Building Skilled Man Through Metalwork Technology Education Programme in Tertiary Institutions for Societal Industrualization in Rivers State.

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Abstract- ***This study looked into building skilled man through metalwork technology education programmes in tertiary institutions for societal Industrialization in Rivers State. Three objectives and research questions were raised, while three 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 28 technologists in metalwork/mechanical technology education from the three tertiary institutions in Rivers State that offers the programmes, the entire population was sampled. The researchers collected data for the study using questionnaires. The instrument was validated by two lecturers in the department of mechanical technology education, Niger Delta University who were not part of the respondents. The reliability coefficient achieved using Cronbach Alpha Reliability Coefficient was .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 hypothesis at 0.5 level. The study found among others that Most metalwork technology education workshops need modern equipment and machine for the training of her students to become skilled men. It also found that milling operation, drilling, turning, knurling etc are machining skills required from students to become skilled men for the industrialization of the 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 the skills required to produce skilled men through metalwork programmes in a contemporary society in Rivers State.***

Indexed Terms- ***Building, Skilled man, Metalwork Technology Education, tertiary Institutions, Societal Industrialization***

I. INTRODUCTION

Education that produces skilled individual is important for every nation, it plays a vital role to change the state of a country. It makes a man realize about himself and his goals and how to achieve them. In this era of globalization, a country without technical and technological base will be turned into a dumping ground for imported goods. Balogun as cited in Ahante & Ademila (2014) states that the pressure on Nigeria is to source means as cheaply as possible to be able to remain competitive in a deregulated global economy, as the present reality of our economic problems has made the nation to focus attention on the role that skilled manpower produced from the various higher institutions. can play in making Nigeria an industrialized and production society in this age

Tertiary institutions are places where students are trained to acquire relevant knowledge and practical skills in different occupations for employment in the world of work. Tertiary institutions involve so many fields of study including technical or industrial education, which metalwork is part and parcel of, mechanical engineering, among others Okwelle, Idibia, & Ajie (2022).

In line with this (Ajie, & Ojobah, 2025) stated that Several educational programmes are offered in our tertiary institutions to provide manpower in different fields. One of the programmes designed is Metalwork technology education, Jadas cited in Yakubu (2019), sees metalwork technology education as a discipline which aimed at training students on the general properties and use of metal in order to help them in materials selection for a particular job, train them on how to differentiate the techniques and approaches for a specific work and teach them how to utilize the safety rules and regulations in the workshop.

In view of the above therefore, occupations in the metalworks as fabrication, welding, casting, machining and assembling, metal finishing will be available and at a higher degree demand. It aims at helping students to relate what they have learned in the class or workshop into actual practical situation. helps students understand, use and handle tools, equipment and machines properly. It provides students with job opportunities after graduation in companies, Industries, government parastatals or be self-reliance

Institutions offering metalwork technology as a course are required to have up-to-date facilitators, Lecturers and workshop technologist that possess the requisite qualification of both the manipulative skills and other theoretical knowledge for them to carry out their duties effectively. This is because metal work by its nature requires the establishment of uniformity of technical procedures, administrative procedures, working conditions, tools, equipment, work place arrangement, operation and motion sequences, materials (consumables), quality requirements and similar factors which may affect the performance of the work. Abba cited in Ojobah, Iyagbaye, & Ajie (2024) observed that the challenges facing the management of technical education in Nigeria revolves on ways and means of providing competent and effective technical and vocational training that will meet students need for employable skills, knowledge and attitudes. Ideally, teaching metal work employ the services of highly qualified teachers, who are competent in both the theoretical aspect and the manipulative skills of the course. Metal workshops must be fully equipped with all necessary tools, equipment and machines. There should also be constant supply of exhaustible materials especially the metal, to enable the teacher demonstrate and carryout practical works with the students so that teaching will be more effective. Since the course needs more of practical skills, metal workers should be motivated to attend courses that will expose him to the latest developing in the field (teaching metal work technology) so as to improve the standard of teaching the course.

Industrialization is a term that was mostly associated with the development experience of countries in Western Europe and North America during the 19th and early 20th centuries (Purma, cited in Onyebuchi & Wogor, 2019). In its early sense, it referred to a marked departure from a subsistence economy that was largely agricultural towards a more mechanized system of production that entailed more efficient and highly technical exploitation of natural resources in a highly formal and commercialized economic setting. Chandra in Benedicte, Ngah, & Tabi (2022), industrialization can be seen as the increase in the value added of the manufacturing sector as a percentage of GDP. In this regard, the achievement of industrialization implies a faster growth registered in the manufacturing sector relative to other sectors. For Adinoyi, (2015), industrialization was understood purely in economic terms particularly the physical presence of industrial plants that were involved in manufacturing capital goods as well as processing raw materials into finished goods either for further industrial use, general commercial use or purely for domestic purposes. However, the driving force for processing of these materials into finished goods was the technical know-how provided by the long neglected technical education which metalwork technology is part and parcel of.

More so, Uwaifo in Ehijele & Ezeorie (2018) emphases that training of Nigeria citizenry in metalwork and the need to be technologically liberate, will lead to self-reliance, industrialization and sustainability. He stressed that metalwork technology education more than any other profession has direct impact on national welfare. However, metalwork technology contributions are widespread and visible. Consequently, metalwork technology education can serve as change agents not only for technical systems but also for many other-societal changes

II. STATEMENT OF THE PROBLEM

Metalwork technology is a field of study that teaches individual how to make use of metal to produce different product for daily needs.it is unfortunate that the crop of graduates (supposed Killed men) produce today in technical institutions are less skilled practically, some see it as a result of lack of fully equipped workshop, lack of skilled facilitators (lecturers and workshop technologists). in line with this Dasmani in Ndirmbita & Bwala (2019) states that most of the technical institutions in Nigeria have been forced to perform below standard due to low availability, inadequate, non-functional and poor management of the required tools and equipment in the workshops for effective training of these students. Mbata in Ude (2018) observed that deplorable state of most metalwork workshops and training institutions responsible for training and building manpower are some major factors affecting the building of skilled men, this is resulting from low level funding, inadequate training facilities, and staffing situation. Olatekan in Dawudo (2016) Buttressing on this, lamented that Nigeria technical institutions has not enough skilled manpower or expertise to handle the machines, and equipment for imparting skills to the learners these factors hampers the building of skills that can help in developing manpower in metalwork technology. In a study conducted by Onyene (2018) on the production of skill-oriented graduates for the labor market, the study revealed that the available physical and material resources used in teaching technical vocational education are grossly inadequate. It is against this that the researchers deemed it necessary to look into building skilled man through metalwork technology education programme in tertiary institutions for societal industrialization in Rivers State.

III. PURPOSE OF THE STUDY

The study investigated building skilled man through metalwork technology education programme in tertiary institutions for societal industrialization in Rivers State. Specifically, it investigated:

1. Institutional requirement for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State
2. Essential machining skills required for building skilled man through metalwork technology education programme for societal industrialization in Rivers State
3. Welding and fabrication skills required for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State.

Research Question

The following research questions were raised and guided the study.

1. What is the institutional requirement for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State?
2. What are the essential machining skills required for building skilled man through metalwork technology education programme for societal industrialization in Rivers State?
4. What are the welding and fabrication skills required for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State?

Hypothesis

The following null hypotheses were tested at .05 level of significance:

Ho_1 There is no significant difference between the mean response of metalwork technology education lecturers and workshop technologists in the Institutional requirement for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State

Ho_2 There is no significant difference between the mean response of metalwork technology education lecturers and workshop technologists in the Essential machining skills required for building skilled man through metalwork technology education programme for societal industrialization in Rivers State.

Ho_3 There is no significant difference in the mean response of metalwork technology education lecturers and workshop technologists on the welding and fabrication skills required for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State.

IV. METHODOLOGY

The study was carried out in the three tertiary institutions that offer metalwork/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 River 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 and 28 metalwork/mechanical technology education lecturers and workshop technologists respectively in these tertiary institutions. The entire population was sampled for the study using purposive sampling technique. The instrument for data collection was validated by experts in the department of mechanical technology in Niger Delta University, Bayelsa State The instrument was structured in a four-point rating scale of strongly agree (SA), agree (A), disagree (D), and strongly disagree (SD). The reliability of the instrument was determined using Cronbach Alpha Reliability method. after administering it to 5 and 4 lecturers and 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 instrument 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 less than 2.50 was rejected while mean value equal or greater than 2.50 was accepted.

V. RESULTS AND ANALYSIS

Research Question 1; What is the institutional requirement for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State?

Table 1, means responses on the institutional requirement for building skilled man

		Lecturers n=48			Technologists n=28		
s/n	Items	$\bar{x}_1$	SD$_1$	Decision	$\bar{x}_2$	SD$_2$	Decision
1	Have qualified/ skilled programme facilitators	3.22	.78	Agree	3.11	.70	Agree
2	Have up-to-date technological library	3.10	.86	Agree	3.28	.86	Agree
3	Have up-to-date classroom instructional delivery facilities	3.11	.94	Agree	3.24	.81	Agree
4	Have functional workshop for practical activities	3.90	.82	Agree	3.09	.89	Agree
5	Strengthen the collaboration between industry and the institutions for the skill training of the students	3.00	.85	Agree	3.81	.97	Agree
6	Ensuring that training materials are not lacked in the	3.81	92	Agree	3.63	.91	Agree

	workshops						
7	Ensure that on-the-job training are given to the programme facilitators to enable them update their skills	3.09	.71	Agree	3.45	.98	Agree
8	Always make provision for training/ workshop practical materials	3.75	.90	Agree	3.55	.70	Agree
9	Ensuring that there are modern infrastructures	3.50	.79	Agree	3.40	.94	Agree
	Total	3.38	.84	Agree	3.38	.86	Agree

Source: Field Survey 2025

Table 1: On the institutional requirement for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State, shows that lecturers and technologist agreed that the items posted above among others are the institutional requirement for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State. This is based on the grand mean score of 3.38 and 3.38 respectively which is above 2.50 that was earlier stated as the acceptable means. Furthermore, the closeness in the standard deviation for the two groups which is .84 and .86 shows homogeneity in their responses.

Research Question 2; What are the essential machining skills required for building skilled man through metalwork technology education programme for societal industrialization in Rivers State?

Table 2, means responses on the essential machining skills required for building skill man

Lecturers n= 48					Technologists n=28		
s/n	Items	$\bar{x}_1$	SD1	Decision	$\bar{x}_2$	SD2	Decision
1	Skills to use jig and fixtures	3.01	.66	Agree	3.77	.70	Agree
2	Skills in the operation of parallel shank drills	3.89	.91	Agree	3.64	.89	Agree
3	Skill on the ability of teeth setting of the saw blade required in the cutting / matching work	3.79	93	Agree	3.67	.82	Agree
4	Skill on the specification of drilling machine	3.74	.70	Agree	3.34	.88	Agree

5	Knurling skill	3.04	.78	Agree	3.76	.70	Agree
6	Countersink skills	3.87	.83	Agree	3.50	.89	Agree
7	Skill in operation of sharing machine	3.95	.90	Agree	3.91	.72	Agree
8	Milling machine operation skill	3.53	.80	Agree	3.40	.88	Agree
	Total	3.60	.81	Agree	3.62	.81	Agree

Source: Field Survey 2025

Table 2: On the essential machining skills required for building skilled man through metalwork technology education programme for societal industrialization in Rivers State, shows that lecturers and technologist agreed that the items posted above among others are the essential machining skills required for building skilled man through metalwork technology education programme for societal industrialization in Rivers State. This is based on the grand mean score of 3.60 and 3.62 respectively which is above 2.50 that was earlier stated as the acceptable means. Furthermore, the closeness in the standard deviation for the two groups which is .81 and .81 shows homogeneity in their responses.

Research Question 3: What are the welding and fabrication skills required for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State?

Table 3 means responses on the welding and fabrication skills required for building skill man

Lecturers n=48				Technologists n=28			
s/n	Items	$\bar{x}_1$	SD$_1$	Decision	$\bar{x}_2$	SD$_2$	Decision
1	Measurement and calculation of residual stress in weldment Skill	3.74	.88	Agree	3.43	.60	Agree
2	Joint preparation for fusion welding skill	3.90	.92	Agree	3.74	.88	Agree
3	Skill to perform soldering and brazing	3.49	.87	Agree	3.50	.59	Agree
4	Skill to properly use, measuring, marking out, and cutting, tools	3.85	.72	Agree	3.64	.94	Agree
5	Skills to Identify welding Symbols, codes and their areas of application	3.89	.91	Agree	3.93	1.01	Agree
6	Skill in metal arc joining	3.66	.79	Agree	3.50	1.00	Agree
7	Thermal cutting	3.44	.77	Agree	3.54	.91	Agree

	and welding process skill						
8	Skill in cast-welding process	3.09	.90	Agree	3.33	.84	Agree
9	Skills in electroslag welding	3.50	.66	Agree	3.38	1.11	Agree
10	Skills in seam welding process	3.50	.82	Agree	3.30	.90	Agree
11	Skill in carbon arc welding	3.64	.89	Agree	3.53	.81	Agree
12	Plasma arc welding skills	3.84	.74	Agree	3.93	.80	Agree
13	Electron beam welding skills	3.91	.66	Agree	3.74	.84	Agree
14	Oxy-Acetylene welding skill	3.21	.60	Agree	3.77	.84	Agree
15	Electric resistance butt seam welding skill	3.12	.80	Agree	3.58	.83	Agree
16	Skill to identify and repair arc and oxy-acetylene welding defects	3.19	.71	Agree	3.55	.50	Agree
17	Skills in methods of improving fatigue life of welding structure.	3.89	.88	Agree	3.72	.78	Agree
	Total	3.58	.79	Agree	3.59	.83	Agree

Source: Field Survey 2025

Table 3: On the welding and fabrication skills required for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State, shows that lecturers and technologist agreed that the items posted above among others are the welding and fabrication skills required for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State. This is based on the grand mean score of 3.58 and 3.59 respectively which is above 2.50 that was earlier stated as the acceptable means. Furthermore, the closeness in the standard deviation for the two groups which is .79 and .83 shows homogeneity in their responses.

Hypothesis 1: There is no significant difference in the mean response of mechanical technology education lecturers and workshop technologists on the Institutional requirement for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State

Table 4: t-Test Analysis on the Institutional requirement for building skilled man

Category	N	$\bar{x}$	SD	DF	t-cal	t-crit	Remark
Lecturers	48	3.38	.84				
				74	0.00	1.98	Accepted

Technologists	28	3.38	.86				

Table 4 shows that lecturers mean and standard deviation scores were 3.38 and .84 respectively, while workshop technologists mean and standard deviation scores were 3.38 and .86 respectively. The t-cal value was 0.00, while the t-crit was 1.98 with DF = 74 at .05 level of significance. This result shows that t-cal was less than t-crit, which means that the null hypothesis was accepted. Thus, there was no significant difference in the mean response of mechanical technology education lecturers and workshop technologists on the Institutional requirement for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State

Hypothesis 2: There is no significant difference in the mean response of mechanical technology education lecturers and workshop technologists on the welding and fabrication skills required for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State.

Table 5: t-Test Analysis on the essential machining skills required for building skilled man

Category	N	$\bar{x}$	SD	DF	t-cal	t-crit	Remark
Lecturers	48	3.60	.81				
				74	0.02	1.98	Accepted
Technologists	28	3.62	.81				

Table 5 shows that lecturers mean and standard deviation scores were 3.60 and .81 respectively, while workshop technologists mean and standard deviation scores were 3.62 and .81 respectively. The t-cal value was 0.02, while the t-crit was 1.98 with DF = 74 at .05 level of significance. This result shows that t-cal was less than t-crit, which means that the null hypothesis was accepted. Thus, there was no significant difference in the mean response of metalwork technology education lecturers and workshop technologists on the welding and fabrication skills required for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State.

Hypothesis 3: There is no significant difference in the mean response of mechanical technology education lecturers and workshop technologists on the welding and fabrication skills required for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State.

Table 6: t-Test Analysis on the welding and fabrication skills required for building skilled man

Category	N	$\bar{x}$	SD	DF	t-cal	t-crit	Remark
Lecturers	48	3.58	.79				
				74	0.05	1.98	Accepted
Technologists	28	3.59	.83				

Table 6 shows that lecturers mean and standard deviation scores were 3.58 and .79 respectively, while workshop technologists mean and standard deviation scores were 3.59 and .83 respectively. The t-cal value was 0.05, while the t-crit was 1.98 with DF = 74 at .05 level of significance. This result shows that t-cal was less than t-crit, which means that the null hypothesis was accepted. Thus, there was no significant difference in the mean response of mechanical technology education lecturers and technologists on the welding and fabrication skills required for building skilled man through metalwork technology education programmes for societal industrialization in Rivers State.

CONCLUSION

Building skilled man in technology education programme is the basic goal of Government and the institutions. Skills acquisition by students is of paramount importance in getting worthwhile employment in recognized institutions or being self-

reliant to help in industrializing the society on graduation. When students are exposed to intense practical skills training in metalwork technology education by qualified and skilled programme facilitators, they can properly fit into the world of work and contribute to societal industrialization. In the study, the institutional requirement for building skilled man, the essential machining skills required, and welding and fabrication skills required for building skilled man through metalwork technology education programme for societal industrialization in Rivers State were all considered.

RECOMMENDATION

Based on the findings of the study, the following recommendations have been made to enable metalwork technology education students successfully acquire practical skills to become skilled men for societal industrialization in Rivers State:

1. Highly qualified and skilled metalwork technology education programme facilitators should be employed to effectively teach and train the students
2. Government should as a matter of necessity provide modern laboratory/workshop so students can acquire the requisite practical skills as to become skilled before graduation to enable them contribute to the industrialization of the society
3. The management of the tertiary institutions should ensure that the collaboration between school and industries are strengthened so as to help in providing on-the-job training to the programme facilitators, to enable the transmit same to the students.
4. The government and school management should intensive the monitoring of the classroom and workshop activities of the students and lecturers to ensure that the students are given appropriate training.

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