

Management of Electrical/Electronics Workshop Accident in Technical Colleges in Oyo and Ogun States Nigeria

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Abstract

The major purpose of the study was to Management of electrical/electronics workshop accident in technical colleges in Oyo and Ogun states Nigeria. Two research Questions were answered. The study adopted a descriptive survey design. The population for the study was sixty six (66) comprised of forty two (42) electrical /electronics teachers from technical colleges, Ogun state and twenty four (24) electrical/electronics teachers from technical colleges, Oyo state. No sampling was adopted because the population was of manageable Size. Structured questionnaire containing 58 items was designed and used for data collection. The internal consistency of the instrument was ascertained using Cronbach Alpha method and reliability coefficient obtained for the instrument was 0.95. Mean and standard deviation were used to analyze research questions. The findings of the study revealed that The findings of the study revealed that: nine accidents do occur at least once in a month in electrical/electronics workshops; accidents in school workshops can result to reduction in students' enrolment. The findings of the study revealed that electrical/ electronics workshop accidents can be managed by providing well stocked first aid boxes to the workshop and give adequate training to teachers and workshop attendants on method of administering it. It was recommended that workshop attendants or technologists should be recruited and updated always for proper monitoring of students' activities inside workshop.

INTRODUCTION

Technical Colleges are educational institutions aimed to produce the young manpower for a country's economic growth and development. Ayomike in Abdulrauf (2012) viewed technical college as institution where specific knowledge and practical skills required for specific trade, employment or professional, craftsmen, technicians, technologist, scientists or similar levels in business, are imparted or taught. Technical colleges aim to provide functional vocational, technological and scientific skills, knowledge and attitudes which individuals needed to gain entry to and progress in a selected occupation. United Nations Educational, Scientific and Cultural Organization (UNESCO) and National Board for Technical Education, (NBTE), (2001) reported that the aim of technical colleges' curriculum is to give training and impart the necessary skills leading to the production of craftsmen, technicians and other personnel who will be enterprising and self-reliant. Technical colleges enroll students who must not be less than 14 years of age and should have successfully completed three years of junior secondary education or its equivalent (UNESCO & NBTE, 2001). The students are admitted and trained for different occupational areas. Technical college students are introduced to different subjects and courses including electrical/electronic trade. Federal Republic of Nigeria, FRN, on her National Policy on Education (2004), opined that the range of courses in the technical colleges shall be as wide as possible to include but not limited to: Mechanical Trade, Computer Craft Practice, Building Trades, Wood Trades, Hospitality, Textile Trades, Printing Trade, Beauty Culture Trade and Electrical Engineering Trades among others.

The Electrical Engineering trades cover electricity/electronics subjects. Federal Republic of Nigeria, FRN, (2004) highlighted three subjects that are subsumed into electrical engineering trade: Electrical installation and maintenance work; Radio, television and electronics work; and Appliances repairs. Electricity, according to Grob cited in James (2009), is an invisible force that can produce heat, light and motion, and many other physical effects. Electricity implies a form of energy generated, transmitted, and converted into heat, light, motion, and other forms of energy through natural processes such as lightning, as well as by devices built by people such as generators and alternators. Anaemena (2000) asserted that electronics is a physical science that deals with the study of the properties and behavior of electrons under all conditions, especially with reference to technical and industrial application. Electronics, according to Amos & Amos (1999), is the study of the conduction of electricity in a vacuum, in gases and in semiconductors. The authors stated further that electronics is concerned with method of generating and controlling charge carriers such as electrons, holes and ions in, for example, electron of tubes and transistors and with applications for such devices. The relative difference between electricity and electronics is in the quantity and nature of electric current used in each field. In electricity, high alternating currents and voltages are involved whereas electronics functions with minute direct current and voltage. United Nations Educational, Scientific and Cultural Organization (UNESCO) and National Board for Technical Education (NBTE), (2001) stated that the curriculum of each programme including Electrical/Electronics is broadly divided into three components: General education which accounts for 30% of the total hours required for the programme; Trade theory, trade practice and related studies which account for 65%; and Supervised Industrial Training/work experience which accounts for about 5% of the total hours

required for the programme.

The trade practice and supervised industrial training/work experience in the curriculum require laboratory or workshop exercises and practices for the practical part of the training to be acquired by the students. Ezeji (2004) described laboratory as a unique learning situation in which the learners may experiment, test, construct, disassemble, repair, design, create, imagine, and study. Workshop, according to Okorie in Ofonmbuk and Ekereobong (2012), is defined as a place where the learners may experiment, test, construct, dismantle, repair, design, create, imagine, and study. Mammam (2008) submitted that electrical/electronics workshop is a place where electrical and electronics equipment and materials for practical lessons are kept and utilized for training in skill acquisition. The workshops and laboratories are essential and highly needed in technical colleges for imparting the practical skills needed by students to develop in their career choice, and also for teachers to improve on skills they have acquired. For practical to be done properly in laboratory and workshop, training equipment; instrument; tools and consumables, as listed by United Nation Educational, Scientific and Cultural Organization (UNESCO) and National Board for Technical Education (NBTE), (2001) are needed to be at students and teachers disposal. Students interact with these instructional resources for proper habit formation under the guidance of teachers. Most of the equipment, tools, instruments and consumables are expensive, fragile, delicate, risky and dangerous. They require special skills, competencies, and care for handling them. During the course of interactions, mistakes which can be caused by ignorance, lack of knowledge and carelessness are made which may result to accidents.

Accidents are anxious, sudden and unexpected event or situation without forewarning that can result into loss of materials, injury and death. Accident, according to Jorgensen in Tuuli (2010), is a result of a chain of events in which something has gone wrong, resulting in an undesired conclusion. Jorgensen in Tuuli defined electrical accidents as events resulting from either personnel action or equipment failure involving electrical installations that has the potential to result in an injury due to electrical flash and/or burn and Electric shock from a source greater than 50V. Accident in electrical/electronics workshops and laboratories can occur in a number of forms. The electrical/electronics workshop accidents can be electric shock, electrocution and other general workshop accidents. National Institute for Occupational Safety and Health, (2009) asserted that electric accidents can be fire outbreak, electric shock, explosions, and burns.

Accidents are caused by number of factors. Washington State Department of Labor and Industries (2009) reported that from experience and analysis accidents are caused by occurrences. The department also reported that accidents are the logical outcome of hazards caused by things people do or fail to do. This shows that before accidents can occur, there should be initiating factors which Ward (2009) described in question form: what must be present to provide opportunity for an accident to occur? Ward stated that this necessary factor is hazard, something which in itself present no danger but when activated leads to damages or injuries. Hazard is an inherent property of a substance, agent, and source of energy or situation having the potential of causing undesirable consequences or effects (Work Cover Corporation, 2004). Occupational Safety and Health Organization, OSHA, (2003) stated that hazards exist in every workshop in many different forms: sharp edges, falling objects, flying sparks, chemicals, noise and myriad of other potentially dangerous situation. Hazards in electrical/electronics workshops include: Faulty equipment or machines, improper organization of the workshops and laboratories, unjust and unsafe abandonment of naked life wires or cables, working with life and high current without putting on necessary protective equipments, using defective tools or equipment, unjust placement of very hot soldering iron on object with low melting point and so on. United State Department of Labor (2002) submitted that most electrical accidents result from the following three factors: unsafe equipment or installation, unsafe environment and unsafe work practice. These with other actions may deteriorate the situation of electrical/electronics school workshops and laboratories.

Thus, due to the occurrence of accidents in school workshops and laboratories, series of preventive measures were prescribed by experts, scientists, engineers and researchers to be implemented. The prescriptions ranged from taking necessary precautions while working in the workshops/ laboratories, keeping laboratories/ workshop safe, working with healthy machines, use of appropriate safety equipments while working with machines among others. Mbaba in Ofonmbuk and Ekereobong (2012) warned that any Technical school that ignores safety practices or pays lip service to its implementation does so at its own risk because the losses it will encounter will be enormous. Also, Kigin in Nichols (2005) identified these as strategies teachers should use to prevent accident in schools:

- Be present in the classroom at all times when a class is in session.
- Maintain a neat, orderly, and safe classroom environment.
- Instigate a comprehensive and continuing safety program.
- Correct all known hazards and defective conditions.
- Review safety policies and procedures on a regular schedule.
- Provide a good personal example, particularly when demonstrating power equipment.
- Equip and maintain all machines with guards that meet or exceed industrial standards.

Insist that guards be in position and used whenever a machine is in operation.
Be particularly alert and in a close proximity to power machines when students use them.
Require 100% eye and face protection of all students and classroom visitors.
Establish safety zones around all power equipment.
Use visual safety aids (posters, films, and printed material) as an integral part of classroom instruction.
Don't assume that students will perform in a safe manner without adequate supervision.
Predetermine a plan of action in the event of an emergency.
Stay in the classroom

Despite these prescriptions, things sometimes go wrong in the workshops. This is because preventive measures for accidents may be inadequate or it may not be implemented as expected. These may therefore have great effect students, teachers, workshop users, workshop tools and equipments and schools as whole.

Thus, accident in the school workshop has traumatic effect on students, teachers and material properties in the school system. Lar (2013) opined that consequence of accidents is related both to what is damaged and the magnitude of the damage. Accident maims, kills and causes loss of valuable resources in general workshops and in specific electrical/electronic laboratories and workshops. Effect may be death, injury or loss of valuable properties. Nichols (2005) reported that National Safety Council estimated that, more than 24,000 accidents were sustained by students in a year in United State of America. The author stated further that those Figures represent only accidents which were reported, and caused property damage or resulted in the loss of at least one half day of the school by the students. United States Department of Health and Human Service in Nichols (2005) also reported that the actual accident figures for students in vocational/technical institutions would be much greater in number nowadays if all accidents were reported. In Nigeria also, numbers of accident cases were reported. Olagbegi, Kwasi and Ugbi (2013) reported that in production department, University of Benin a technician was almost electrocuted to death. Also, Osang, Obi and Ewona (2013) reported that in 2008, a first year student in Cross River University of technology was rushed to hospital during practical experiment in chemistry laboratory due to chemicals which was wrongly mixed by self. Thus, the visible effect of an accident in the schools workshops and laboratories demand urgent and immediate action: accident management in the school workshops.

Management is a process by which resources, human and material resources, are channeled toward the achievement of organizational goal and objectives. Akpan in Ademola (2002) also claimed that management is a process of planning, organizing, directing and controlling the activities of any human being in an organization so as to forge an integrated system which is capable of achieving the laid down objectives. International Atomic Energy Agency, IAEA, (2005) opined that accident management is a set of actions taken during the evolution of an event sequenced to a beyond design basis accident: to prevent the escalation of the event into a severe accident; to mitigate the consequences of a severe accident; and to achieve a long term safe stable state. Accident management technique in school workshops implies the process of planning, organizing, directing, commanding, coordinating and controlling the available resources to respond to and to mitigate accident situation as quick as possible with the aim of achieving stable workshop environment, and total normal recovery. Accident management involves emergency actions to arrest and to recover from hazardous situation. Emergency is a process of offering an immediate response to unexpected and dangerous situation. Health and Safety Executive (2004) explained that emergency is a plan for the worst that can happen. Emergency includes rescue of victims and administration of first aid treatment to the victim, stopping of further generation of incident or unwanted events and evacuation of human and valuable resources from accident sites. In workshops and laboratories, the emergency equipment such as fire extinguisher and fire blanket in case of fire outbreak and first aid kit should be provided. The school must also train their teachers and through them the students on complete application of the first aid kit and equipment in the case of injury or accident. Department of Education, Training and Employment (2013) asserted that in compliance with the work health and safety act 2011 all schools must ensure the health and safety of staff, students and others. Department stated further that this statutory obligation requires all school managements and administrators, principals, to provide and maintain adequate first aid facilities in schools for the effective emergency management of accident and injuries, based on an evaluation of risks and need.

Statement of the Problem

A healthy school environment is that which support the health and safety of students, teachers and other members of the school system. Technical colleges, being a type of secondary schools, are established to prepare students for gainful employment. To achieve this objective, teachers and students interact specifically in Electrical/Electronics workshops for effective teaching and learning. Teachers and students interact with tools, equipments, machines and consumables to inculcate and acquire practical skills respectively. Electrical/Electronics trade is an integral part of course of studies offered at technical colleges. Thus, Electrical/Electronics trade is an accident prone career where teachers and students interact with high voltage, dangerous equipment, tools, chemical and other hazardous consumable items during teaching and learning activities. These made Electrical/Electronics workshop a dangerous area where students, teachers and other

workshop users can be exposed to accident which can lead to injuries, death and loss of properties. However, teachers and students most times encounter accidents which lead to loss of valuable resources, minor and major injuries, and even death when interacting within the workshops and laboratories. Osang, Obi and Ewona (2013) reported that between 2008 and 2012, four thousand and fifteen (4015) accident cases occurred in eighteen (18) secondary schools in eighteen (18) local governments in Cross River state. Also, Chiejile (2001) reported that within two years, 2,033 accidents occurred in technical colleges in delta states. These are similar to what is happening in technical colleges in Oyo and Ogun states Nigeria..

The consequence of accidents especially in technical colleges in Oyo and Ogun states Nigeria is the reduction in students' enrolment in the colleges because many parents will not allow their sons and daughters to lose their lives. This is therefore reducing the technological and economical growth in Nigeria as a whole. This is because the production of technicians and craftsmen, which technical colleges are tasked with, is drastically diminishing. The problem seems to start from the teachers of technical colleges' inadequate knowledge of the types of accident and accident management which leads to students' inability to recognize and identify elements which can cause accidents in electrical/electronics workshops and laboratories, and their inability to apply necessary measures in case an accident occurs. The problem might also emanate from school management and government nonchalant attitude toward accident management in workshop and laboratories in technical colleges.

If the students through the teachers are acquainted with knowledge of types, possible consequence of accidents that are occurring in electrical/electronics workshops and laboratories as well as the necessary knowledge of actions to be taken in case of accident occurrence, technical colleges in south western part of Nigeria specifically electrical/electronics departments will regain moderate students enrolment which will also provide immense help to the technological and economical growth and development of Nigeria as a whole. It is on the idea of this necessity that this study is set to determine the management of electrical/electronics workshop accidents in technical colleges in Oyo and Ogun states Nigeria.

Purpose of the Study

The major purpose of the study was to determine the Management of Electrical/Electronics Workshop Accidents in Technical Colleges in Oyo and Ogun states Nigeria. Specifically, the study sought to:

1. Ascertain the type of accident that frequently occurs in electrical/electronics workshops in technical colleges in Oyo and Ogun states Nigeria.
2. Determine the consequence of accidents that frequently occur in electrical/electronics workshops in technical colleges in Oyo and Ogun states Nigeria.
3. Determine the accident management techniques required in electrical/electronics workshops in technical colleges in Oyo and Ogun states Nigeria.

METHODOLOGY

The study adopted descriptive survey research design. The study was conducted in Oyo and Ogun states, Nigeria. The population for the study was sixty six (66) technical college teachers comprised of forty two (42) electrical/electronics teachers in technical colleges in Ogun state and twenty four (24) electrical/electronics teachers in technical colleges in Oyo states. The entire population of 66 respondents was used for the study. Thus, no sample was used because the population for the study was of manageable size.

The instrument used for data collection from respondents was a structured questionnaire. The questionnaire contained one fifty eight (58) items which was used to obtain information from electrical/electronics teachers in technical colleges, in Oyo and Ogun states. The questionnaire was divided into six sections: A, B, C and D. Sections A was used to seek for electrical/electronics teachers' personal information. Sections B, C and D consisted of items relevant for answering the research questions posed for the study. Section B, C and D of the questionnaire was structured on four-point rating scale with value as 4, 3, 2, and 1 in descending order. The response options for the section B of the questionnaire were: Highly Occur, HO, (occur at least once in week) _ 4, Moderately Occur, MO, (occur at least once in a month) _ 3, Slightly Occur, SO, (occur at least once in a term or section) _ 2 and No Occurrence, NO, (no accident occurrence) _ 1. Whereas, the response options for section C and D of the questionnaire were: Strongly Agree (SA) _ 4, Agree (A) _ 3, Disagree (D) _ 2 and Strongly Disagree (SD) _ 1

The questionnaire was validated by three experts. Cronbach Alpha method was used to determine the internal consistency of the questionnaire items. Thus, a reliability coefficient of 0.95 was obtained which means that the instrument was reliable for the study.

Sixty six copies of questionnaire were administered to the respondents by the researcher with the help of two research assistants through personal contact in each technical college in Oyo and Ogun States.

The data collected for this study were analyzed using mean and standard deviation. The decision rule for section B, C and D of questionnaire were based on the mean cut off point of 2.50. The decision rule for

interpreting section B of the questionnaire was based on class boundary of values of the response options: Highly Occur (3.50-4.49), Moderately Occur (2.50-3.49), Slightly Occur (1.50-2.49) and No Occurrence (0.50-1.49). Based on this, any item in section B that has the mean score of 3.50-4.00 was regarded as Highly Occur, 2.50-3.49 was regarded as Moderately Occur, 1.50-2.49 was regarded as Slightly Occur and 0.50-1.49 was regarded as No Occurrence. Thus, for section C and D, any item with mean of 2.50 or above was considered agree; whereas any item with a mean below 2.50 was considered disagree.

RESULT

The presentation and analysis are done in tables and arranged according to the research questions posed for the study.

Research Question 1: *What are the type of accidents that frequently occur in electrical/electronics workshops in technical colleges in Oyo and Ogun State?*

The data for answering research question one are presented in Table 1 below:

Table 1:

Mean ratings and standard deviation of Responses of Teachers on Type of Accident that Frequently Occur in Electrical/Electronics Workshop in Technical Colleges in Oyo and Ogun States.
 N=15

S/N	Types of accidents	\bar{X}	S D	Decision
1	Falling below working level	2.71	0.74	Moderately Occurred
2	Striking of legs forcefully against an object in the workshop	2.89	0.91	Moderately Occurred
3	Exposure to harmful chemicals or substances in the workshop	2.71	1.13	Moderately Occurred
4	Falling of Objects in the workshop.	2.14	0.88	Slightly occurred
5	Inhaling of poisonous gases in the workshop	2.41	0.84	Slightly occurred
6	Exposure to electric arc or electric flash while interacting with electric equipments in workshop	2.65	0.94	Moderately Occurred
7	Crushing by machine and tools in the workshop	2.35	1.03	Slightly occurred
8	Slipping, tripping or falling to surface in the Workshop	2.64	1.06	Moderately Occurred
9	Extending, straining or stressing of body while performing a task in workshops.	2.65	0.69	Moderately Occurred
10	Exposure to electric shock inside workshop	2.77	0.60	Moderately Occurred
11	Explosions in workshop.	2.53	0.61	Moderately Occurred
12	Thermal/ electric burns in the workshop	2.71	0.80	Moderately Occurred
13	Fire Outbreak within workshop environment	2.59	0.82	Moderately Occurred
14	Stepping on sharp object in the workshop.	2.58	0.72	Moderately Occurred
15	Exposure to high temperature in the workshop.	2.24	0.68	Slightly occurred
Overall		2.39	0.82	

Key: \bar{X} = Mean, SD = Standard Deviation and S/N = Number of items

The data presented in Table 1 above indicated that none of the accidents appeared at highly occur. This implied that none of the accidents occur as frequent as on weekly basis. It was also discovered that all accidents in the items were claimed by respondents to be occurring in electrical/electronics workshops in technical colleges in Oyo and Ogun states. The table also indicates that items 1, 2, 3, 6, 8, 9, 10, 11, 12, 13 and 14 had their mean values ranged from 2.53-2.89. This implies that all the accidents occurred moderately. This means that those accidents identified in the items occur, at least, once in a month in electrical/electronics workshops in technical colleges in Oyo and Ogun States. This is because the range of values of these items falls within the class boundaries of moderate occurrence. However, items 4, 5, 7, and 15 had their mean values ranged from 2.14-2.45 which means that those accidents in the items occur slightly. This implies that those accidents occur at least once in a term or section in electrical/electronics workshop in technical colleges in the states. The standard deviation of all the items as well as the overall standard deviation ranged from 0.60 to 1.13 indicating that the respondents' opinions were not far from the mean and from one another. This implies that all the respondents have similar opinions on the occurrence of accidents that frequently occur in electrical/ electronics workshops in technical colleges in Oyo and Ogun States.

Research Question 2: *What are the consequences of accidents in electrical/electronics workshop in technical colleges in Oyo and Ogun states?*

The data for answering research question 3 were presented in Table 3 below:

Table 3:
Mean ratings and standard deviation of Responses of Teachers on Consequences of Accidents in Electrical/Electronics Workshops in Technical Colleges in Oyo and Ogun states.

N=18

S/N	consequences of accidents	\bar{x}	SD	Decision
16	Loss of any part of the student/teachers' body	2.09	0.72	Disagree
17	Loss of life of teacher/student	1.38	0.63	Disagree
18	Loss of job on part of teachers due to their fault which lead to accident	2.55	0.81	Agree
19	loss of workshop tools, equipment and other consumable items	2.86	0.88	Agree
20	Student untimely dropout from school due to injuries	2.53	0.77	Agree
21	Damaging of workshop valuable items and workshop environment.	3.06	0.80	Agree
22	Loss of school reputation and integrity	2.56	0.68	Agree
23	Closing down of school for some days or weeks	1.91	0.74	Disagree
24	Time and money wastage on investigations	3.11	0.59	Agree
25	Increase in insurance liabilities	2.21	0.60	Disagree
26	Cost of repairs of workshop tools machines and equipment	2.74	0.81	Agree
27	Payment of fine	2.15	0.47	Disagree
28	Suspension of students from school for some days due to their contributions to the occurrence of an accidents	2.56	0.68	Agree
29	Loss of at least one or half day of school period by student	2.97	0.72	Agree
30	Reduction in students enrolment	2.59	0.86	Agree
31	Illness to teacher or students	2.53	0.90	Agree
32	Poor performance and noticeable behaviour changes in	2.50	0.73	Agree
33	Gradual deterioration in the overall functioning of the school.	2.08	0.75	Disagree
Overall		2.47	0.73	

Key: \bar{X} = Mean, SD = Standard Deviation and S/N = Number of items

The data presented in Table 3 revealed that twelve items had their mean values ranged from 2.50-3.11. This implied that there are twelve (12) consequences of accidents in electrical/electronics workshops in technical colleges in Oyo and Ogun states. However, six (6) items had the mean values range from 1.19-2.21 which indicates that those six items are not the consequences to accidents in Electrical/Electronics workshops in technical colleges in Oyo and Ogun states. Furthermore, the standard deviation for all the items as well as overall standard deviation ranged from 0.47-0.90. This shows that the responses of teachers were not far from one another.

Research Question 3: *What are the accident management techniques in Electrical/Electronics workshops in technical colleges in Oyo and Ogun States?*

The data for answering research question are presented in Table 5 below.

Table 5
Mean Ratings and Standard Deviation of Responses of Teachers on Accidents Management Techniques in Electrical/Electronics Workshops in Technical Colleges in Oyo and Ogun States.

N=25

S/N	Accidents management techniques	\bar{X}	SD	Decision
34	Proper investigation of minor and major accidents	2.73	0.71	Agree
35	Proper report of minor and major accidents	2.62	0.86	Agree
36	Proper documentation of every accident	2.58	0.70	Agree
37	Carrying out proper analysis of an accident to guard against future occurrences	3.11	0.68	Agree
38	Assure school teachers and other personnel involved that outcome of accident investigation is not to fire or prosecute anybody.	3.15	0.61	Agree
39	Providing well stocked first aid boxes	2.82	0.61	Agree
40	Rescue kits are to be checked and placed at the isolated area or in close proximity to the working area.	2.58	0.68	Agree
41	Training of teachers and workshop attendants on techniques or method of administering first aids	2.73	0.69	Agree
42	Establishment of specific format for reporting workshop accident	2.50	0.64	Agree
43	Establishment of policies related to workshop safety or accident Prevention	2.26	0.73	Disagree
44	Frequent visitation and evaluation of workshop conditions	2.73	0.83	Agree
45	Establishment of committee to oversee workshop condition	2.14	0.88	Disagree
46	Conducting an accident preparedness exercise for teachers and students in the school workshops.	2.95	0.67	Agree
47	Proper establishment of rules and regulations that will govern workshop behavior	2.56	0.66	Agree
48	Development of methods or channels for communicating matters related to workshop accidents in the school system.	2.56	0.84	Agree
49	Giving of advice to government on provision of safety tools and equipment to school workshops	2.61	0.65	Agree
50	Provision of adequate functional accident preventive and responsive equipment to the school workshops.	2.88	0.83	Agree
51	Provision of first aid service to those who need it at appropriate time.	2.71	0.86	Agree
51	provision of adequate fund for department to make available safety tools and equipment	3.00	0.86	Agree
53	Provision of smoke alert system to the workshop	2.65	0.69	Agree
54	Advice and support teachers to update themselves on accident prevention and management skills	3.06	0.78	Agree
55	Advice government to sponsor teachers to partake in accident prevention and management workshop, seminars and conferences.	2.97	0.74	Agree
56	Quick repair and replacement of faulty and damage tools and equipment for the re-commencement of workshop activities after the accident.	2.65	0.62	Agree
57	Provision of alarming system to alert member of the school in case of emergency.	3.21	0.64	Agree
58	Provision of emergency functional phone numbers to all members of the school.	3.11	0.66	Agree
Overall		2.75	0.80	

Key: \bar{X} = Mean, SD = Standard Deviation and S/N = Number of items

The data presented in Table 3 revealed that twenty three (23) items had their mean values ranged between 2.50 and 3.21 which implied that those items are required for accident management in electrical/electronics workshops in technical colleges in Oyo and Ogun states. However, items 43 and 45 had their mean values as 2.26 and 2.14 respectively. This indicates that the two techniques in items are not required for accident management in electrical/electronic workshops in technical colleges in Oyo and Ogun States. In addition, the standard deviation of all items ranged from 0.61 to 0.88. This indicated that the responses of the respondents were uniform with regard to accident management techniques in electrical/electronics workshops.

Discussion of findings

The discussion of the findings is presented according to issues addressed by research questions.

Types of accidents that frequently occur

The findings of the study on Types of accidents that frequently occur indicated that eleven accidents are moderately occurring in electrical/electronics workshops in technical colleges Oyo and Ogun States. The findings show that these accidents occur at least once in a month. From the findings, it was observed that, falling below the working level, striking legs against object, exposure to harmful chemical, slipping to surface in workshop, exposure to electric shock among others include the accidents that are moderately occurring, that is, accidents that occur at least once in a month in electrical/electronics workshop in technical colleges in Oyo and Ogun States. However, it was also discovered that falling of Objects; inhaling of poisonous gases; crushing by machine and tools; and exposures to high temperature in the workshop occur slightly. This implies that those accidents occur at least once in a term or section.

This finding is in line with the work of Chiejile (2002). He reported the types of accidents and the rate of their occurrences within two years as follows: falling occurred most frequently in 88 percent; striking the body against tools and equipment occurred in 87 percent; hand tools accident like chisel cut and saw cut occurred in 75 percent; slip occurred in 75 percent and explosion occurred in 72 percent. Therefore, the finding of the present study agrees with that of chiejile.

Consequences of Accidents

The Findings of the study on consequences of accidents indicated that accidents in electrical/electronics workshops have a number of consequences on workshop and workshop users. The consequences of accidents in electrical/electronics workshops include: loss of job on part of the teacher due to their fault which lead to accident; students untimely dropout from school; damages to workshop valuable items and workshop environment; loss of school reputation and integrity; time and money wastage on investigation; cost of repairs of workshop tools machines and equipment; suspension of students from school for some days; loss of at least one or half day of school period; reduction in students enrolment; illness to teachers or students and poor performances and noticeable behavior changes in students.

The findings of this study agree with the report made by Nichols (2005) who found that in United State of America, an estimated value of 24,000 of accidents which were sustained by vocational/technical students in one year represent accidents which caused property damage or resulted in the loss of at least one half day of school by the student. Whereas, the findings of the study disagree with the opinion of Osang, Obi and Ewona (2013) who opined that the workshop or laboratory claimed too many victims (lives) in the process of carrying out research by scientist, engineer, students or colleagues in the workshop or laboratory.

Accident Management Techniques

The Findings of the study further revealed twenty three techniques for accident management in electrical/electronics workshops in technical colleges in Oyo and Ogun states. The techniques include: given of advice to government on provision of safety tools and equipment to school workshop; provision of adequate functional accidents preventive and responsive equipment to the school workshops; provision of first aid service to those who need it at appropriate time; provision of smoke alert system to the workshop; advice and support teachers to update themselves on accident prevention and management skill; advice government to sponsor teachers to partake in accident prevention and management workshop, seminars and conferences; quick repair and replacement of faulty and damaged tools and equipment for the recommencement of workshop activities after the accident and provision of alarm system to alert member of the school in case of emergency.

This finding is in line with Azodo and Adejuyigbe (2013) discoveries. They discovered that knowing the signs of possible emergencies such as how to shut down your equipment, where to find and use the fire extinguisher or worst of all how to escape from the workshop in case of overwhelming situation is very important. The findings of author cited above authenticated the discoveries of this study.

Summary of Findings

Based on the data analyzed; the following principal findings were made

Eleven accidents were found to be occurring for at least once in a month in electrical/electronics workshops in technical colleges in Oyo and Ogun states. However, four accidents were discovered to be occurring for at least once per term or section.

It was also in the findings that there are twelve consequences of accidents that frequently occur in electrical/electronics workshops in technical colleges in Oyo and Ogun states.

Twenty three techniques for managing accidents in electrical/electronic workshop in technical colleges in Oyo and Ogun states were also identified.

Conclusion

The following conclusions were drawn from the findings of this study:

Many accidents such as explosion, thermal/electric burns and electric shocks among others were found to be occurring frequently in electrical/electronics workshops in technical colleges in Oyo and Ogun states. The accidents are mostly caused by poor housekeeping and Failure to de-energize or isolate the electrical energy source prior to maintenance activities among others. Thus, accidents can be managed by providing well stocked first aid boxes and Provision of smoke alert system to the workshops.

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