

Safety Practice Skills Required by Metalwork Students of Colleges of Education for Effective Operation in the Workshop: A Case Study of Federal College of Education (Technical) Gombe

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Abstract

The study was carried out to determine safety practice skills required by metalwork students of Federal Colleges of Education (Technical) Gombe for effective operation in the workshop. A Survey research design was used. The population for the study comprised of 18 metal work teachers and 25 metalwork final year students. The instrument used for data collection was structured questionnaire two purposes and research questions were formulated. Mean and standard deviation were used to analyze the data for answering research questions. The study found that 12 safety practice skills were required by students in using metalwork hand tools, 10 for effective operation of machine tools. Based on these findings, it was recommended that all the identified safety practice skills should be integrated into metal work curriculum right from technical colleges to higher technical institution of learning in Nigeria

Keywords: safety practice, metalwork students, workshop, skills.

Introduction

Metalwork Trade is one of the professional trade offered at the Nigeria Certificate in Education (NCE) in Colleges of Education in Nigeria. It is a vocational education courses which according to Okoro (2006) described as only form of education whose primary purpose is to prepare students for employment. Technical and vocational

education is an aspect of education which prepares its recipients with skills, knowledge and attitudes necessary for effective employment in recognized occupation (Osami, 2013; Yusuf, 2006). According to Odogwu, (2005) Vocational and Technical Education stresses preparation and participation for social value, it is pragmatic thus trains both the head and the hands (Oranu,

et'al, 2009). The Federal Republic of Nigeria in her National Policy on Education (NPE,) (2004) Vocational Education is further described as being a characteristic of education that promotes the acquisition of hands-on skills and applied scientific knowledge. The extent of technological development and growth of any country is therefore, dependent on the quality and effectiveness of her technical and vocational education. According to Olaitan (1996), Vocational Education is the essential preparation that will enable the individual to 'meet his/her developmental needs and aspirations which for many will constitute an immediate entry into the world of work. The objectives of technical and vocational education in Nigeria are such that if properly implemented will impact on technological development. As outlined in the National Policy on Education, the objectives include, among others, the training of individuals particularly at professional grades, the provision of technical knowledge and vocational competencies and providing training and skills that lead to the making of craftsmen, specialists and other trained personnel (FRN, 2004).The emphasis is to allocate more time to

practice skill over theory in each trade during training as this will enable the students to gain practical experience in their chosen vocation so as to be gainfully employed in the world of work as technical personnel.

The programme of metalwork trade in Nigerian Technical Colleges is designed to produce competent craftsmen in various metalwork trades. According to National Board for Technical Education (NBTE,2001), a graduate of Metalwork is expected to operate machines and perform other metalwork skills like welding, foundry, casting, metal forming and fabrication effectively for production purposes in private practices or in the industries. The Federal Government of Nigeria (FRN2004) pointed out that the main feature of the curricular activities for Technical Colleges shall be structured in foundation and trade modules, the curriculum for each trade shall consists of general education, theory and related courses, workshop practice industrial and entrepreneurial training. The trade theory and workshop practice involve the study of welding, fabrication and machine operation. The curriculum of metalwork if adequately implemented is expected to produce competent technicians or

craftsmen for industrial and technological development in Nigeria. The technicians/craftsmen can be employable or be self-reliant if adequate skills are possessed in metalwork.

However, the increase in accident rate in the Metal workshop during the various operations call for more advanced instruction on accidents prevention that requires increase emphasis on safety. Diraso and Apagu (2007) stated that, emphasis should be placed on safety education because of sophisticated machines and equipment which are becoming increasingly complicated and digitalized. They further added that, the need for industrial safety was realized because of millions of industrial accidents occurring yearly which results in injuries, permanent or temporary disablement and sometimes in death. Prasha and Bansal (2008) defined safety as the art and science of identifying, evaluation and controlling work place hazards. They further stated that, safety is the state of being certain that adverse effect will not be caused by some agents under defined condition.

Alex (2014) stated that, real safety means safeguarding against damage to machine tools and materials as well as preventing personal injuries.

The authors agreed that every step toward skills acquisition must first address the subject matter of industrial accident and safety. Prosser in Alex, (2014) provided vocational educational theory which supports that effective skill acquisition in vocational education can only be secured when the teacher has successful experience in the application of skills and knowledge of safety practice to the operations. Therefore, safety can be termed as any method, technique or process which people at work (students) can apply to minimize or prevent accident in industries and workshops of technical institutions.

An accident according to the National Safety Council (1998) is a mishap in an industrial establishments causing bodily injuries to a person which make him unfit to resume his duties in the next 48 hours. An accident is explained in Wikipedia (2011) as a specific, unpredictable, unusual and unintended external action which occurs in a particular time and place, with no apparent and deliberate cause but with marked effects. It implies a generally negative outcome which may have been avoided or prevented, had circumstances leading up to the accident been

recognized, and acted upon, prior to its occurrence. National Safety Council (1998) further postulated that accident is an unwanted, unexpected event which cannot be anticipated in advance. Improper dressing, ignorance, over confidence, carelessness, non-provision of required safety guards to revolving parts of machines, filthiness, insensitivity, distraction, influence of alcohol and abuse of tools are the sources of accident in the workshops.

These therefore, call for metalwork students of Colleges of Education (Technical) who are trained for industries and teaching metalwork trades in vocational institutions to be conversant with safety practice skills right from the school. Acquisition of safety practice skills by metalwork students before graduation may likely reduce high rate of accidents in metal workshop as well as industries. Skills in the opinion of Osinem and Nwoji (2010), is the ability to perform activity expertly. They further explained that skill is a well-established habit of doing things and involves acquisition of performance capabilities through repetition of an operation. Dagogo (2014) also defined skill as ability of an individual to perform an intellectual or physical task. Skill is

the demonstration of dexterity or the ability of manipulating step by step processes of metalwork operation such as cutting, drilling, forging, fitting, welding and assembling in the Colleges' metal workshop with little or no wastage of necessary resources. The study sought to identify the safety practice skills required by Metalwork students for effective operation in the metalwork workshop in College of Education in Nigeria particularly Federal College of Education (T) Gombe.

Statement of the Problem

Students are prone to accidents as a result of the nature of operations involved in metal workshops, in Technical Colleges of Education. The operations include welding, fabrication, casting, foundry, forging, machining and fitting. These operations also involve working with hot metals, sharp objects, working with infrared light, combustible gases and substances, hazardous tools, materials and equipment. For these operations to be carried out effectively, Metal work teachers and students must possess safety practice skills in order to prevent or totally eliminate occurrences of accidents which will result in human and material resource wastage.

As emphasized that accidents occur in the workshop due to non-observance of simple workshop rules and regulations. Students are often exposed to hazards without the necessary safety instructions to guide them during practical exercises. Uwaifo (2009) explained that lack of adherence to safety rules in the workshops including metalwork shop has rendered many tools, machines and materials ineffective. Moreover, the Metalwork Curriculum for N.C.E. Technical does not lay much emphasis on the teaching of safety practice skills or have it taught to the students especially during classroom instructions.

In addition, Teachers often fail to inculcate safety practices skills into the students due to the fact that instructional aids such as posters, bulletin boards and films are not provided by the authority concerned. Where they are available the teachers may lack the knowledge and skills to apply and administer the safety tools and equipment. Also, some activities or operations (gas welding, cutting, drilling) in the metal workshop sometimes inflict serious injuries to students such as deep cut, arc burns, electric shock and even serious explosion during gas welding. These cause serious

damage to the workshop building, oxy-acetylene equipment and amputation of the students' hand. However, if safety practice skills are identified and included in the training of students, there are possibilities of reducing accident, damage to tools, machines and wastage of materials in metal workshop in colleges of education in Nigeria.

Purpose of the Study

The major purpose of this study was to determine the safety practice skills required by Metalwork Students from Colleges of Education for effective operation in the workshop. Specifically, the study sought to determine:

1. Safety practice skills required by Metalwork students for using hand tools in the metal workshops.
2. Safety practice skills required by Metalwork students for effective operation of machine tools in the metal workshop.

Research Questions

The following research questions guided the study:

1. What are the safety practice skills required by metalwork students in using metalwork hand tools?
2. What are the safety practice skills required by metalwork students for

effective operation of machine tools in metal workshop?

Methodology

The study adopted a descriptive survey design. Descriptive survey research according to Nworgu (2006) is a systematic means of data collection. It is aimed at collecting data and describing the characteristics, features of facts about a given population using questionnaire, interviews and observation as instrument for data collection. Descriptive survey research design is considered suitable since this study solicit for information from the metalwork teachers and students on safety practice skills required by metalwork students for effective operations in workshop. The study was carried out in F. C. E. (T) Gombe. The population for the study comprised 18 metalwork teachers and 25 final year metalwork students. The entire population was used for the study since it was not too large. A validated structured questionnaire was used as the instrument

for data collection. The questionnaire items addressed each of the research questions. The questionnaire items responses were as follows: Highly required (HR), Required (R), Moderately Required (MR) and Not Required (NR):

Highly Required 4 points

Required 3 points

Moderately Required 2 points

Not Required 1 point.

The researcher administered the instrument to the respondents through personal contact. The data collected for this study were analyzed using Mean and Standard Deviation (SD) to answer the research questions. Each item was accepted as required if the calculated mean of any item is greater or equal to 2.50 while mean of any item below 2.50 was considered as not required.

Results Presentation

Research Question 1

What are the safety practice skills required by metalwork students in using metalwork hand tools?

Table 1: Mean Responses and standard deviation of the Respondents on the Safety Practice Skills required by Metalwork Students in using Metalwork Hand Tools N = 43

S/N	Items	\bar{X}	Sd	Remark
1.	Make sure appropriate tool is used	3.70	0.64	required
2.	Always keep tools in good working condition by sharpening, cleaning, and oiling.	3.60	0.51	required
3.	Always return all tools to their respective positions after use.	3.63	0.52	required
4.	Secure work in a vice whenever possible; Never hold small work in your hand when using a screw driver	3.73	0.65	required
5.	Chisels, screw driver or other pointed tools should never be carried in clothing pockets	3.62	0.52	required
6.	Hammer should have heads ground properly, should not have broken claws or handles	3.80	0.78	required
7.		3.50	0.48	required
8.	Keep the cutting tools sharp to ensure smooth cutting	3.62	0.52	required
9.	Following the correct procedure for using every tool.	3.58	0.50	required
10.	Make sure that cutting tools are sharp and in good working condition before using.			
	Always ensuring that all small works and	3.64	0.54	required
11.	short works are secured with a vice or	3.70	0.65	required

12 clamp. 3.63 0.54 required

Do not use files without a handle.

Do not use screw drivers as chisels or pry
bars

The data presented in Table 1 revealed that, all the 12 safety practice skills have their mean value ranged from 3.50 to 3.80. This shows that, the mean value of each item was above the cut-off point of 3.50, indicating that all the 12 safety practice skills were required by metalwork students in using metalwork hand tools. The table also shows that, the standard deviations (σ) of the items are

within the range of 0.48 to 0.78, this indicated that the mean values of the respondents were not far from one another in their responses.

Research Question 2

What are the safety practice skills required by metalwork students for effective operation of machine tools in metal workshop?

Table 2: Mean Responses of the Respondents on the Safety Practice Skills required by Metalwork Students for Effective Operation of Machine Tools in Metal Workshop N =43.

S/N	Items	\bar{X}	Sd	Remark
1	Do not operate any machine you cannot control (stop it)	3.90	0.82	Required
2	Always wear hand gloves to protect the hands from cutting	3.69	0.62	Required
3	During machining operation, always wear appropriate respiratory equipment in compliance with the regulations	3.56	0.52	Required
4	During machining operation, use tightly fitted safety goggles or face shield	3.69	0.62	Required
5	During machining operation, use ear protection and safety shoes	3.52	0.50	Required
6	Those who are highly sensitive should take precautions, due to possible eye, nose, or throat irritation from stardom solid surfaces, dust and foams	3.68	0.61	Required
7	Do not wear rings and other jewelries when machining	3.67	0.60	Required
8	Keep a clear, safe and oil free working space around machine tool	3.80	0.75	Required
9	Read instructional manual before operating a machine	3.92	0.83	Required
10	Use guards and keep them properly adjusted	3.78	0.64	Required

The data presented in Table 2 revealed that 10 safety practice skills have their mean value ranged from 3.52 to 3.92. This shows that, the mean value of each item was above the cut-off point of 3.50, indicating that all the 10 safety practice skills were required for effective operation of machine tools in metal workshop. The table also shows that, the Standard Deviations (SD) of the items are within the range of 0.50 to 0.83, this indicated that, the mean values of the

respondents were not far from one another in their responses

Findings of the Study

The following findings emerged from the study based on the research questions.

Safety Practice Skills required by Metalwork Students for using HandTools in the Metal Workshop

1. Make sure that appropriate tools are used for the job

2. Always keep tools in good working condition by sharpening, cleaning, and oiling.
3. Always return all tools to their respective positions after use.
4. Secure work in a vice whenever possible; Never hold small work in hand when using a screw driver
5. Chisels, screw driver or other pointed tools should never be carried in clothing pockets
6. Hammer should have heads ground properly, should not have broken claws or handles. Check for loose handle. Always use proper size and weight for the job
7. Keep the cutting tools sharp to ensure good smooth cutting.
8. Following the correct procedure for using every tool.
9. Make sure that cutting tools are sharp and in good working condition before using.
10. Always ensure that all small works and short works are secured with a vice or clamp
11. Do not use files without a handle.
12. Do not use screw drivers as chisels or pry bars

Safety Practice Skills required by Metalwork Students for

Effective Operation of Machine Tools in the Metal Workshop

1. Do not operate any machine you cannot control (stop it)
2. Always wear hand gloves to protect the hands from cuttings.
3. During machining operation, always wear appropriate respiratory equipment in compliance with local regulations.
4. During machining operation, use tightly fitted safety goggles or face shield.
5. During machining operation use ear protection and safety boot (shoes).
6. Those who are highly sensitive, should take precautions due to possible eye, nose, or throat irritation from strong solid surfaces dust and foams.
7. Do not wear rings and other jewelries when machining
8. Keep a clear, safe and oil free working area around machine tools
9. Read instructional manual before operating a machine
10. Use guards and keep them properly adjusted.

Discussion of Findings

The findings of this study revealed that the respondents agreed that the metalwork students required all the 12 safety practice skills items in using metalwork hand tools in college

workshops of F.C.E.(T) Gombe. These safety practice skills as identified and illustrated in the findings of the study are in line with the opinion of (Diraso and Apagu, 2007) that proper handling of hand tools in the workshops do not result to accidents or damage of materials. The author further explained that users of hand tools should always use proper size and weight for the job and keep the cutting tools sharp to ensure good smooth cutting

Similarly, the findings of this study revealed that the respondents agreed that the metalwork students required all the 10 safety practice skills for effective operation of machine tools in metal workshop in the college workshops. These safety practice skills identified by the respondents as elaborated in the findings are in line with the opinions of (Uwaifo, 2009) that goggles and hand gloves should be worn when carrying out operation on machine tools in the workshops.

Conclusions

Based on the findings of the study, the following conclusions were drawn: In order to avoid accidents and waste of materials while working with metalwork hand tools, equipment, and machines in the workshops, there is need

for students to acquire safety practice skills in using hand tools, machine tools, handling metalwork materials, forging, welding and foundry operations identified by this study, and should be applied while working in the workshops after graduation.

Damages of expensive materials and machines in the workshops could be reduced or totally eradicated if safety practice skills are acquired by students right from school. This study was carried out and was found that all the safety practice skills identified are required by metalwork students of Federal College of Education (Technical) Gombe for effective operation in the workshops.

Recommendations

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

1. All the safety practice skills identified in this study should be incorporated into metalwork curriculum to train students right from Technical Colleges to higher institutions of learning.
2. Workshop and seminars should be organized for teachers and students of metalwork from technical colleges to higher level of learning in order to build their capacity on safety practice skills

required by students for effective operations in workshop/laboratory.

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