National Technical Certificate (ANTC) for craftsmen and master craftsmen. However, effective instructional delivery in fabrication and welding in technical colleges involves the use of relevant material resources - tools, equipment, machines, consumable materials as well as the selection of good teaching techniques.

Furthermore, material resources are facilities and materials procured for effective training of the students in practical skills and applied scientific knowledge in fabrication and welding and other skills in technical colleges. These include tools, equipment, machines and consumables- angle grinding wheels, fill electrode, parent plates or pipes (materials, fill electrode (wire), stripling gas, steel pipe, carbon steel, tool steel, square steel pipe, electrodes, flux cored wires, alloy steel, gases (hydrogen, ammonia, carbondioxide), paints, saw wires rectangular steel pipes, electrodes and angular steel pipes among others (Ibrahim, 2010; Poripo, 2012 and Ubanwa et al, 2022). According to Ogbonanya et al (2017) material resources are fixed or movable object, equipment, supplies and

facilities that maybe turned to educational use for attainment of set goals. In the same vein, Kaizer and Okoli (2021) stated that material resources for technical colleges must be in perfect condition for success to be achieved. Therefore, material resources play vital roles in student's learning, without material resources practical work will be difficult to organize (Manabete and Makinde, 2016). Hence, the success of the students can be linked to effective instructional delivery as a result of the adequacy, functionality and usability of material resources.

Instructional delivery refers to the process by which the teacher effectively engages students in learning by using a variety of instructional strategies to meet individual learning needs. Lawal and Yakubu (2018) defined instructional delivery as all human interactive skills employed by the teacher to promote/facilitate learning in the classroom situation thereby leading to improved performance on the part of the learner. In order to achieve the goals of instructional delivery in fabrication and welding in technical colleges, there is need to assess the available material resources. In addition, assessment is an indispensable component of instructional delivery.

Poripo (2012) defined assessment as the process of determining the worth or the effectiveness of school quality indicators like facilities, equipment and classroom preparation of graduates. In the same vein, Houghton (2014) described assessment as the act of appraisal. Hence, assessment is the process of determining and addressing "needs or gaps" between current conditions and desired conditions or wants. In order to achieve effective instructional delivery in fabrication and welding in technical colleges, there is need to assess the adequacy, functionality and usability of the available material resources, as this will ensure the attainment of the goals of fabrication and welding in technical colleges.

## STATEMENT OF THE PROBLEM

The importance of material resources cannot be overemphasized as it aids the process of teaching and learning. The practical nature of



fabrication and welding in technical colleges requires that the students are trained in hands on practical skill acquisition through the use of material resources to compliment theoretical teaching with the view of making them employable on graduation. Ironically, a large number of graduates still find it difficult to access jobs, and are either roaming the streets or are engaged in the business of motorcycle or tricycle riding not necessary because Nigeria's economy is totally weak, but largely because they lack adequate skills that employers are looking for (Olawale & Olaseni, 2019).

This has given rise to the question as to whether these students were taught with the relevant material resources that will enable them acquired the required skills to become employable on graduation. Could it be that the material resources meant for teaching and learning were not functional and hence were not used or even when they are functional were not adequate? If this situation is left as it is, more unqualified fabrication and welding graduates will be produced, year in year out. Hence, the researcher is worried about the continual production of half baked fabrication and welding graduates that do not possess the necessary skills, knowledge and attitude needed for the world of work. This scenario arouses the interest of the researcher. Therefore, the problem of this study is that Technical College graduates of fabrication and welding do not seem to possess the required skills need for employment hence it became imperative to carry out this empirical study to assess the adequacy, functionality and usability of material resources for effective instructional delivery of fabrication and welding in technical colleges in Delta State.

### **Purpose of the Study**

The main purpose of this study was to assess the material resources for instructional delivery of fabrication and welding in technical colleges in Delta State. Specifically, the study determined the;

1. Adequacy of material resources for instructional delivery of fabrication and welding in technical colleges.

2. Functionality of material resources for instructional delivery of fabrication and welding in technical colleges.
3. Usability of material resources for instructional delivery of fabrication and welding in technical colleges.

### **Research Questions**

The following research questions were formulated to guide the study:

1. What is the adequacy of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State?
2. What is the functionality of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State?
3. What is the level of usability of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State?

### **Hypotheses of the Study**

The following hypotheses were formulated and tested at 0.05 level of significance.

- Ho<sub>1</sub>: There is no significant difference between the mean responses of technical college teachers/instructors and students on the adequacy of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State.
- Ho<sub>2</sub>: There is no significant difference between the mean responses of technical college teachers/instructors and students on functionality of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State.
- Ho<sub>3</sub>: There is no significant difference between the mean responses of technical college teachers/instructors and students on the usage of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State.

### **METHODOLOGY**

The design adopted for the study was the descriptive survey design. It was carried out in Delta State. A population of 90 respondents was



used for the study which comprised 12 instructors, 6 teachers and 72 students of National Technical Certificate III (NTC III). Due to the manageable size of the population, the entire population was used as sample for the study. The instrument for data collection was a checklist designed by the researcher which contains 17 items in each section of the three research questions on "Adequacy, Functionality and Usability of Material Resources for Instructional Delivery in Technical Colleges (AFUMRIDTC)". The instrument was validated by three experts.

The reliability of the instrument was established using Kendal Co-efficient of Concordance (w) method which yielded 0.82 for adequacy, 0.78 for functionality and 0.73 for usability. Data collected was analysed using

percentage, mean and standard deviation for the research questions while t-test was used to test the null hypotheses at 0.05 level of significance. In taking decision, any percentage below 50% was regarded as not being adequate. The mean values of 3.00 - 5.00 were accepted as being functional and usable while mean values of 1.00 – 2.99 were not accepted. In testing the hypotheses, if t-calculated was less than the t-critical, the null hypothesis was accepted and if the t-calculated was greater than the t-critical, the null hypothesis was accepted and if the t-calculated was greater than the t-critical, the null hypothesis was rejected at 0.05 level of significance.

## RESULTS

Table 1: Analysis of Adequacy of Material Resources for Instructional Delivery of Fabrication and Welding in Technical Colleges.

S/N	Items	Quantity	No of Users	% Adequacy	Remarks
1	Angle grinding wheels	10	87	11.49%	Inadequate
2	Welding wires	147	87	169%	Adequate
3	Electrodes	152	87	175%	Adequate
4	Fluxes	18	87	20.69%	Inadequate
5	Flux coved wires	145	87	166.67%	Adequate
6	Welding Shield	88	87	101%	Adequate
7	Gases (Hydrogen, Ammonia, Carbondioxides)	228	87	131%	Adequate
8	Square steel pipes	81	87	93%	Inadequate
9	Rectangular steel pipes	73	87	84%	Inadequate
10	Angular steel pipes	80	87	92%	Inadequate
11	Steels pipes	81	87	80.46%	Inadequate
12	Welding and cutting torch	70	87	80.46%	Inadequate
13	Spanner	89	87	102%	Adequate
14	Hammer	77	87	88.51%	Inadequate
15	Chisel	98	87	112.64%	Adequate
16	Pillar drilling machine	24	87	27.59%	Inadequate
17	Tool and cutting grinding machine.	8	87	9.19%	Inadequate

**Source:** Field Work (2025)

Summary of result on Table1 reveals that out of the seventeen material resources for instructional delivery of fabrication and welding in technical colleges in Delta State, seven (Welding

wires, Electrodes, Flux coved wires, Welding Shield, Gases, Spanner and Hammers) are adequate.

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Table 2: Analysis of Functionality of Material Resources for Instructional Delivery of Fabrication and Welding in Technical Colleges

S/N	Items	Mean	Std deviation	Remarks
1	Angle grinding wheels	3.66	0.48	Functional
2	Welding wires	3.44	0.50	Functional
3	Electrodes	3.41	0.49	Functional
4	Fluxes	3.46	0.58	Functional
5	Flux coved wires	3.47	0.52	Functional
6	Welding Shield	3.48	0.50	Functional
7	Gases (Hydrogen, Ammonia, Carbondioxides)	3.48	0.50	Functional
8	Square steel pipes	3.54	0.58	Functional
9	Rectangular steel pipes	3.44	0.58	Functional
10	Angular steel pipes	3.52	0.66	Functional
11	Steels pipes	3.26	0.63	Functional
12	Welding and cutting torch	3.31	0.63	Functional
13	Spanner	3.56	0.55	Functional
14	Hammer	3.43	0.54	Functional
15	Chisel	3.44	0.58	Functional
16	Pillar drilling machine	3.60	0.49	Functional
17	Tool and cutting grinding machine.	3.63	0.55	Functional

Source: Field Work (2025)

Table 2 revealed that the available tools and equipment in item 1-17 for teaching and learning of fabrication and welding were functional.

Table 3: Analysis of Usability of Material Resources for Instructional Delivery of Fabrication and Welding in Technical Colleges

S/N	Items	Mean	Std deviation	Remarks
18	Angle grinding wheels	3.34	0.58	Usable
19	Welding wires	3.48	0.50	Usable
20	Electrodes	3.27	0.63	Usable
21	Fluxes	3.56	0.62	Usable
22	Flux coved wires	3.70	0.46	Usable
23	Welding Shield	3.60	0.49	Usable
24	Gases (Hydrogen, Ammonia, Carbondioxides)	3.37	0.51	Usable
25	Square steel pipes	3.58	0.50	Usable
26	Rectangular steel pipes	3.30	0.57	Usable
27	Angular steel pipes	3.28	0.70	Usable
28	Steels pipes	3.39	0.68	Usable
29	Welding and cutting torch	3.17	0.81	Usable
30	Spanner	2.90	0.81	Not Usable
31	Hammer	3.22	0.85	Usable
32	Chisel	3.28	0.84	Usable



S/N	Items	Mean	Std deviation	Remarks
33	Pillar drilling machine	3.37	0.81	Usable
34	Tool and cutting grinding machine.	3.26	0.83	Usable

Source: Field Work (2025)

Table 3 revealed that that the tools and equipments for teaching and learning of fabrication and welding are usable. They are Angle grinding wheels, Welding wire, Electrodes welding shield, Gases (Hydrogen, Amonia Carbondioxide), Square steel pipes, Rectangular

steel pipes, Angular steel pipes, Steel pipes, Welding and cutting torch, Hammer, Chisel, Pillar drilling machine and tool and cutting grinding machine. Item 30 (spanner) has mean below 2.99, this indicate that the item it is not well usable.

Table 4: t-test analysis on mean responses of the respondents on the adequacy of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State.

S/N	Items	Mean diff	DF	Sig. (2-tailed)	F	P	t-value	t-critical	Remarks
	Angle grinding wheels	0.296	47.40	0.23	0.650	0.422	1.90	1.96	NS
	Welding wires	0.172	47.55	0.39	10.827	0.001	0.88	1.96	NS
	Electrodes	-	47.45	0.92	0.031	0.861	-0.95	1.96	NS
		0.018							
	Fluxes	0.184	47.78	0.80	2.90	0.092	0.85	1.96	NS
	Flux covered wires	0.196	47.61	0.34	4.91	0.029	0.98	1.96	NS
	Welding Shield	0.053	47.46	0.79	0.835	0.363	0.26	1.96	NS
	Gases (Hydrogen, Ammonia, Carbondioxides)	0.053	47.46	0.79	0.835	0.363	0.26	1.96	S
	Square steel pipes	0.590	47.50	0.02	4.163	0.044	2.63	1.96	NS
	Rectangular steel pipes	0.373	47.14	0.23	0.466	0.497	1.31	1.96	NS
	Angular steel pipes	-	47.84	0.82	0.780	0.380	-0.23	1.96	NS
		0.053							
	Steels pipes	0.122	48.63	0.54	5.478	0.022	0.63	1.96	NS
	Welding and cutting torch	0.492	47.41	0.07	0.279	0.598	1.92	1.96	S
	Spanner	0.385	48.10	0.03	45.229	0.000	4.04	1.96	NS
	Hammer	0.315	48.14	0.10	18.45	0.000	1.76	1.96	NS
	Chisel	0.017	47.64	0.93	0.518	0.474	0.07	1.96	NS
	Pillar drilling machine	0.185	47.44	0.37	0.136	0.713	0.92	1.96	NS
	Tool and cutting grinding machine.	0.686	47.11	0.06	1.825	0.180	2.57	1.96	S

Source: Field Work: 2025

Table 4 presents the result of hypothesis 1 which revealed that the calculated t-value for some of the items are less than the critical t-test value of 1.96 at 0.05 level of significance, hence the null hypothesis was

accepted. This means that there is no significance difference in the mean responses of teachers and students on the adequacy of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State.



Table 5: t-test Analysis on Mean Responses of the Students and Teachers on Functionality of Material Resources for Instructional Delivery of Fabrication and Welding in Technical Colleges in Delta State

S/N	Items	Category	Mean	SD	t.cal	A	t.crit	Remarks																																																																																																																																																																																										
1	Angle grinding wheels	Students	3.76	0.44	1.48	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.61	0.49					2	Welding wires	Students	3.34	0.48	1.33	0.05	1.99	NS	Teachers	3.49	0.50	3	Electrodes	Students	3.48	0.51	0.93	0.05	1.99	NS	Teachers	3.38	0.49	4	Fluxes	Students	3.48	0.63	0.29	0.05	1.99	NS	Teachers	3.44	0.56	5	Flux coved wires	Students	3.52	0.51	0.64	0.05	1.99	NS	Teachers	3.44	0.53	6	Welding Shield	Students	3.48	0.51	0.06	0.05	1.99	NS	Teachers	3.48	0.50	7	Gases (Hydrogen, Ammonia, Carbondioxides)	Students	3.38	0.49	1.30	0.05	1.99	NS	Teachers	3.52	0.50	8	Square steel pipes	Students	3.62	0.49	0.93	0.05	1.99	NS	Teachers	3.51	0.62	9	Rectangular steel pipes	Students	3.38	0.56	0.40	0.05	1.99	NS	Teachers	3.33	0.60	10	Angular steel pipes	Students	3.38	0.68	1.40	0.05	1.99	NS	Teachers	3.59	0.64	11	Steels pipes	Students	3.17	0.66	0.84	0.05	1.99	NS	Teachers	3.30	0.62	12	Welding and cutting torch	Students	3.24	0.58	0.76	0.05	1.99	NS	Teachers	3.34	0.66	13	Spanner	Students	3.48	0.57	1.49	0.05	1.99	NS	Teachers	3.30	0.53	14	Hammer	Students	3.34	0.48	1.13	0.05	1.99	NS	Teachers	3.48	0.57	15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS	Teachers	3.43	0.59	16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67
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		Teachers	3.44	0.56					5	Flux coved wires	Students	3.52	0.51	0.64	0.05	1.99	NS	Teachers	3.44	0.53	6	Welding Shield	Students	3.48	0.51	0.06	0.05	1.99	NS	Teachers	3.48	0.50	7	Gases (Hydrogen, Ammonia, Carbondioxides)	Students	3.38	0.49	1.30	0.05	1.99	NS	Teachers	3.52	0.50	8	Square steel pipes	Students	3.62	0.49	0.93	0.05	1.99	NS	Teachers	3.51	0.62	9	Rectangular steel pipes	Students	3.38	0.56	0.40	0.05	1.99	NS	Teachers	3.33	0.60	10	Angular steel pipes	Students	3.38	0.68	1.40	0.05	1.99	NS	Teachers	3.59	0.64	11	Steels pipes	Students	3.17	0.66	0.84	0.05	1.99	NS	Teachers	3.30	0.62	12	Welding and cutting torch	Students	3.24	0.58	0.76	0.05	1.99	NS	Teachers	3.34	0.66	13	Spanner	Students	3.48	0.57	1.49	0.05	1.99	NS	Teachers	3.30	0.53	14	Hammer	Students	3.34	0.48	1.13	0.05	1.99	NS	Teachers	3.48	0.57	15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS	Teachers	3.43	0.59	16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																														
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		Teachers	3.44	0.53					6	Welding Shield	Students	3.48	0.51	0.06	0.05	1.99	NS	Teachers	3.48	0.50	7	Gases (Hydrogen, Ammonia, Carbondioxides)	Students	3.38	0.49	1.30	0.05	1.99	NS	Teachers	3.52	0.50	8	Square steel pipes	Students	3.62	0.49	0.93	0.05	1.99	NS	Teachers	3.51	0.62	9	Rectangular steel pipes	Students	3.38	0.56	0.40	0.05	1.99	NS	Teachers	3.33	0.60	10	Angular steel pipes	Students	3.38	0.68	1.40	0.05	1.99	NS	Teachers	3.59	0.64	11	Steels pipes	Students	3.17	0.66	0.84	0.05	1.99	NS	Teachers	3.30	0.62	12	Welding and cutting torch	Students	3.24	0.58	0.76	0.05	1.99	NS	Teachers	3.34	0.66	13	Spanner	Students	3.48	0.57	1.49	0.05	1.99	NS	Teachers	3.30	0.53	14	Hammer	Students	3.34	0.48	1.13	0.05	1.99	NS	Teachers	3.48	0.57	15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS	Teachers	3.43	0.59	16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																																										
6	Welding Shield	Students	3.48	0.51	0.06	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.48	0.50					7	Gases (Hydrogen, Ammonia, Carbondioxides)	Students	3.38	0.49	1.30	0.05	1.99	NS	Teachers	3.52	0.50	8	Square steel pipes	Students	3.62	0.49	0.93	0.05	1.99	NS	Teachers	3.51	0.62	9	Rectangular steel pipes	Students	3.38	0.56	0.40	0.05	1.99	NS	Teachers	3.33	0.60	10	Angular steel pipes	Students	3.38	0.68	1.40	0.05	1.99	NS	Teachers	3.59	0.64	11	Steels pipes	Students	3.17	0.66	0.84	0.05	1.99	NS	Teachers	3.30	0.62	12	Welding and cutting torch	Students	3.24	0.58	0.76	0.05	1.99	NS	Teachers	3.34	0.66	13	Spanner	Students	3.48	0.57	1.49	0.05	1.99	NS	Teachers	3.30	0.53	14	Hammer	Students	3.34	0.48	1.13	0.05	1.99	NS	Teachers	3.48	0.57	15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS	Teachers	3.43	0.59	16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																																																						
7	Gases (Hydrogen, Ammonia, Carbondioxides)	Students	3.38	0.49	1.30	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.52	0.50					8	Square steel pipes	Students	3.62	0.49	0.93	0.05	1.99	NS	Teachers	3.51	0.62	9	Rectangular steel pipes	Students	3.38	0.56	0.40	0.05	1.99	NS	Teachers	3.33	0.60	10	Angular steel pipes	Students	3.38	0.68	1.40	0.05	1.99	NS	Teachers	3.59	0.64	11	Steels pipes	Students	3.17	0.66	0.84	0.05	1.99	NS	Teachers	3.30	0.62	12	Welding and cutting torch	Students	3.24	0.58	0.76	0.05	1.99	NS	Teachers	3.34	0.66	13	Spanner	Students	3.48	0.57	1.49	0.05	1.99	NS	Teachers	3.30	0.53	14	Hammer	Students	3.34	0.48	1.13	0.05	1.99	NS	Teachers	3.48	0.57	15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS	Teachers	3.43	0.59	16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																																																																		
8	Square steel pipes	Students	3.62	0.49	0.93	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.51	0.62					9	Rectangular steel pipes	Students	3.38	0.56	0.40	0.05	1.99	NS	Teachers	3.33	0.60	10	Angular steel pipes	Students	3.38	0.68	1.40	0.05	1.99	NS	Teachers	3.59	0.64	11	Steels pipes	Students	3.17	0.66	0.84	0.05	1.99	NS	Teachers	3.30	0.62	12	Welding and cutting torch	Students	3.24	0.58	0.76	0.05	1.99	NS	Teachers	3.34	0.66	13	Spanner	Students	3.48	0.57	1.49	0.05	1.99	NS	Teachers	3.30	0.53	14	Hammer	Students	3.34	0.48	1.13	0.05	1.99	NS	Teachers	3.48	0.57	15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS	Teachers	3.43	0.59	16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																																																																														
9	Rectangular steel pipes	Students	3.38	0.56	0.40	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.33	0.60					10	Angular steel pipes	Students	3.38	0.68	1.40	0.05	1.99	NS	Teachers	3.59	0.64	11	Steels pipes	Students	3.17	0.66	0.84	0.05	1.99	NS	Teachers	3.30	0.62	12	Welding and cutting torch	Students	3.24	0.58	0.76	0.05	1.99	NS	Teachers	3.34	0.66	13	Spanner	Students	3.48	0.57	1.49	0.05	1.99	NS	Teachers	3.30	0.53	14	Hammer	Students	3.34	0.48	1.13	0.05	1.99	NS	Teachers	3.48	0.57	15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS	Teachers	3.43	0.59	16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																																																																																										
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		Teachers	3.59	0.64					11	Steels pipes	Students	3.17	0.66	0.84	0.05	1.99	NS	Teachers	3.30	0.62	12	Welding and cutting torch	Students	3.24	0.58	0.76	0.05	1.99	NS	Teachers	3.34	0.66	13	Spanner	Students	3.48	0.57	1.49	0.05	1.99	NS	Teachers	3.30	0.53	14	Hammer	Students	3.34	0.48	1.13	0.05	1.99	NS	Teachers	3.48	0.57	15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS	Teachers	3.43	0.59	16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																																																																																																						
11	Steels pipes	Students	3.17	0.66	0.84	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.30	0.62					12	Welding and cutting torch	Students	3.24	0.58	0.76	0.05	1.99	NS	Teachers	3.34	0.66	13	Spanner	Students	3.48	0.57	1.49	0.05	1.99	NS	Teachers	3.30	0.53	14	Hammer	Students	3.34	0.48	1.13	0.05	1.99	NS	Teachers	3.48	0.57	15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS	Teachers	3.43	0.59	16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																																																																																																																		
12	Welding and cutting torch	Students	3.24	0.58	0.76	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.34	0.66					13	Spanner	Students	3.48	0.57	1.49	0.05	1.99	NS	Teachers	3.30	0.53	14	Hammer	Students	3.34	0.48	1.13	0.05	1.99	NS	Teachers	3.48	0.57	15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS	Teachers	3.43	0.59	16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																																																																																																																														
13	Spanner	Students	3.48	0.57	1.49	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.30	0.53					14	Hammer	Students	3.34	0.48	1.13	0.05	1.99	NS	Teachers	3.48	0.57	15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS	Teachers	3.43	0.59	16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																																																																																																																																										
14	Hammer	Students	3.34	0.48	1.13	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.48	0.57					15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS	Teachers	3.43	0.59	16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																																																																																																																																																						
15	Chisel	Students	3.48	0.57	0.43	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.43	0.59					16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																																																																																																																																																																		
16	Pillar drilling machine	Students	3.59	0.50	0.18	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.61	0.49					17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS	Teachers	3.57	0.59																																																																																																																																																																														
17	Tool and cutting grinding machine.	Students	3.76	0.44	1.67	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.57	0.59																																																																																																																																																																																														

Source: Field Work (2025)

Table 5 presents the result of hypothesis 2 which revealed that the calculated t-value for all the items are less than the t-critical value of 1.99 at 0.05 level of significance, hence the null hypotheses was accepted. This means

that there is no significant difference between the responses of the teachers and students on the functionality of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State.

Table 6: T-test Analysis on Mean Responses of the Students and Teachers on Usability of Material Resources for Instructional Delivery of Fabrication and Welding in Technical Colleges in Delta State



S/N	Items	Category	Mean	SD	t.cal	A	t.crit	Remarks																																																																																																																																																																																										
18	Angle grinding wheels	Students	3.28	0.59	0.76	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.38	0.58					19	Welding wires	Students	3.45	0.51	0.38	0.05	1.99	NS	Teachers	3.49	0.50	20	Electrodes	Students	3.28	0.59	0.10	0.05	1.99	NS	Teachers	3.26	0.66	21	Fluxes	Students	3.62	0.49	0.76	0.05	1.99	NS	Teachers	3.52	0.67	22	Flux coved wires	Students	3.72	0.46	0.34	0.05	1.99	NS	Teachers	3.69	0.47	23	Welding Shield	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	24	Gases (Hydrogen, Ammonia, Carbondioxides)	Students	3.52	0.51	1.95	0.05	1.99	NS	Teachers	3.30	0.50	25	Square steel pipes	Students	3.62	0.49	0.57	0.05	1.99	NS	Teachers	3.56	0.50	26	Rectangular steel pipes	Students	3.48	0.51	2.24	0.05	1.99	S	Teachers	3.21	0.58	27	Angular steel pipes	Students	3.34	0.61	0.67	0.05	1.99	NS	Teachers	3.25	0.75	28	Steels pipes	Students	3.48	0.69	0.90	0.05	1.99	NS	Teachers	3.34	0.68	29	Welding and cutting torch	Students	3.10	0.86	0.49	0.05	1.99	NS	Teachers	3.20	0.79	30	Spanner	Students	2.69	0.81	1.71	0.05	1.99	NS	Teachers	3.00	0.80	31	Hammer	Students	3.34	0.86	0.94	0.05	1.99	NS	Teachers	3.16	0.84	32	Chisel	Students	3.28	0.88	0.01	0.05	1.99	NS	Teachers	3.28	0.82	33	Pillar drilling machine	Students	3.41	0.83	0.38	0.05	1.99	NS	Teachers	3.34	0.81	34	Tool and cutting grinding machine.	Students	3.31	0.81	0.44
19	Welding wires	Students	3.45	0.51	0.38	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.49	0.50					20	Electrodes	Students	3.28	0.59	0.10	0.05	1.99	NS	Teachers	3.26	0.66	21	Fluxes	Students	3.62	0.49	0.76	0.05	1.99	NS	Teachers	3.52	0.67	22	Flux coved wires	Students	3.72	0.46	0.34	0.05	1.99	NS	Teachers	3.69	0.47	23	Welding Shield	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	24	Gases (Hydrogen, Ammonia, Carbondioxides)	Students	3.52	0.51	1.95	0.05	1.99	NS	Teachers	3.30	0.50	25	Square steel pipes	Students	3.62	0.49	0.57	0.05	1.99	NS	Teachers	3.56	0.50	26	Rectangular steel pipes	Students	3.48	0.51	2.24	0.05	1.99	S	Teachers	3.21	0.58	27	Angular steel pipes	Students	3.34	0.61	0.67	0.05	1.99	NS	Teachers	3.25	0.75	28	Steels pipes	Students	3.48	0.69	0.90	0.05	1.99	NS	Teachers	3.34	0.68	29	Welding and cutting torch	Students	3.10	0.86	0.49	0.05	1.99	NS	Teachers	3.20	0.79	30	Spanner	Students	2.69	0.81	1.71	0.05	1.99	NS	Teachers	3.00	0.80	31	Hammer	Students	3.34	0.86	0.94	0.05	1.99	NS	Teachers	3.16	0.84	32	Chisel	Students	3.28	0.88	0.01	0.05	1.99	NS	Teachers	3.28	0.82	33	Pillar drilling machine	Students	3.41	0.83	0.38	0.05	1.99	NS	Teachers	3.34	0.81	34	Tool and cutting grinding machine.	Students	3.31	0.81	0.44	0.05	1.99	NS	Teachers	3.23	0.84						
20	Electrodes	Students	3.28	0.59	0.10	0.05	1.99	NS																																																																																																																																																																																										
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21	Fluxes	Students	3.62	0.49	0.76	0.05	1.99	NS																																																																																																																																																																																										
		Teachers	3.52	0.67					22	Flux coved wires	Students	3.72	0.46	0.34	0.05	1.99	NS	Teachers	3.69	0.47	23	Welding Shield	Students	3.59	0.50	0.18	0.05	1.99	NS	Teachers	3.61	0.49	24	Gases (Hydrogen, Ammonia, Carbondioxides)	Students	3.52	0.51	1.95	0.05	1.99	NS	Teachers	3.30	0.50	25	Square steel pipes	Students	3.62	0.49	0.57	0.05	1.99	NS	Teachers	3.56	0.50	26	Rectangular steel pipes	Students	3.48	0.51	2.24	0.05	1.99	S	Teachers	3.21	0.58	27	Angular steel pipes	Students	3.34	0.61	0.67	0.05	1.99	NS	Teachers	3.25	0.75	28	Steels pipes	Students	3.48	0.69	0.90	0.05	1.99	NS	Teachers	3.34	0.68	29	Welding and cutting torch	Students	3.10	0.86	0.49	0.05	1.99	NS	Teachers	3.20	0.79	30	Spanner	Students	2.69	0.81	1.71	0.05	1.99	NS	Teachers	3.00	0.80	31	Hammer	Students	3.34	0.86	0.94	0.05	1.99	NS	Teachers	3.16	0.84	32	Chisel	Students	3.28	0.88	0.01	0.05	1.99	NS	Teachers	3.28	0.82	33	Pillar drilling machine	Students	3.41	0.83	0.38	0.05	1.99	NS	Teachers	3.34	0.81	34	Tool and cutting grinding machine.	Students	3.31	0.81	0.44	0.05	1.99	NS	Teachers	3.23	0.84																														
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Source: Field Work (2025)

Summary of data analysis presented on Table5 revealed that the calculated t-value for all the items except item 26 (Rectangular steel pipes) are less than the t-critical value of 1.99 at 0.05 level of significance. Based on the decision rule the null hypothesis was accepted except for item 26. This means that there is no significant difference between the responses of the teachers and students on the usability of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State.

#### Summary of Findings

1. Most of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State are grossly inadequate.
2. On the functionality of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State, results showed that all of the material resources listed for the study are functional.

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3. On the usability of material resources for instructional delivery of fabrication and welding in technical colleges in Delta State, results showed that all of the material resources listed for this study are usable except the Rectangular Steel Pipes.

### DISCUSSION OF FINDINGS

The findings of the study on research question one as presented on Table 1 showed that some material resources for effective instructional delivery are grossly inadequate in technical colleges in Delta State. This implies that technical colleges need more material resources for effective instructional delivery as supported by Beli (2015) who stated that inadequate material resources for instructional delivery might lead to over stretching of the material resources available in the colleges. Corroborating this finding Audu et al. (2021) found a severe inadequacy of essential equipment, tools and modern training modules in many of the technical colleges in Bauchi State.

The test on null hypothesis one in Table 4 showed that there is no significant difference between the mean rating of teacher and students on the adequacy of material resources for instructional delivery of fabrication and welding in technical colleges. Thus the null hypothesis was accepted. This finding is in agreement with the finding of Brobbry et al. (2022) who found that many necessary facilities and material for practical work were either outdated, insufficient or completely non-existent.

Also, the findings of the study on research question two as presented on Table 2 showed that all of the material resources listed for the study are functional in technical colleges in Delta State. This finding confirms with the finding of Oduma et al. (2021) who found that the material resources available for effective teaching of business studies upper basic education in private secondary schools in Ebonyi State Central Senatorial Zone are functional. In the same vein, Ogbonaya et al. (2017) asserted that material resources must be in perfect condition for success to be achieved and that for teaching to be a pleasure, material resources needed in the

workshop must be functional for teaching and learning to be effective.

The test of null hypothesis two in Table 5 showed that there is no significant difference in the mean rating of teachers and students on the functionality of material resources for instructional delivery of fabrication and welding in technical colleges. Thus the null hypothesis was accepted. This finding aligns with the study of Oladimeji (2023) who found that there is no significant difference in the mean rating of motor vehicle mechanic teachers and workshop technicians as regards the extent to which tools and equipment are functional for teaching motor vehicle mechanic trade in technical colleges in Osun State.

The findings of the study on research question three as presented on Table 3 showed that the material resources listed were used during practicals except one in technical colleges in Delta State. This finding is in consonance with the finding of Ogbu (2017) who found that some of the instructional facilities were used while some were never used in teaching of Basic Electricity in technical colleges in Ebonyi State. Corroborating this finding also, Osuyi et al. (2021) asserted that the use of workshop material resources could have significant effect on students academic achievement in technical colleges.

The test of null hypothesis three in Table 6 showed that there is no significant difference in the mean rating of teachers and students on the usability of material resources for instructional delivery of fabrication and welding in technical colleges. Thus the null hypothesis was accepted. This implies that the available material resources were used for instructional delivery in fabrication and welding. This finding conforms with the study of Uwameiye (2016) who found that there is no significant difference between the mean rating of garment making teachers and students on the rate of utilization of equipment and materials for teaching and learning of garment making in senior secondary schools in Edo State.

### CONCLUSION

It is very vital that fabrication and welding students in technical colleges in Delta State are practically skilled in their trade. It is required that these students are competent



practical-wise. This can only be achieved when material resources in fabrication and welding are adequate, functional and well used. When students who are very energetic graduate with little or no relevant skills for self reliance, they suffer depression which may lead to other social vices in the society. To avert this, technical colleges have the duty to ensure that every tool and equipment, as recommended by the NBTE are adequate, functional and well used to ensure effective instructional delivery of fabrication and welding programmes.

### RECOMMENDATIONS

Based on the findings from the study the following recommendations were made:

1. Fabrication and welding subject should be taught using the recommended number of tools and equipment by the NBTE. Also the technical college management should strictly maintain the number of students that are supposed to undertake practical exercises based on NBTE guideline.
2. Government of Delta State should equip technical colleges workshops with modern tools and equipment from time to time as required for teaching and learning of fabrication and welding.
3. Adequate training and re-training of the workshop managers on assigning tools and equipment to students and teachers for practical exercises is important in all technical colleges in Delta State.
4. Government should ensure proper monitoring and supervision of the technical colleges to ensure that tools and equipment available are adequately used and maintained.
5. The school authorities should make requisition to replace un-usable fabrication and welding tools and equipment to ensure effective instructional delivery.

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