

# SAFETY AWARENESS AND KNOWLEDGE AMONG WORKSHOP AND LABORATORY PERSONNELS IN NIGERIAN PUBLIC POLYTECHNICS

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## ABSTRACT

Workshop/laboratory managers are central to the ensuring that workshop/laboratories safety rules and regulations are adhered to during students' practical sessions. This study examined the level of knowledge and awareness of safety among workshop/laboratory managers in Nigerian public polytechnics. A total of seventy six (76) workshops/laboratories managers participated in the survey out of which sixty five (85.5%) useful questionnaires were returned and used for the analysis. Descriptive statistics was used to analyze the data collected. The results showed that all the workshop/laboratories managers have high level of awareness and knowledge of workshop/laboratory safety except in one knowledge item "*Color coding to identify potential danger zones in the workshop/laboratory*" with a low mean score of 1.80 which indicates that workshop/laboratory managers have low or no knowledge of color coding that indicates danger in the workshop/laboratory. The overall result indicates that school workshop/laboratory managers have high level of awareness and knowledge of safety. The result further revealed that workshop/laboratory managers' high level of awareness and knowledge on safety has contributed in no small way in preventing accidents in school workshop/laboratory during students' practical exercises.

**Keywords:** Safety knowledge, Safety awareness, workshop/laboratory managers

## 1. INTRODUCTION

Safety awareness and knowledge is fundamental to sustainable working environment in school workshops and laboratories. It is paramount as according Workplace Safety and Insurance Board- Work Solution (2001) that it is the necessary fundamental things one must know under the workshop and laboratory awareness program. There is no gain saying that there are hazards in every working place and therefore, it is not enough for any workshop/laboratory personnel to identify the hazards in his/her working place but, they need to be train on how to recognized, assess and control the hazards they find in their working place immediately before the unwanted happened. Of course, workshop/laboratory managers and users may not have control over which they are not responsible, but they may be responsible for how they respond to circumstances (Griffin et al., 1995). Likewise, our lives and safety are no one's responsibility to safeguards them but our own. The goal of workshop/laboratory safety campaign is to increase managers and users' awareness and knowledge, without creating overwhelming anxiety about situations they may encounter as staff or students, and to develop basic workshop/laboratory safety habits which they can readily use to remember in challenging situations.

Many new workshops/laboratories managers and users enrolled into technical and science courses with limited knowledge and training regarding safety issues as they relate to workshop/laboratory based practices. The issue of potential danger is one that anybody should consciously bring to his/her daily awareness at the beginning of one journey to the workshop and or laboratory either as a manager or any workshop or laboratory user. Therefore, it is in everyone's best interest to be vigilant about the workshop and laboratory environment and to have a plan at all times should one be confronted with any danger in the workshop. Learning a set of achievable interventions aimed at recognizing, managing, or avoiding dangerous situations is important at all times (Fernandez, 1995). A final thought involves maintaining one's safety with regard to health and well-being. It is important and everyone's best interest to be vigilant about the workshop/laboratory environment that managers and users be aware of and practices universal precautions as well as making themselves insusceptible from exposure to potential danger when working in the workshop/laboratory.

## 2. STATEMENT OF THE PROBLEM

It is paramount to know what workshop/laboratory managers understand about workshop safety or whether they are familiar with the main themes of workshop/laboratory safety at all, considering the enormous importance of workshop/laboratory safety in sustaining a safe working environment. Workshop and laboratory managers' awareness and understanding of what workshop/laboratory safety constitutes is crucial to ensuring a safe working environment. Yet research efforts appraising the workshop/laboratory safety awareness and knowledge among users are acutely lacking. There were basically no much research found that directly examine workshop/laboratory managers'

awareness and knowledge of workshop safety awareness and knowledge on equipment and the workshop/laboratory environment. Only a few others have looked at the attitudinal aspects of students' safety in the workshop and laboratory, explaining the value and need for safety precaution in the workshop with no attempt to assess workshop and laboratory managers' awareness and knowledge on the workshop/laboratory safety whom are the daily handlers of the industries. This study was prompted by the acute lack of research in workshop/laboratory and workshop/laboratory safety awareness and knowledge involving managers, particularly in a Polytechnic setting, who are daily users of workshop/laboratory based on the nature of their academic training engagements. It was premised upon the idea that workshop/laboratory managers' awareness and knowledge is an important foundation of the hazard free workshop/laboratory environment and for the acquisition of the right frame of mind for safe working environment. Therefore, this research was directed into exploring the levels of safety awareness and knowledge among workshop/laboratory managers in the polytechnic sector, as the findings may provide useful data for drawing up workshop/laboratory safety initiatives in the minds of workshop/laboratory managers in the polytechnics and other tertiary institutions' that are daily users of workshops and laboratories.

### 3. OBJECTIVES OF THE STUDY

The objective of this research is set within this framework:

1. to assess the levels of safety awareness among workshop/laboratory managers in Nigerian public polytechnics by identifying whether they are familiar with its core values.
2. to assess the levels of knowledge on safety among workshop/laboratory managers in Nigerian public polytechnics by identifying whether they are familiar with its core values.
3. to determine whether the level of safety awareness and knowledge correlate with infrequent accidents occurrences in the workshop.

### 4. LITERATURE REVIEW

Workshop/laboratory safety awareness and knowledge among workshop/laboratory managers is paramount. Awareness and knowledge of the safety rules and regulations of the designated workshop/laboratory is a seriously business which workshop/laboratory managers and students must always consider when they are in practical session. These workshop/laboratory rules and regulations are provided with the intent to safeguard the students and other workshop/laboratory users so as to avoid any potential risks. Workshop/laboratory safety knowledge and awareness serves as the core determinants of the attitudes and intentions of exhibiting a behavior (Bello, 2017). It also serves in determining behavior because without knowledge, one cannot act on any information or problem that is confronting him/her (Abd Hamid & Ahmad, 2012).

According to Mostafa & Momen, (2014), knowledge has significant influence on the students' safety practices in workshop/laboratory. Safety may not be born alone unless it is sets and given priority at all time. Environmental knowledge leads to environmental awareness and concern, which lead to proactive environmental behaviour (Kollmass and Agyeman, 2002). Knowledge holds the key to the formation of environmental proactive attitude, and that environmental knowledge is the key to driving any program movement such as safety (McDougall, 1993; Laroche, et al., 2002). Therefore, knowledge and awareness about workshop/laboratory environment is paramount. According to Meyer (2017), workshop managers and users need to understand their responsibilities to protect themselves, their working colleagues and the wider community and work environment. These safety aspects should be applied to foster safety values at all levels. Awareness and knowledge of safety in doing work must be implemented at the grassroots level of all workers and students in order to nurture the attitude of all workshop/laboratory users so that they are always aware of the safety aspect when doing a job or task. The delivery of Occupational Safety and Health as a fundamental part of technical and vocational education may set the shade for having the workshop/laboratory managers and students adopt safe work procedures during their orientation toward work (Okun, et al. 2016).

Knowledge and awareness regarding occupational hazard and safety practices is important in order to mitigate negative consequences as stated by (Onowhakpor, et al. 2017).

Having the knowledge and awareness of safety practices for workshop/laboratory managers and users is very helpful and crucial to start from early stage in preventing the occurrence of accidents in the workshop or at any workplace. According to Fullman and James (1984), accidents and damage happen due to lack of enough awareness, knowledge and skills, especially in the use of machinery or equipment. Accidents that occur usually result in serious injuries, maim and sometimes result in death. Therefore, the rules of safety in the workshop/laboratory need to be taken seriously at all times by all parties both students and other workshop/laboratory users.

## 5. RESEARCH METHODOLOGY

A survey method was used in this study as it is considered to be a suitable research method for this type of study (Choudrie and Dwivedi, 2006). Questionnaire that comprised the primary survey instrument for data collection was utilized, since it addresses the issue of reliability of information by reducing and eliminating differences in the way that the questions were asked, and how they were presented (Fowler, 2002). Furthermore, questionnaires facilitate the collection of data from the respondents within the time frame of the study, which was a critical issue for this research.

### Measurement of Awareness

Awareness is the state of being conscious of ideas or events (Brown & Ryan, 2003) or the state of realizing that something exists (O'Collins, 2004). A person becomes aware of an idea or event as a result of having heard of it or having come into contact with it through various different means, such as through conversations, discussions, watching commercials advertisements, reading leaflets, listening to the news, and others. In this study, *awareness* of workshop and laboratory safety was defined as students' familiarity with the workshop/laboratory safety as a result of having heard about it from teachers/instructors through class or workshop/laboratory discussion, reading safety leaflets pasted on the walls, safety warning on the machines, and or through whatever sources. The construct was measured by getting workshop/laboratory managers to rate the levels of their awareness on the questionnaire items of the awareness on a 5-point Likert's scale.

### Measurement of Knowledge

Knowledge is defined as the amount of information held in the memory that affect the way individual assess, interpret and react to the stimuli around them (Blackwell et al, 2001). Brucks (1985) provided a categorization of knowledge by breaking it down to subjective and objective types. Subjective knowledge is an individual's perception or self-assessment of what and how much he or she knows about a subject. Objective knowledge refers to accurate factual information stored in the memory. Perceived or subjective knowledge reflect what individuals think they know about a subject, while objective knowledge is a measure of what they actually know about it.

In this study, the researchers intend to assess whether workshop/laboratory managers' knowledge of workshop/laboratory safety influence the non rampant occurrence of workshop/laboratory accidents in school workshop/laboratory. Measure of this was assessed through a questionnaire that will require workshop/laboratory managers to respond by indicating their level of knowledge of workshop/laboratory safety tips.

### Population and Sample

Population of this study consists of all workshop/laboratory managers which include technologists, technicians, and workshop/laboratory attendants from sciences, technology and engineering colleges of the Hassan Usman Katsina Polytechnic, Katsina - Nigeria. The sample of the study was purposively and randomly selected to participate in the survey. All members of the workshop and laboratory management were targeted to participate in the survey; therefore every member of the workshop/laboratory manager had equal and likely chance to participate in the survey. The polytechnic instructors, technologists, technicians, workshop/laboratory attendants and store men from colleges of science and technology, college of engineering, college of vocational and technical education, college of agriculture, and college of environmental studies of the Hassan Usman Katsina Polytechnic, were selected for the study because they are directly involved in daily workshop/laboratory practices with students, as such they might have gone into several workshop practical sessions, and therefore, they should have had some idea, information and experiences in school workshop tools, machines, equipment and or laboratory apparatus and work environment and their safety rules and regulations.

### Instrument for data collection

The study utilized an adopted and modified workshop/laboratory safety knowledge and awareness questionnaire used by Bello (2016) on students' workshop safety awareness with a Likert's-type items that requested participants to rate their levels of awareness and knowledge on each item in the questionnaire. The response categories used in the study were "High", "Quite High", "Moderate", "Low" and "None." The items were validated by a panel of experts for content properties. The internal consistency of the data of the items was assessed utilizing a reliability test (i.e. Cronbach's  $\alpha$ ), and was found fit with  $\alpha = 0.86$ , which is very good for an exploratory study, as it is scholarly agreed that reliability index for an exploratory survey should be equal to or above 0.60 (Straub et al. 2004; Golafshani, 2003; Kirk & Miller, 1986).

### Data Collection and Analysis

Data was collected by the researchers through questionnaires in the workshops and laboratories. Workshop/laboratory managers were asked to fill the questionnaires out and returned them in person or through the research assistants from

each college of the institution who assisted in the distribution and collection of the questionnaire. Participants were encouraged to fill in the questionnaire at the spot and gave it back to the research assistant. This method ensured very good returns response of the questionnaire. Analysis of the data involved descriptive statistics (i.e. percentages and frequency counts) and mean score analysis was computed from the respondents' responses to the Likert's-type items on the awareness and knowledge of workshop and laboratory safety rules and regulations on machines, tools, equipment, apparatus and workshop/laboratory environment using SPSS version 16.0 for windows.

## 6. RESULT OF THE STUDY

The result of the study was presented in tabular form in two tables each for the descriptive analysis and mean scores of the awareness and knowledge items as produced by the SPSS version 16.0. The result is summated and average percentage score of each item was tabulated as shown in Tables 1 and 3, while Tables 2 and 4 show the mean score of the items.

**Table 1.** Descriptive analysis of Awareness of Workshop Safety Items

Items	None		Low		Moderate		Quite High		High	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
1. Machines and tables should be installed/fixed with enough space	3	4.6	5	7.0	19	29.2	10	29.2	28	43.1
2. The first aid box in the workshop/laboratory	6	9.2	4	6.2	12	18.5	16	24.6	29	44.6
3. Environmental effect of hazardous chemicals	5	7.7	12	18.5	22	33.8	15	23.1	11	16.9
4. The presence of sand bucket in the workshop/laboratory	5	7.7	7	10.8	15	23.1	14	21.5	24	36.9
5. Never use a tool/equipment until you know how to use it	2	3.1	6	9.2	13	20.0	12	18.5	32	49.2
6. The right tool/apparatus should be use for a job	9	13.8	5	7.7	11	16.9	8	12.3	32	49.2
7. Permission must be sought before using a tool in the workshop/laboratory	5	7.7	2	3.1	14	21.5	14	21.5	30	46.2

Freq= Frequency of respondents

%= Percentage of respondents

The result of the analysis (Table 1) indicates that respondents have between moderate and high level of awareness in all the items of workshop safety precaution. This shows that workshop and laboratory managers in public Polytechnics are very much aware of all necessary measures to be taken to avoid any possibilities of workshop/laboratory accident during students' practical sessions, and this is a very welcome development.

**Table 2.** Mean Score of Safety Awareness Items

S/No	Item Description	N	Mean Score
1	Machines and tables should be installed/fixed with enough space	65	2.846
2	First aid box in the workshop/laboratory	65	3.023
3	Environmental effect of hazardous chemicals	65	2.046
4	The present of sand bucket in the workshop/laboratory	65	2.507
5	The right tool/apparatus should be use for a job	65	2.753
6	Permission must be sought before using a tool in the workshop/laboratory	65	3.153
7	Never use a tool/equipment until you know how to use it	65	3.015
	Valid N (listwise)	65	



The mean score of the seven items (Table 2) of safety awareness also shows a good mean score in all the seven (7) items even though three of the items indicated high levels of workshop/laboratory safety awareness among workshop/laboratory managers in the public Polytechnic. The overall result of the analysis on the awareness indicated that managers have a high level of awareness of safety in the workshop/laboratory in Nigerian public Polytechnic.

**Table 3.** Descriptive analysis of Knowledge of Workshop Items

Items	None		Low		Moderate		Quite High		High	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
1. Type of floor to be use in the workshop/laboratory	1	1.5	1	1.5	10	15.4	19	29.2	34	52.3
2. Related operations should be organized in the workshop/laboratory	6	9.2	4	6.2	25	38.5	14	21.5	16	24.6
3. Type of protective clothing that should be worn in the workshop/laboratory	2	3.1	2	3.1	12	18.5	11	16.9	38	58.5
4. Color coding to identify potential danger zones in the workshop/laboratory	17	26.2	11	16.9	14	21.5	14	21.5	9	13.8
5. How fire extinguishers are operated in case of fire outbreak	4	6.2	10	15.4	14	21.5	16	24.5	21	32.3
6. How a sand bucket should be used in the workshop/laboratory	8	12.3	10	15.4	9	13.8	17	26.2	21	32.3
7. Where the emergency control panel is situated in the workshop/laboratory	7	10.8	7	10.8	19	29.2	17	26.2	15	23.0
8. How emergency control panel is switch off in case of emergency	6	9.2	8	12.3	14	21.5	17	26.2	20	30.8

Freq= Frequency of respondents

%= Percentage of respondents

The result of the analysis (Table 3) indicates that respondents have between moderate and high level of knowledge of in all the eight items of workshop safety precaution. This also shows that workshop/laboratory managers in public Polytechnic have the necessary knowledge about workshop/laboratory safety and therefore, can avoid any possibility of workshop/laboratory accident during students' practical exercises.

**Table 4.** Mean Score of Safety Knowledge Items

S/No	Item Description	N	Mean Score
1	Type of floor to be use in the workshop/laboratory	65	3.292
2	Related operations should be organized in the workshop/laboratory	65	2.461
3	Type of protective clothing that should be worn in the workshop/laboratory	65	3.246
4	Color coding to identify potential danger zones in the workshop/laboratory	65	1.800
5	How fire extinguishers are operated in case of fire outbreak	65	2.615
6	How a sand bucket should be used in the workshop/laboratory	65	2.507
7	Where the emergency control panel is situated in the workshop/laboratory	65	2.030
8	How emergency control panel is switch of in case of emergency	65	2.215
	Valid N (listwise)	65	

The mean score of the eight items of knowledge on safety also (Table 4) shows a good mean score in all the eight (8) items with two of the items “*Type of floor to be use in the workshop/laboratory*” and “*Type of protective clothing that should be worn in the workshop/laboratory*” indicated high mean score of knowledge on safety among workshop/laboratory managers in the public Polytechnic. However, one item “*Color coding to identify potential danger zones in the workshop/laboratory*” shows that managers have low or no knowledge on the workshop/laboratory safety in this aspect. Besides this, the overall results of the analysis on knowledge of workshop/laboratory safety indicated that managers have a good knowledge on safety precaution in school workshop/laboratory in Nigerian public Polytechnic.

These results correlate with the fact that there are infrequent happenings of accident in school workshop/laboratory during students’ practical exercise as all necessary steps have been taken to avoid it by the managers of these workshops/laboratories owing to the fact they have all the necessary awareness and knowledge of workshop/laboratory safety precaution.

## 7. CONCLUSION AND RECOMMENDATIONS

The findings of this study support the fact that there is hardly any accident in school workshop/laboratory during students practical in Nigerian public polytechnics during workshop/laboratory practices, particularly in Hassan Usman Katsina Polytechnic. This might not be unconnected with the professional training received by the workshop/laboratory managers prior to their engagement and on the job training during which emphasis were given to workshop/laboratory safety rules and regulations. This is in addition to the managers’ unrelenting commitments to their primary responsibilities of ensuring a workshop/laboratory accidents’ free environment. Therefore, the researchers are hereby calling on departments and colleges to maintain these traditions of ensuring that, only qualified and competent personnel are employed as technologist, technician and workshop/laboratory attendants and they should be given on the job training in order to make them safety conscious at all time. It is further emphasized that workshop/laboratory managers should never hesitate to remind their students on the imperative of safety precautions whenever they are in the workshop/laboratory practical sessions for a safe working environment.

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