STUDENTS' PERCEPTION ON SAFETY PROCEDURES IN ELECTRICAL ELECTRONICS WORKSHOPS IN TECHNICAL COLLEGES IN EKITI STATE, NIGERIA

Adameji J. O.

Department of Vocational and Technical Education, Faculty of Education, Ekiti State University, Ado Ekiti.
08137836836

Abstract

Safety awareness campaigns for schools have failed in the past due to the inability to identify and pinpoint the respective roles of all those involved. This has resulted in many accidents and even shifting blames with no one actually accepting responsibilities thereby compromising the safety of both the teachers or instructors and the students that carry out practical works in the workshops. This necessitated this study, invariably. This study examined safety procedures in Electrical Electronics workshops in Technical Colleges in Ekiti State, Nigeria. Two research questions were raised and several literature were reviewed with the aim of achieving the purposes of the study. The population for the study covered 818 Electrical Electronics students in all the 5 Technical Colleges owned by the Ekiti State Government. The sample was 272 students chosen through random sampling techniques and 22 teachers chosen through purposive sampling techniques from three Technical Colleges in Ekiti State. The findings of the study led to the conclusion that accidents are caused in the workshop because of worn-out tools, poor lighting, bad equipments, overcrowding of the workshop, untidiness and neglect of safety rules and regulations. It was equally concluded that adequate storage facilities, fire extinguishers, a well-equipped first-aid box, pasting of hazard cards on the available machines, proper inspection of tools and equipments and provision of overalls and other protective clothing can successfully combat accidents in Electrical Electronics workshops in Technical Colleges in Ekiti State.finally, the study recommended that All the bodies involved in safety should be educated on why and how accidents happen, how to forestall the occurrence of accidents and the need to develop and adhere to safe working habits. Displaying of safety posters, running seminars on safety awareness and the likes are required to make both the students and the teachers safety conscious.

Key words: Safety procedures, Electrical Electronics Workshop and Technical Colleges.

Introduction

Technical Vocational Education and Training (TVET) is a type of education designed to equip individuals with competencies in an occupational trade for the technological and economic development of Nigeria. According to Federal Government of Nigeria (2004), TVET is described as a comprehensive term referring to those aspects of the educational process involving general education, technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. However, modernization as we know it would not exist without electricity and the attendant technologies that have arisen out of it (Caribbean Examinations Council, 2005).

As part of the TVET programme, Electrical and Electronic Technology syllabus is designed to provide the fundamental knowledge necessary for a lifelong career in the dynamic and exciting field of Electrical and Electronic Technology. More particularly, for the continued development of the nation and its citizenry, it is necessary for students to be exposed to subject areas that embody current technological trends and practices of the wider world (Caribbean Examinations

Council, 2005). Electrical and Electronic Technology syllabus, therefore, seeks to address this need by offering advanced technical and vocational training that would prepare students for the world of work. It also seeks to satisfy the prerequisite for further training as technicians and engineers in specific areas.

Students of Technical Colleges spend most of their time in the workshop. The workshops are provided and furnished but it appears, nothing significant at all is known about the safety procedures to be followed while working in the workshops. This, therefore, explain the genesis of the avoidable accidents that occur intermittently in the workshops, and thereby discourage others, especially female, to enrol for this course in higher institutions.

Okoro (2006) described Safety as the condition of being free from harm, not involved in risks, uninjured, freedom from dangers or hazards and the act of abstaining from activities that will endanger other people (Okoro, 2006). Safety can also be described as the active endeavour taken by an individual or group of people to promote precautionary measures against possible injury or accidents. Therefore, safety rules and regulations are guidelines to be followed by students and teachers in the workshop to deter accidents and to influence positively the teaching and learning process.

Analyses of accident reports have revealed that accidents are mostly caused due to omission of certain safe working procedures (Mattila 2009). Still, there is little knowledge as to why safety procedures are omitted. Accident investigation does not normally go far beyond the immediate (or apparent) causes despite the fact that the identification and elimination of underlying accident causes is a key element in the prevention of further accidents. Every accident is usually preceded by a hazard and if this can be removed, the accident can be forestalled. In this vein, it is realised that the importance of safety in Electrical Electronics and Mechanical workshops in Technical Colleges can therefore not be over emphasised.

The key to safety is based on knowing one's responsibilities, possessing a high level of self-control and being able to identify oneself. The need for safety awareness in the electrical electronics workshops in technical colleges has become very vital in the light of the role of technical education in Nigerian schools and colleges. This is because according to Elwood (1990), safety and health are of importance in the aims and objectives of Vocational and Technical Education in schools and colleges. In other words, students who learn to work safely in the school workshops will become safe workers in the field or labour market.

Statement of the Problem

All Electrical Electronics students are expected to be aware of the safety rules and regulations as it is instrumental to effective learning and part of the foundation of professional engineering practice. It has been observed over the years that students in Ekiti State Technical Colleges seem not to observe safety rules and regulations. Inescapably, this breed accidents in the workshop where students engage in the practical aspect of their course and these accidents may lead to loss of life, permanent disability to the individual(s) involved and/or damage of very valuable equipment, instruments and materials that can-not be done without and therefore have to be replaced. In most cases, safety awareness campaigns for Ekiti State Technical Colleges have failed in the past due to the inability to identify and pinpoint the respective roles of all those involved. This has resulted in shifting blames with no one actually accepting responsibilities thereby compromising the safety of both the teachers or instructors and the students that carry out practical works in the workshops. Hence, the researcher wants to examine safety procedures in Electrical Electronics workshops in Technical Colleges in Ekiti State in order to depreciate unnecessary accidents and appreciate workshops where safety procedures are maintained.

Purpose of the Study

The broad objective of the study was to examine safety procedures in Electrical Electronics workshops in Technical colleges in Ekiti State **.** Specifically, the study was designed to examine the causes of accidents that occur in the Electrical Electronics and Mechanical Workshops in Technical Colleges. In the same vein, the study will find out safety rules and regulations to be put in place in order to successfully combat accidents in Electrical Electronics Workshops.

Research Questions

This study is specifically carried out to answer the following research questions listed below

i. What are the common causes of accidents that occur in the Electrical Electronics and Mechanical Workshops in Technical Colleges?
ii. What are the safety rules and regulations to be put in place in order to successfully combat accidents in Electrical Electronics and Mechanical Workshops in Technical Colleges?

Literature Review

Common Causes of Accidents that Occur in the Electrical Electronics and Mechanical Workshops in Technical Colleges

Accidents occur for many reasons. In many situations, people tend to look for things or reasons to blame when an accident happens. This seems to them to be easier than to look for the root or basic reasons for the incident to begin with. Below are some of the reasons that accidents occur according to MSU (2008):

i. Taking Shortcuts
ii. Being overconfident
iii. Ignoring Safety Procedures
iv. Starting a Job with Incomplete Instructions
v. Poor Housekeeping
vi. Mental Distractions from Work
vii. Failure to Pre-Plan your Work

Taking shortcuts: Every day we make decisions that we hope will make a job go faster and more efficient. Often times when we think we are saving time, we have to be careful that we aren't jeopardizing our health or the health of one of our employees. Shortcuts that reduce the safety of the job aren't shortcuts, but are items that might increase our chances of injury. Therefore, taking shortcuts is one of the ways through which accidents can occur in the workplaces.

Being overconfident**:** Confidence is a good thing. Overconfidence to the point of arrogance is too much of a good thing and this should not be displayed in the workshop. Also, the old adage of "it can't happen to me," is an attitude that can lead to improper methods of carrying out a task, using incorrect procedures or sometimes the wrong tools. Any one of these items can cause an injury to a worker or to fellow workers.

Ignoring Safety Procedures**:** Ignoring safety procedures, intentionally or unintentionally, can endanger a student or other students in the

workshop. The workshop has safety policies in place and they are to be observed. Casual attitudes about safety can result in a casualty. Sometimes, failure to observe safety procedures can lead to death of a worker or workers.

Starting a Job with Incomplete Instructions: In order to do a job safely and to do it right the first time, a complete set of instructions in needed. In the workshop, Electrical Electronic and Mechanical students often made a mess of a task or assignment because they didn't have sufficient instructions or the instructions weren't clear. It is expected of students that when carrying out an assignment they should not be afraid to ask questions or get explanations for what is unclear to them. Failure to ask questions and laissez-faire attitude to instruction given will invariably cause an accident in the workshop.

Poor Housekeeping: Anytime that guests, friends, colleagues or safety professionals come through a work site, whether it is the maintenance shops, storage areas, offices, etc. the first impression they get is sometimes the lasting one. If the office is unorganized or dirty, the maintenance shops are cluttered and unorganized; it portrays a sense of looseness and a lack of pride in the work site. On the other side of the coin, if they enter and see it neat and orderly, a sense of pride and quality of purpose is the attitude that they are most likely to leave with.

Mental distractions from work: Bringing outside problems to work can keep a learner from focusing on a task at hand. If this happens, it can be a hazard. Friends coming by while working can cause a distraction and can keep Electrical and Electronic and Mechanical students from focusing on the task at hand. Both of these incidents can put learners into a hazardous situation. Don't become a statistic; stay focused on the task at hand.

Failure to pre-plan your work: In the workshop, it is important to pre-plan a task. First of all, it will uncover unforeseen problems and give the opportunity to solve it and continue to work. Secondly, it will make the job go faster and more efficiently because the processes are known in advance of the start-up.

According to Pella (1995), the following are the common causes of accidents:

i. Poor lighting
ii. Untidiness
iii. Use of worn out tools
iv. Use of bad equipment
v. Carelessness
vi. Over crowding
vii. Use of irrelevant tools
viii. Over confidence

The teacher is therefore responsible for preparing the workspace or work area (he or she could appoint some students to tidy the place up), making sure that the workshop is not overcrowded for practical works and that the tools and equipment to be used are in good shape.

In Technical Colleges where stakeholders fail in their responsibilities to provide and observe safety manuals, accident is inevitable. Hence, without any iota of doubt, the availability and utilization of safety rules and regulations seem to be the best ways with which accidents could be averted in the workshops.

Safety Rules and Regulations to combat accidents in Electrical Electronics and Mechanical Workshops in Technical Colleges

Safe practice is an attitude and a knowledgeable awareness of potential hazards. Safety is a mutual responsibility and requires the full co-operation of everyone in the laboratory (MME safety manual, 2012). This co-operation means that each student and instructor will observe safety precautions and procedures. A good number of workshop accidents can be avoided if adequate safe working conditions and safe working techniques are provided and exhibited. For Safety in the workshop, the following points remain relevant.

i. Wearing of overall and other protective clothing: Fred (2003) submit that it is very paramount that an overall is worn by both the students and the teachers (instructors or supervisors) while working in Electrical Electronics and Mechanical workshops in Technical Colleges as it will protect the cloth or school uniform from stains or permanent marks. Always wear safety gear while working in the workshop. Corroborating this, Tarun and Kenneth (2011) conclude that hand gloves, safety shoes, helmets and eyeglasses are mandatory for workshops jobs like plumbing, machine fitting, welding or carpentry. For instance, some people do not wear welding glasses while dealing with welding works. This might result in temporary or permanent blindness because welding sparks can destroy the tissues of the human eye.

ii. Switch off the Machine and do the repair: Malfunctioning machines can occur any time. It could happen during the process of screw tightening or replacing the motor of the machine. Irrespective of the type of break down, never try to work on it while the machine is on and running. Electrical components always have a scope of error, irrespective of their design, make or technology. Even if the break down is normal and requires just screw tightening, it is always advisable to switch off the machine and then do the repair. Electrical shocks can be fatal or at least be capable of damaging human cells due to the workshop machines very high power rating Tarun and Kenneth (2011).

iii. Adequate ventilation and lighting: Scholars like Tarun and Kenneth, (2011), Fred, (2003) and Julian (2016) discourse that adequate ventilation and lighting should be provided to propagate safety in the Electrical Electronics and workshops. To achieve this, the work area or the workshop room should have a good number of windows that should be opened every time practical works are being carried out in the workshop to aid the free flow of fresh air. This will curb suffocation and will reduce the inhalation of poisonous gas and other substances harmful to the health of a human being.

iv. Adequate storage facilities: The storage facility of an Electrical Electronics and Mechanical workshops tells a lot about the safety of students and teachers (instructors or supervisors) carrying out practical works in the workshop, (Fred, 2003). This is because it is one of the major safety precaution rule that tools, equipments and materials that are no longer in use should be discarded to avoid clustering on the work table. This can only be possible when the workshop in use has enough adequate storage facilities (i.e. cupboards, shelves, racks and hangers). It should also be noted that apart from reducing accidents due to the cluster of various irrelevant tools, it also keeps the tools and equipments in good condition.

v. Listen and actively participate during emergency drills: Julian (2016) cited in http://www.abcarticledirectory.com opined that some work places conduct emergency drills to make sure their employees know what to do in cases of emergencies so as to avoid accidents. Some employees take this as another boring drill so they just look around and take it for granted. So when emergency time comes they are the ones who are left behind in the face of grave danger.

vi. Provision of fire extinguishers: In every Electrical Electronics and Mechanical workshops, there should be at least one fire extinguisher conspicuously situated. During practical works in the electrical electronics workshops, it has been found that a fire outburst might occur due to the use of electrical equipment and appliances (Tarun and Kenneth, 2011). However, the lack of adequate facilities to combat this little burst can result in a serious fire outbreak. In order to avoid this, a working fire extinguisher should be available in the workshop at all times as well as a metal bucket filled with dry sand.

vii. Provision of first aid equipment: It has been established that at one point or the other, while working in the Electrical Electronics and Mechanical workshops, accidents are bound to occur. These accidents could either result in minor or major injuries. As a matter of fact, if not promptly attended to, a minor injury could develop into a major one or even cause a permanent damage in the physique or body structure of the victim. In order to prevent this, a functional first aid box furnished with all the necessary materials and tools should be readily available in the workshop.

Methodology

The type of design used in this study was a descriptive research of the survey type because it allowed the researcher to study small sample and later generalized the findings to the whole population. The population for the study covered 818 Electrical Electronics students in all the technical colleges owned by the Ekiti State Government. The sample consists of 272 students chosen through random sampling techniques from three Technical Colleges in Ekiti State. The research instrument designed for collecting data was a well-structured questionnaire. The instrument was divided into two sections; A and B. Section A is on the personal bio-data of the respondents while section B was made up of items for the purpose of gathering information to provide answers to the research questions. The questionnaire was structured in such a way to allow the respondents to choose from a list of suggested options. The research instrument was validated by two lecturers in the Department Vocational and Technical Education. These experts critically scrutinized the instrument for relevance of items, appropriateness and adequate representativeness of contents and clarity of statements. The reliability of the instrument was ensured through a test re-test method. The instrument was administered on a sample of students and teachers in Technical Colleges outside the population of the study and results obtained showed its reliability. 272 questionnaires were administered and all the administered questionnaires were retrieved. Simple percentage and frequency counts were used to analyse the responses of the respondents.

Results and Discussion

Research Question 1: What are the common causes of accidents that occur in the Electrical Electronics and Mechanical Workshops in Technical Colleges?

Table 1: Responses of the respondents on the common causes of accidents that occur in the Electrical Electronics and Mechanical Workshops in Technical Colleges.

S/N	Items	Agreed		Disagreed	
		F	%	F	%
1	Using of worn-out tools can cause accident in the workshop	257	94.5	15	5.5
2	Poor lighting can cause accident in the workshop	260	95.6	12	4.4
3	Failure to observe safety rules and regulations breed accident in the workshops	269	98.8	3	1.2
4	Overcrowding of the workshop can cause accident	210	77.2	62	22.8
5	Untidiness can cause accident in the workshop	188	69.1	84	30.9
6	Carelessness of the students and the teachers can cause accident in the workshop	202	74.3	70	25.7
7	Average responses	231	84.9	41	15.1

The result in table 4 revealed that 94.5% of the respondents agreed that using of worn-out tools can cause accident in the workshop while 5.5% of the respondents disagreed. 95.6% of the respondents agreed that poor lighting can cause accident in the workshop while 4.4% disagreed. Furthermore, 98.8% of the respondents agreed that using of bad equipments can cause accident in the workshop while 1.2% disagreed. In the same vein, 77.2% of the respondents agreed that overcrowding of the workshop can cause accident while 22.8% disagreed. In the same line, it was revealed that 69.1% of the respondents agreed that untidiness can cause accident in the workshop while 30.9% of the respondents disagreed. Lastly, 74.3% of the respondents agree that neglect of safety rules can cause accident in the workshop while 25.7% disagreed.

Research Question 2: What are the safety rules and regulations to be put in place in order to successfully combat accidents in Electrical Electronics and Mechanical Workshops in Technical Colleges?

Table 2: Respondents' responses on the safety rules and regulations to be put in place in order to successfully combat accidents in Electrical Electronics and Mechanical Workshops in Technical Colleges.

S/N	Items	Agreed		Disagreed	
		F	%	F	%
1	Adequate storage facilities to house tools should be provided to reduce the occurrence of accidents in the workshop	268	98.5	4	1.5
2	Fire extinguishers should be made available in the workshop	270	99.3	2	0.7
3	A well-equipped first-aid box should be readily available in the workshop	272	100	0	0
4	Safety posters should be on the walls of the workshop to serve as a remembrance of the safety rules	220	80.9	52	19.1
5	Hazard cards should be pasted on available machines in the workshop	247	90.9	25	9.1
6	The tools and equipments used in the workshop should be inspected periodically to ensure they are safe to use	269	98.8	5	1.2
7	Overalls and other protective clothing should be provided for both teachers and students going for practical in the workshop	270	100	-	-
8	Average responses	259.7	95.5	12.3	4.5

The results in table 5 indicated that 98.5% of the respondents agreed that adequate storage facilities should be provided to reduce the occurrence of accidents in the workshop while 1.5% of the respondents disagreed. It was equally revealed that 99.3% of the respondents agreed that fire extinguishers should be made available in the

workshop while 0.7% disagreed. 100% of the respondents agreed that a well-equipped first-aid box should be readily available in the workshop. Moreover, it was gathered that 80.9% of the respondents agreed that safety posters should be on the walls of the workshop to serve as a remembrance of the safety rules while 19.1% disagreed. In the same vein, 90.9% of the respondents agreed that hazard cards should be pasted on available machines in the workshop while 9.1% disagreed. In addition, 98.8% of the respondents agreed that the tools and equipments used in the workshop should be inspected periodically to ensure they are safe to use while 1.2% of the respondents disagreed. Lastly, 100% of the respondents agreed that overalls and other protective clothing should be provided for both teachers and students going for practical in the workshop.

Discussion of findings

In research question one, the average responses of the respondents revealed that 84.9% agreed that using of worn-out tools can cause accident in the workshop, poor lighting can cause accident in the workshop, using of bad equipment can cause accident in the workshop overcrowding of the workshop can cause accident, untidiness can cause accident in the workshop and neglect of safety rules can cause accident in the workshop while 15.1% disagreed. This finding was in harmony with Mattila (2009) when he asserted the aforementioned ways through which accident can be caused in the workshops. In the same vein, the findings gave credence to the submission of MSU (2008) on how accidents are caused in the workshops.

The average responses in research question two showed that 95.5% of the respondents agreed that adequate storage facilities should be provided to reduce the occurrence of accidents in the workshop, fire extinguishers should be made available in the workshop, a well-equipped first-aid box should be readily available in the workshop, safety posters should be on the walls of the workshop to serve as a remembrance of the safety rules, hazard cards should be pasted on available machines in the workshop, the tools and equipment used in the workshop should be inspected periodically to ensure they are safe to use and Overalls and other protective clothing should be provided for both teachers and students going for practical in the workshop while 4.5% disagreed. This finding was in tandem with Fred (2003) when he submitted that a good number of workshop accidents could be avoided if adequate safe working conditions and safe working techniques are provided and exhibited.

Conclusion

It was therefore concluded from the findings of the study that accidents are caused in the workshop because of worn-out tools, poor lighting, bad equipment, overcrowding of the workshop, untidiness and neglect of safety rules and regulations. It was equally concluded that adequate storage facilities, fire extinguishers, a well-equipped first-aid box, pasting of hazard cards on the available machines, proper inspection of tools and equipment and provision of overalls and other protective clothing can successfully combat accidents in Electrical Electronics workshops in Technical Colleges in Ekiti State.

Recommendations

In the light of the findings of the study, the following recommendations are made:

i. All the bodies involved in safety should be educated on why and how accidents happen, how to forestall the occurrence of accidents and the need to develop and adhere to safe working habits.

ii. Displaying of safety posters, running seminars on safety awareness and the likes are required to make both the students and the teachers safety conscious.

iii. Students should be guided and orientated on the need for safety and the process of achieving it and also disciplinary measures should be put in place to check the students' digression from safety obligations or safety rules and regulations and curb the nonchalant attitude that some of them might decide to put up when it comes to the safety of one's self and others.

iv. The government and other educational bodies should pay rapt and adequate attention to the needs of the workshops in technical colleges and should be generous in their allocation of funds to promote and maintain a safe working condition in the schools.

Reference

Caribbean Examinations Council. (2005). The Garrison, St Michael BB14038: Barbados, Jamaica.

Elwood P. (1990): Safety: your first responsibility. Vocational Education Journal, 65 n2 pp16-17.

Fall Injuries Prevention in the Workplace (2006). NIOSH Workplace Safety and Health Topic. National Institute for Occupational Safety and Health.

Fred E. (2003). Basic Safety Administration: A Handbook for the New Safety Specialists.

FRN (2004). National Policy on Education. Lagos: NERDC Press.

Okoro, O. M. (2006). Principles and methods in vocational and technical education. Nsukka: university trust Publishers.

Mattila, M. 2009. Toimialan onnettomuudet, 2008. Tukes-julkaisu 2/2009, Turvatekniikankeskus, 81 p.http://www.tukes.fi/Tiedostot/julkaisut/2_2009.pdf. [Jan. 3rd, 2010] (Accidents that occurred in sectors supervised by Tukes in 2008, in Finnish).

Pella L. T. (1995): The Safe and Unsafe Technical Teacher; University of Winston U.S.A.

Tarun, G. and Kenneth, S. (2011). Understanding workshop practice- Relevant Terms, Safety and Fire Precaution. Bright Hub Engineering.