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Assessment of Safety Skills Possessed by Metalwork Technology Education Students in Nigeria Certificate in Education Awarding Institutions in Kaduna State, Nigeria.

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ABSTRACT:

The purpose of this study was to assess safety skills possessed by metalwork technology Education students in Nigeria certificate in education (Technical) awarding institutions in Kaduna state, two research questions and two null hypotheses tested at 0.05 level of significance guided the study, a descriptive survey research was adapted for the study. The population of the study comprised 50 metalwork technology education students in Nigeria certificate in education (Technical) awarding institutions. An observational checklist consisting of 24 items was used as the data collection instruments. Three experts from Department of Vocational and Technology education, faculty of Technology Education, Abubakar Tafawa Balewa University Bauchi, Kaduna State College of Education (KSCOE) Gidan waya Kafanchan and State College of Education Akwanga Nasarawa state, validated the instrument. The reliability coefficient of the instrument was 0.89. Data collected were analyzed using Mean and standard deviation for the research questions while a t-test was used for testing the null hypotheses. It was found from the study that the students had low safety skills when using a lathe and drilling, machine. It was recommended that regular and systematic retraining should be organized for metalwork students to help require safety skills in using these machines.

1.1 Introduction

Metalwork Technology Education course is one of the professional courses at some Nigeria higher institutions offering Nigeria Certificate in Education (Technical). Also it is one of the courses in technical colleges which is aimed at training skilled labour for self-reliance. Jadas (2014) explained that metalwork involves activities in occupations that entail designing, processing and fabrication of metal products; it includes activities in foundry, forging, welding and machine shop. Considering the various importance of metalwork to everyday life and also the overall objective of vocational and technical education (in which metalwork is one) which offers training in skill for self-reliance, self-sufficiency and employment opportunity in the world of work, metalwork becomes an important subject to be taught to students (Emmanuel, 2018)

This technical subject, however, present a paradox; while it equips students with valuable technical knowledge and skills, it also exposes them to potential hazards due to its inherent practical nature. Beako, Okorieocha, Ojotule and Kooli (2017) highlight the vulnerability of metalwork students to accidents during practical sessions. This, they attribute to adherence to safety procedure while handling hazardous tools and equipment. Research by Aina, Ehinmore, and Ojelabi (2021) and reports by Awojobi and Fatai (2014) highlight the prevalence of burns, cuts, and other injuries among NCE metalwork students, often stemming from a lack of occupational safety, and health awareness. Yakubu (2014) paint a concerning picture of students reluctance to engage in practical activities due to the frequent occurrence of accidents leading to injuries and equipment damage. Yakubu also asserted that Students of metalwork technology education upon graduation in Nigeria certificate in education (Technical) are presently finding it hard to operate safely in technical workshops, this is because they lack safety skills, the safety skills gained from learning and training is no longer enough to operate safely.

Skill according to Adeyini (2023) is the proficiency displayed by someone in the performance of a given task. In the context of this study, safety skill is the ability that an individual has acquired that enables him perform a task safely using machine tools. These findings points toward a critical gap in safety skills acquisition among metalwork students, addressing this gap necessitate a focused on assessment of the current state of safety skills possession among NCE (Technical) students,

1.2 Statement of the problem

Despite the importance of practical metalwork skills for Nigeria certificate in education (Technical) students, a significant portion are reluctant to participate due to frequents accidents resulting in injuries and equipment damage. This fear of injury not only hinders students learning and development

of practical skills but also poses a financial burden on institutions due to loss of tools and equipment. If students possess the required safety skills and use them effectively, the probability of accidents in our technical workshops can be significantly reduced.

To eliminate or reduce the number of accidents that usually occur in the workshops during student practical work and result in creating fear, broken tools, material waste, and injuries, this study was therefore embarked upon to find out the safety skills possessed by the students of metalwork technology education in the use of lathe and drilling machine tools in Nigeria certificate in education (Technical) awarding institution in Kaduna State.

1.3 Research Questions

The following research questions were formulated to guide the study:

1. What are the safety skills possessed by Metalwork Technology education students of Nigeria Certificate in Education in the use of lathe machine?

2. What are the safety skills possessed by Metalwork Technology education students of Nigeria Certificate in Education in the use of drilling machine?

1.4 Hypothesis

The following research hypotheses (Ho) were tested in the study

Ho1: There is no significant difference between the mean responses of Polytechnic NCE Students and Colleges of Education Students on safety skills possessed in using lathe machine.

Ho2: There is no significant difference between the mean responses of Polytechnic NCE Students and Colleges of Education Students on safety skills possessed in using drilling machine.

1.5 Methodology

A descriptive survey design was adopted for this study. The study was carried out in all the Nigeria Certificate in Education NCE (Technical) Awarding Institutions in Kaduna State. The population of the study consisted 50 metalwork technology education students from 3 awarding NCE technical institutions in Kaduna State. Since the numbers of the students is not large, the entire population was used because it was manageable for the study. An observational checklist was the instrument for data collection. The response categories of the instrument used are Very Highly Possessed (VHP), Highly Possessed (HP), Moderately Possessed (MP), Slightly Possessed (SP) and Not Possessed (NP), which were assigned numerical values of 5, 4, 3, 2, and 1 respectively. The instrument was subjected to face and content validation by three lecturers from the Department of Vocational and Technology Education, faculty of Technology Education, Abubakar Tafawa Balewa University Bauchi, Kaduna State College of Education (KSCOE) Gidan waya Kafanchan and State College of Education Akwanga Nasarawa state to attest the appropriateness of the instrument in measuring what it intended to measure. The instrument was trial tested on 20 respondents which comprised NCE III metalwork students from Nasarawa State College of Education Akwanga. This yielded a reliability coefficient of 0.89 using the Cronbach Alpha formula. The data was collected by observing the respondents directly by the researchers and two research assistants.

1.6 Method of Data Analysis

The data collected from the study were analyzed using mean and standard deviation for answering the research questions and t-test for testing the hypotheses at probability level of 0.05 and 49 degree of freedom (df). Any item with a mean value of 3.50 and above was regarded as possessed while any item with a mean below 3.00 was regarded as not possessed. For the hypotheses, if the calculated p values is greater than the confidence level, the null hypothesis was accepted and where otherwise was rejected.

1.7 Results

Table 1: Mean Ratings and Standard Deviation Analysis of the Respondents on the safety skills possessed by Metalwork Technology students Education of NCE (Technical) in using lathe machine.

S/N	Item Statement	X_1	SD_1	X_2	SD_2	X_g	Remark
1.	The ability of the student to ensure that Safety glasses are worn when working with the lathe machine.	3.23	.808	3.07	.799	3.18	MP
2.	The ability of the student to ensure that Sturdy footwear are worn when working with the lathe machine.	2.89	.993	2.47	.834	2.76	NP

3.	The ability of the student to ensure that Close fitting/protective clothing are worn while working with the lathe machine.	2.89	.900	2.60	.737	2.80	NP
4.	The ability of the student to ensure that workspaces and walkways are clear to ensure no slip/trip hazards are present while working with the lathe machine.	2.51	.853	2.33	.724	2.46	NP
5.	The ability of the student to ensure that all guards are fitted, secure and functional while working with the lathe machine.	3.17	.822	3.40	.828	3.24	MP
6.	The ability of the student to ensure that the job is clamped tight in the chuck while working with the lathe machine.	2.69	.867	2.60	.737	2.66	NP
7.	The ability of the student to ensure that all tools are remove from the bed and slides of the machine.	2.97	.985	2.87	.915	2.81	NP
8.	The ability of the student to ensure that the chuck key is remove before starting the lathe.	3.20	.933	3.27	.961	3.22	MP
9.	The ability of the student to ensure that the correct speed is selected while working with the lathe machine.	2.43	.948	2.40	1.056	2.42	NP
10.	The ability of the student to ensure that switch off and bring the machine to a complete standstill, before making adjustments or measurements,	3.11	.900	3.27	.799	3.16	MP
11.	The ability of the student to ensure that the lathe machine is switch off when work is completed.	2.69	.963	2.93	.961	2.76	NP
12.	The ability of the student to ensure that all guards of lathe machine are reset to a fully closed position when work is completed.	2.40	1.006	2.27	.799	2.36	NP
13.	The ability of the student to ensure that avoidance of letting swarf build up on the tool or job. Stop the lathe machine and remove it.	2.60	.946	2.40	.828	2.54	NP
14.	The ability of the student to ensure that the lathe machine is left in a safe, clean and tidy state.	2.94	.838	2.80	.862	2.90	NP
	Grand Mean	**2.84**	**.912**	**2.76**	**.846**	**2.81**	**NP**

Table 2: T-test analysis of the mean responses of Polytechnic NCE Students and College of Education Students on safety skills possessed in using lathe machine.

	N	**X**	**S.D**	**Df**	**T**	**P**	**Decision**
Polytechnic NCE Students	35	2.84	.912				
				49	.299	.766	(NS) Accepted
COE NCE Students	15	2.76	.846				

Note: N_1=35 (Number of NCE Students from Polytechnic), X_1= Mean of Polytechnic NCE Students**,** SD_1= Standard Deviation of Polytechnic NCE Students**,** N_2=15 (Number of NCE Students from COE)**,** X_2= Mean of COE Students**,** SD_2= Standard Deviation of COE Students, T-test = .299; NS = Not Significant; MP = Moderately Possessed; SP = Slightly Possessed; P =, 766; H0 = Null Hypothesis.

Data presented in Table 1 shows that the safety skills with mean values from 3.16 – 3.24 are possessed by metalwork technology education students, while the safety skills with mean 2.42 – 2.90 are not possessed by metalwork technology education students in the use of lathe machine. While table 2

shows that all the 14 safety skills items had their grand t-calculated values of .299 was less than that of the grand p value of .766. This indicated that, there was no significant difference between the mean responses of Polytechnic NCE Students and Colleges of Education Students on safety skills possessed in using lathe machine.

Table 3: Mean Ratings and Standard Deviation Analysis of the Respondents on the safety skills possessed by Metalwork Technology Education students of Nigeria Certificate in Education (Technical) in using Drilling machine

S/N	Item Statement	X_1	SD_1	X_2	SD_2	X_g	Remark
1.	The ability of the student to ensure that all guards are keeps in place while operating drilling machine.	2.69	.932	2.53	.834	2.64	NP
2.	The ability of the student to ensure that all chuck keys and wrenches are remove before operating drilling machine.	2.74	.780	2.80	1.014	2.76	NP
3.	The ability of the student to ensure that tools or equipment are never place on the drilling tables.	2.54	.852	2.20	.775	2.44	NP
4.	The ability of the student to ensure that always eye protection is worn while operating a drilling machine.	2.37	.942	2.13	.640	2.30	SP
5.	The ability of the student to ensure that all loose clothing Keep away from turning parts of drilling machine.	2.97	.822	2.93	.961	2.96	NP
6.	The ability of the student to ensure that never make any adjustments while the drilling machine is operating.	3.00	.907	2.73	.961	2.92	NP
7.	The ability of the student to ensure that never clean away chips with hand while working with drilling machine.	2.97	.891	2.80	.676	2.93	NP
8.	The ability of the student to ensure that the cutting tools are running straight before starting the operation using drilling machine.	2.86	.974	2.80	.676	2.87	NP
9.	The ability of the student to ensure that use a holding device to prevent the work piece from being turn from the operator's hand while working with drilling machine.	2.69	.900	2.93	.961	2.76	NP
10.	The ability of the student to ensure that ease up on the feed as the drill breaks through the work to avoid damaged tools or work piece while working with drilling machine.	2.94	.998	2.87	.990	2.92	NP
	Grand Mean	**2.78**	**.900**	**2.67**	**.845**	**2.75**	**NP**

Table 4: T-test analysis of the mean responses of Polytechnic NCE Students and College of Education Students on safety skills possessed in using drilling machine.

	N	X	S.D	Df	T	P	Decision
Polytechnic NCE Students	35	2.78	.900				
				49	.414	.680	Accepted
COE NCE Students	15	2.67	.845				

Note: N_1=35 (Number of NCE Students from Polytechnic), X_1= Mean of Polytechnic NCE Students**,** SD_1= Standard Deviation of Polytechnic NCE Students**,** N_2=15 (Number of NCE Students from COE)**,** X_2= Mean of COE Students**,** SD_2= Standard Deviation of COE Students, T-test = .414; NS = Not Significant; MP = Moderately Possessed; SP = Slightly Possessed; P = .680; H0 = Null Hypothesis.

Data presented in Table 3 shows that all safety skills had mean values lower than 3.00. This indicated that the safety skills are not possessed by metalwork technology education students of NCE awarding institutions in Kaduna state in the use of drilling machine. While table 4 shows that all the 10 safety skills items had their grand t-calculated values of .414 was less than that of the grand p value of .680. This indicated that, there was no significant difference between the Mean responses of Polytechnic NCE Students and Colleges of Education Students on safety skills possessed in using drilling machine.

1.8 Discussion of the Results

The findings of the study showed that ten safety skills were not possessed by metalwork technology education students in the use of lathe machine. This finding is in agreement with Igharo, Baridue, Opakirite and Daniel (2022) who found out that, students of metalwork technology education needed improvement in safety skills during machine operation.

Further, the results of the study also showed that ten safety skills were not possessed by students of metalwork technology education in the use of drilling machine. This finding is in agreement with Adeniyi (2023) who found out that metalwork technology education students require skills in the use of machine tools.

1.9 Conclusion

Based on the findings of the study, it can be concluded that metalwork technology education students are deficient in some safety skills in the use of lathe and drilling machines. The study found no significant difference in the mean ratings of the respondents on the safety skills possessed by metalwork technology education students in the use of lathe and drilling machines.

1.10 Recommendations

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

- Government and administrators of colleges of education should organize seminar and workshop for metalwork technology education students on safety skills in the use of lathe and drilling machines.
- Metalwork technology education students should be retrained on those safety skills that they do not possess in the use of lathe and drilling machines
- Safety skills that were not possessed by metalwork technology education students in the use of lathe and drilling machines should be integrated into the curriculum of metalwork technology education in colleges of educations and institutions awarding NCE (Technical).
- Government and employers of metalwork technology education graduates should donate machine tools to various NCE (Technical) awarding institutions in Kaduna state

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