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## **Developing Skilled Workforce Through Metalwork Technology Education Programme in Tertiary Institutions for the Contemporary Society in Rivers State, Nigeria.**

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### **Abstract**

*This study examined Developing Skilled Workforce through Metalwork Technology Education Programme in Tertiary Institutions for the Contemporary Society in Rivers State. Two objectives and research questions were raised, while two hypotheses were tested at 0.05 level of significance. A descriptive survey design guided the study. The population of the study was 48 lecturers and 26 technologists in Metalwork/Mechanical Technology Education from the three tertiary institutions in Rivers State that offer Metalwork Technology Education programme. The entire population was sampled. The researchers elicited data for the study using questionnaires. The instrument was validated by two lecturers in the department of Mechanical Technology Education at Niger Delta University, who were not part of the respondents. The reliability coefficient achieved using Cronbach Alpha Reliability Coefficient was 0.84. Mean was used to answer the research questions, while standard deviation was used to determine the homogeneity in the responses. Z-test was used to test the hypotheses at 0.5 level of significance. The study found, among others, that Metalwork Technology Education workshops equipment needed for the development of skilled workforce in tertiary institutions for the contemporary society includes, sensitive drilling machines, metal lathe, shaper, milling machine, arc welding machine, gas acetylene welding equipment etc. It also found that milling operation, drilling, turning, knurling etc, are machining skills required from students to become skillful in contemporary society in Rivers State. It was recommended that Metalwork Technology Education workshops should be equipped with modern machine, and lecturers and technologists should be trained to enable them obtain relevant and modern competences required to produce skilled graduates through Metalwork programmes for the contemporary society in Rivers State.*

**Keywords:** *Skilled Workforce, Metalwork Technology Education, Contemporary Society.*

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### **INTRODUCTION**

The Nigerian system of education is one of the systems in the continent of Africa that has made impact on human development. The system is designed to develop manpower in different areas of specialization that will help in all round development of the country (Amadi & Ochogba, 2022). Several educational programmes are offered in our tertiary institutions to provide manpower/workforce in different fields. One of these programmes designed is Metalwork technology education programme.

Metalwork technology education programme is a crucial component of technical/technology education programme, particularly in tertiary institutions. The discipline equips students with skills in welding, machining, and fabrication. In Nigeria, the importance of technical education in general, and Metalwork Technology in particular, has been highlighted in national development plans (Rasheed, Sgafiu, & Adegunle, 2024). This Metalwork field plays a pivotal role in driving industrialization, manufacturing, and the development of skilled workforce/labour for the country's growing economy. More so, the contribution of Metalwork Technology Education to skills development is well-documented (Usman & Nwosu, 2021). Metalwork Technology, in particular, is vital for Nigeria's industrial sector, providing skilled manpower for the construction and manufacturing industries (Ekanem & Ojo, 2019). As a practical-oriented discipline, Metalwork Technology ensures that graduates acquire the technical skills and knowledge required to engage in productive ventures, either as employees or entrepreneurs (Yusuf, Ibrahim & Olowu, 2022). Developing skilled workforce refers to the process of obtaining, developing, and refining the knowledge, abilities, and competencies necessary to perform specific tasks, operations, or occupations. More so, Ajie, Osah, & Thomas (2022) view it as the process that enables organizations to ensure that there are adequate human resources who will take up responsibilities, thereby promoting continuous growth of the organizations as well as their readiness to actualize their cardinal objectives. Skills and knowledge are the engines of workforce development of any nation, and Metalwork Technology Education, among others, holds the key to training the skilled and entrepreneurial workforce needed for the changing technological workforce (Afeti, cited in Onyenmike, Okwelle, & Okeke, 2015). Developing Skilled workforce is one of the surest ways through which young people (youths) can find ways to the labour market, either in the public or private sector. Skill acquisition varies in nature and complexity according to the trade involved. Therefore, development of skilled workforce can be rephrased simply as developing the human resources for production in this contemporary society.

A contemporary society is described as a setting, characterized by technological innovation and increasing human interconnection and globalization. It brings about changes such as increased life expectancy, literacy, practical skills development, and gender equality, bringing natural equilibrium. Metal skills needed for the development of skilled workforce in a contemporary society, among others, includes, machining, shaping and joining of metals, as well as the finishing and decorations of metal surfaces. In corroborating this concept, Maigidi in beako, Flagg, Okoriecha, and Kooli (2018) confirmed Metalwork as study of all aspects of Metalworking such as machining, sheet, forging, casting, material testing, heat treatment, welding and related aspects of metal manufacturing, which enable individuals excel in a changing world.

### **Statement of the Problem**

Developing technical skills workforce in our institutions in recent years has continued to be a major challenge in Nigeria, despite having one of the largest populations in the world. Skilled manpower is fundamental to economic development and growth, yet Nigeria lags behind in the training of its workforce (Okebukola, cited in Jadas, Amasa, & Ikara, 2023). Metalwork Technology skills, in particular, are needed to provide critical services in this contemporary society. Investigations have shown that national investment in Technical Education, of which Metalwork is an integral part, makes a significant contribution to the overall economic development of a nation. Many experts have warned about the risk of neglecting the training of technical personnel in Nigeria, particularly in Metalwork/Mechanical Technology, and have highlighted the risks of the current level of low skills in a smooth school-to-work transition

(Olaopa, 2019). Notwithstanding, those skills in metal manufacturing have broad applications in virtually every aspect of modern society. Hence, it is the backbone of many occupations. Some occupations that depend on Mechanical/Metalwork include agriculture, transport, commerce, building, equipment and appliances in business communication, electrical/electronics. The situation of skill gap is very evident in the low quality of technical lecturers, especially in Mechanical/Metalwork Technology (Rufai, 2022). This presents a serious impediment to achieving the national goal of an industrialized nation. It is against this backdrop that the researchers sought to investigate “Developing Skilled Workforce through Metalwork Technology Education Programmes in Tertiary Institutions for the Contemporary Society in Rivers State.”

### **Purpose of the Study**

The study is aimed at investigating Developing Skilled Workforce through Metalwork Technology Education Programmes in Tertiary Institutions for the Contemporary Society in Rivers State. Specifically, the study investigated:

1. Administrative strategies for the Development of Skilled Workforce through Metalwork Technology Education Programme in Tertiary Institutions in Rivers State.
2. Metalwork Skills Required by Metalwork Technology Education Lecturers and Workshop Technologists for the Development of Skilled Workforce through Metalwork Technology Education Programme in Tertiary Institutions in Rivers State.

### **Research Questions**

The following research questions guided the study:

1. What are the administrative strategies for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State?
2. What are the Metalwork skills required by Metalwork Technology Education lecturers and technologists for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State?

### **Hypotheses**

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significance difference between the mean responses of lecturers and technologists on the administrative strategies for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State.
2. There is no significance difference between the mean responses of lecturers and technologists on the Metalwork skills required by Metalwork Technology Education lecturers and technologists for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State.

### **Methodology**

The study was carried out in the three tertiary institutions that offer Mechanical Technology Education programmes. These tertiary institutions are Rivers State University, Port Harcourt, Ignatius Ajuru University of Education, Rumuolomini, Port Harcourt, and Federal College of Education (Technical), Omoku, Rivers State, in affiliation with University of Nigeria, Nsukka. The design of the study was a descriptive survey. The population of the study comprised of 48 lecturers and 26 technologists, all in Mechanical Technology Education in these tertiary

institutions. The entire population was sampled for the study using purposive sampling technique. The instrument for data collection was face and content validated by two experts in the department of Mechanical Technology Education at Niger Delta University, Bayelsa State. The instrument was structured in a four-point rating scale. The reliability of the instrument was determined using Cronbach Alpha Reliability method, after administering it to 5 lecturers and 4 technologists in Niger Delta University, who were not part of the study. The reliability coefficient achieved was 0.84. The researchers administered the questionnaires to the respondents directly, and all the questionnaires were retrieved. Mean and Standard Deviation were used to answer the research questions, while Z-test statistical tool was used to test the hypotheses of the instrument. Mean value less than 2.50 was rejected, while mean value equal or greater than 2.50 was accepted.

## Results and Analysis

### Research Question 1

What are the administrative strategies for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State?

**Table 1: Mean Responses on the Administrative Strategies for the Development of Skilled Workforce**

s/n	Items	Lecturers n=48			Technologist n=26		
		$\bar{x}_1$	SD <sub>1</sub>	Decision	$\bar{x}_2$	SD <sub>2</sub>	Decision
1	Intensive supervision of classroom instructional activities	3.76	.98	Agree	3.44	.90	Agree
2	Intensive supervision of students/ technologists' workshop activities	3.62	.73	Agree	3.11	.81	Agree
3	Provision of practical materials	3.88	.88	Agree	3.10	.87	Agree
4	Provision and maintenance of workshop equipment	2.99	.90	Agree	3.21	.79	Agree
5	Intensifying school-industry relationship	3.68	.62	Agree	3.08	.95	Agree
6	Ensure that learners are posted to their areas of Specialization on Industrial Training	3.22	.89	Agree	3.91	.89	Agree
7	Ensure that lecturers & technologists are sent on courses to update their skills	2.91	.59	Agree	3.54	.60	Agree
8	Ensure that practical activities are carried out by students and technologists on regular basis.	3.00	.91	Agree	3.17	.87	Agree
<b>Total</b>		3.38	.81	Agree	3.32	.83	Agree

**Source:** Field Survey, 2025.

Table 1: On the administrative strategies for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State, it shows that lecturers and technologists agreed that the above listed items, among others, are the administrative strategies for the development of skilled workforce through Metalwork Technology Education

programme in tertiary institutions in Rivers State. This is based on the grand mean score of 3.38 and 3.32, respectively, which is above 2.50 that was earlier stated as the acceptable mean benchmark. Furthermore, the closeness in the standard deviations for the two groups, which are .81 and .83, shows homogeneity in their responses.

### Research Question 2

What are the Metalwork skills required by Metalwork Technology Education lecturers and technologists for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State?

**Table 2: Metalwork Skills required by Metalwork Technology Education Lecturers and Technologists**

s/n	Items	Lecturers n= 48			technologist n= 26		
		$\bar{x}_1$	SD <sub>1</sub>	Decision	$\bar{x}_2$	SD <sub>2</sub>	Decision
1	Skills on the production of Gears, such as spur gears, helical gears, bevel gears, and worm gears;	3.86	1.00	Agree	3.96	1.01	Agree
2	Bearings, such as ball bearings, roller bearings and sleeve bearings;	3.66	.80	Agree	3.09	.97	Agree
3	Pipes and pipe fittings skills	3.21	.92	Agree	2.90	.89	Agree
4	Tool and Die making skills	3.20	.90	Agree	3.03	.79	Agree
5	Metal finisher skills	3.27	.81	Agree	3.95	.86	Agree
6	Press operation skills	3.59	.93	Agree	3.81	.59	Agree
7	Plant maintenance welding skills	3.70	.89	Agree	3.89	.85	Agree
8	Aerospace welding skills	3.79	.90	Agree	3.85	.91	Agree
9	Skills on fire protection	3.09	.89	Agree	3.60	.81	Agree
10	Fabrication engineering skills	3.72	.79	Agree	3.20	.83	Agree
11	Technical report writing skills	3.20	.78	Agree	3.80	.96	Agree
12	Structural welding skills	3.09	.69	Agree	3.71	.81	Agree
13	Argon welding skills	3.49	.78	Agree	3.91	.73	Agree
14	Scaffolding skills	3.70	.90	Agree	3.29	.90	Agree
<b>Total</b>		3.63	.85	Agree	3.64	.85	Agree

**Source:** Field Survey, 2025.

Table 2: On the Metalwork skills required by Metalwork Technology Education lecturers and technologists for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State, the table shows that lecturers and technologists agreed that all the above listed items, among others, are the Metalwork skills required by Metalwork Technology Education lecturers and technologists for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State. This is based on the grand mean scores of 3.63 and 3.64, respectively, which is above 2.50 that was earlier stated as the acceptable mean benchmark. Furthermore, the closeness in the



standard deviations for the two groups, which are .85 and .85, shows homogeneity in their responses.

**Hypothesis 1:** There is no significance difference in the mean responses of lecturers and technologists on the administrative strategies for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State.

**Table 3: Summary of Results of Testing Null Hypothesis 1, with z-test Statistics**

Category	N	$\bar{x}$	SD	DF	z-crit	z-cal.	Decision
Lecturers	48	3.38	.81	72	1.98	0.30	Accepted
Technologists	26	3.32	.83				

The result in table 3 shows that z-cal is 0.30, and z-crit is 1.98, at 0.05 significance level. This indicates that z-cal (0.30) is less than z-crit (1.98). As a result, the stated null hypothesis that there is no significance difference in the mean responses of lecturers and technologists on the administrative strategies for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State, is accepted at 0.05 level of significance.

**Hypothesis 2:** There is no significance difference in the mean responses of lecturers and technologists on the Metalwork skills required by Metalwork Technology Education lecturers and technologists for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State.

**Table 4: Summary of Results of Testing Null Hypothesis 2, with z-test Statistics**

Category	N	$\bar{x}$	SD	DF	z-crit	z-cal.	Decision
Lecturers	48	3.63	.85	72	1.98	0.05	Accepted
Technologists	26	3.64	.85				

The result in table 4 shows that z-cal is 0.05, and z-crit is 1.98, at 0.05 level of significance. This indicates that z-cal (0.05) is less than z-crit (1.98). As a result, the stated null hypothesis that there is no significance difference in the mean responses of lecturers and technologists on the Metalwork skills required by Metalwork Technology Education lecturers and technologists for the development of skilled workforce through Metalwork Technology Education programme in tertiary institutions in Rivers State, is accepted at 0.05 level of significance.

## Conclusion

The results obtained underscore the well-established notion that education and skills are crucial drivers of workforce development, economic growth, and productivity. Higher levels of educational attainment and skill raise the supply of skilled workers for the workforce, and boost productivity directly by expanding individuals' economic capabilities, enabling them to accomplish more complex tasks and address more intricate problems. But education and skills are also argued to raise productivity through indirect mechanisms, facilitating technological diffusion and innovation which may enable a contemporary society to move to a higher growth path. One of the major factors that can bring about developing a skilled workforce through Metalwork

Technology Education for the contemporary society of any state is a functional human capacity. Building a functional human capacity involves education and training designed to provide the individuals with knowledge, skills and attitudes related to occupations in Metalwork Technology Education. Educated and skilled workforce can facilitate knowledge transfer within organizations, enabling the spread of best practices and new ideas. Skilled metalworkers can design and develop new metal products, processes, and services, driving innovation, increasing productivity, competitiveness, and economic development for the contemporary society in Rivers State.

### **Recommendations**

Based on the findings of this study, the following recommendations were made:

1. The Management should ensure that there is intense classroom and workshop supervision to equip students with the necessary skills to become competent professionals, enabling them to succeed in the contemporary workforce after graduation.
2. The government should ensure that lecturers and technologists receive regular training to equip them with latest skills and knowledge in Metalwork Technology Education, enabling them to impart relevant skills to students.

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