

## AN INVESTIGATION INTO SAFETY CLIMATE, SAFETY PRACTICE, SAFETY OF THE WORK ENVIRONMENT AND OCCUPATIONAL ACCIDENTS IN TECHNICAL COLLEGES IN NORTHEAST REGION OF NIGERIA

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### ABSTRACT

*This study investigates safety climate and its relationship to safety practice, safety of the work environment and occupational accident in technical colleges in the northeast region of Nigeria. The research work was guided by four (4) objectives and four (4) research questions to determine to what extent safety is practiced in the technical colleges in the northeast region of Nigeria. A random sampling technique was used to select thirty (30) students from each of the six selected technical colleges in the northeast region of Nigeria. The instrument used for data collection was the structure five-point likert type questionnaires. Data collected was analyzed using mean statistics and standard deviation. The result indicated that safety climate; safety practice and condition of the work environment are satisfactory in the technical colleges in northeast region of Nigeria. Area of concern is the occupational accidents which need to be reduced to the barest minimum. Based on the findings, the following were recommended: orientation and workshop on accident prevention should be organized to students and teachers to enlighten them on strategies for accident prevention in the workshop, encourage students to always use correct tool for a correct job, safety gadgets should be provided to all technical colleges in the north east region of Nigeria and periodic maintenance should be carried out on all tools and machines.*

**Key words:** Safety Climate, Safety Practice, Work Environment and Occupational Accidents

## I. INTRODUCTION

Safety involves application of common sense and good work habits. The workers who learn the proper way to use a tool learn the safer way to use it. Good work practice should be learned at the beginning of practical acquisition. A workshop with a diversity of tools, equipments and machinery, exposes workers to diverse accidents and hazards. Studies have shown that the efficient worker is the one who is safety conscious as spelled by Shadrach, (2005). The acquisition of practical and applied skill as well as scientific knowledge that would facilitate occupational efficiency requires performance and skill. Therefore, safety climate, safety practice, safety of the work environment and occupational accidents in technical colleges in the northeast region cannot be over emphasis due to its important in skill acquisition. Safety has been a major challenge in many organizations due to the poor attitude of workers towards safety practice. It is worthy to note that safety have social, medical/physical and psychological implication in the society N.B.T.E (1999).

It is important to realize that safety is relative. Eliminating all risk, if even possible, would be extremely difficult and very expensive. A safe situation is one where risks of accident (injury) or property damage are low and manageable. Safety can be limited in relation to some guarantee or a standard practice” Onuoha, (1991). In view of the foregoing, the research tends to find out the safety climate and its relationship to safety practice, safety of the work environment and occupational accidents in Technical Colleges in the Northeast region of Nigeria.

## II. AIM AND OBJECTIVES

The aim of the study was to find out the safety climate and its relationship to safety practice, safety of the work environment and occupational accident in Technical Colleges in northeast region of Nigeria and devices means of improving the practice. Specifically, the study gathered respondents’ perception regarding the following;

- i. Find out the safety climate in technical colleges in northeast region of Nigeria.
- ii. Find out the safety practice in technical colleges in northeast regions of Nigeria.
- iii. Find out the condition of the work environment as regard to safety in Technical Colleges in northeast region of Nigeria.
- iv. Find out the occupational accidents in Technical Colleges in northeast region of Nigeria.

## III. LITERATURE REVIEW

It is considered generally that skills unlike talent are a consequence of training and practice that is to say skill cannot be acquired except through training as outline by Onuoha, (1991). Whatever may be the function of a school, according to Steven, (2001) should among other things lead the way towards worthwhile aims and objectives. It is the responsibilities of the school to equip with the needed skills that will help learners fulfill themselves and contribute meaningfully to the desired Technological development. The concept of skill involves practice ability; hence it is high time that government through technical schools had insisted that vocational and technical education should be practically and action based and there should be no compromised about that. A well-equipped workshop is a pre-requisite for effective skill acquisition. The main deference’s between a good workshop and a classroom are the facilities and equipments that are available and the safety of that workshop.

### 3.1 Concept of Safety

It is worthy to note that safety have social, medical/physical and psychological implication in the society. Safety is defined as one that is free from obvious factors that might lead to injury of a person or damage to property or the surroundings (Richard 2002). James, (2003) in his article titles “The concept of safety in outdoor education”: a hypothetical “ideal” point out that some people may assume that “safety” is a concrete concept, whilst “risk” is a vague, hypothetical concept. In fact, it’s the other way round. Risk always exists. But true safety never exists, except in hypothetical situations. So, risk is reality, safety is a fantasy. Thus, the concept of safety is a very problematic one. It is often falsely assumed that it is really possible to “be safe” likewise; there are no completely safe outdoor and adventure activities.

There is always the risk of freak events occurring and occasionally they do. Programmes and instructors should closely scrutinize their written and verbal language, taking particular notice of the way the word “safety practice” is that by adopting certain standard ways of operating “acceptable” risk is of course subjective and changes over time and across cultures, and varies widely from individuals. Good safety practices evolve via constant reviewing, based on actual experience and the experiences of others including research evidence and courtroom decisions. Despite safety being an illusion, it has become increasingly attractive, especially when people feel vulnerable or threatened. To strive for safety in an adventure programme has become an increasingly valued objectives from a societal perspective over the last two (2) decades. Focus on safety however, has taken on a mantle above and beyond the bigger picture “safety” is one aspect of participant’s experience. Thus, “true safety’ to the extent that it is achievable, can never be achieved by following static rules; it could only ever be achieved by adopting “live” in situ, decision making based on the dynamic elements in the system. In other word “judgment” is required to successfully manage risk

### 3.2 Importance of Safety Practice

In any workshop setting, be it small, medium or large workshop the importance of safety cannot be over-emphases. A workshop can only be said to be productive only when risk and accident are reduced to the barest minimum (Alcock, 2006). Although the elements of safety culture are somewhat amorphous, there is general agreement that they include both organizational and individual aspects. Elements commonly included at the organizational level are senior management commitment to safety, organizational effectiveness, effective communications, organization of learning and a culture that encourage the identification and resolution of safety issues. Elements indentified at the individual level include personal accountability, a questioning attitude, and procedural adherence. The financial health of the organization and the impact of regulatory bodies are occasionally identified as external factors potentially affecting safety culture” Richard, (2002).

Ridley (2002) point out that the importance’s of safety are the benefit drive during safe working condition in the workshop/industry. The benefits are the three primaries’ majors, which include:

- Prevention of workers from accidents and hazards
- Prevent tools and equipment from damage
- Improve or maximum productivity

Skill is therefore the training given to an individual to make him/her perform expertly on the job by using their knowledge with safety precaution effectively and ready on execution of their jobs. Atumba, (2001) supported this view when he said that technical skill in practical training holds the key to the self-dependence of an individual and by extension the independence of a nation, economic wise. It is well known that effective training in technical skills acquisition has immensely contribute to the technological excellence and economic development of the industrialized nation, it is for this reason that Evereh and Jenkins (1983) while stressing the importance of safety and skill acquisition in nation growth emphatically contended that Nigeria's social and economic problem will be drastically reduce if people are given adequate vocational and technical training skills. Atsumbe (2001) also emphasis that important of safety in a technological developing nation cannot be overemphasized seeing as a result of risk and accident involve in skill acquisition of a premature stage of their technical education.

### **3.3 Individual and Safer Ways of Working**

The condition for individual to work safely can be expressed in terms of three key words. How to work safely, he/she can work safely and he/she has the will to work safely (Hedberg and Bussel, 2017). They also emphasis that knowing how to work safely depends on the training a trainee received for the job task in question, knowledge is needed on functional properties both when the machine is normal in operation and when disturbance of different types occurs. Working safely is also one of the individual ways of ensuring safety in a workshop which depends on the information that may have to be generated by the tool, equipment or machine so that the operator both understands how to act correctly and has what he needs to do so. Safety devices can be designed so that they are not a hindrance to doing the work. The third point is the will to work safely which involve the motivational condition, which is the hardest to satisfy especially from a long-term perspective. But, if the operator is aware of the hazards and if conditions that promote risk taking are kept to a minimum, the likelihood will be considerably greater that he will adopt a fairly safe way of working. It is also conceivable that this aspect of work should be given priority and supervised.

Ridley, (2016) points out that for individual to work safely in a workshop or industry, three organs have to be coordinated: the organization, safety equipment or gadget and safety regulation. The organization is a fundamental aspect of safety concerns how machines are designed and maintained, how job procedures are planned and supervised. For these reasons, it is necessary to carefully consider the role of management principles in designing and establishing a workshop/industry. Organizations have many variants with respect to how they are set up and how they operate. These range from hierarchical systems, where decisions flow from top to bottom, through bureaucratic organizations, which are controlled by detailed regulations, to loosely-controlled organization with diversified authority structures. An organization may have a fixed structure within which there are few opportunities for change, while another common approach is to create one structure when the system is designed and then let the structure change during problem solving to take advantage of new opportunities.

Arowolo, (2003) the second organ is the safety gadgets which play a vital role in ensuring safety of individual at working by preventing individual from accidents and injuries. The last organ is the safety regulations, which specify how task should be undertaken communicating information and controlling people behaviors in hazardous situations. They can also be utilized to control higher-level functions that are of significance for safety, such as

maintenance, planning and design. There is general agreement among most of the parties concerned that safety regulations are necessary and of great value (INSAG, 1991). Also in another related literature review, Elagin, (2003) has provided an overview of the opportunities and limitation safety regulations. One of his conclusions is that “imposed safety rules are only needed where individuals own rules can be seen as a safety and a support to cope with situations in which the person would otherwise be led astray by their normal behavior”.

### **3.4 Approaches to Improve Safety Practice**

Researches have shown that different attempt was made by safely professional bodies to improve safety at work due to its importance in technological development. It is worthwhile to look at safety practice from different angle of development. INSAG, (1991) highlighted that technical design and directives do not govern the actual level of safely within a system. It is the individual’s commitment; attitudes and perspectives on risk are equally important ingredient. A concept that has been employed to discuss these rather operation illusive factors is that of “safety culture”. Two general components of safety culture identified by INSAG. The first is the framework which organizations most have and the second is the attitude of staff at all levels. Attentions to safety consist of many elements.

- Individual awareness of the important of safety
- Knowledge and competence
- Commitment requiring demonstration of senior management level of high priority of safety and adoption by individuals of the common goal of safety.
- Motivation through leadership, the setting of objectives and system of rewards and sanction through individual self-generated attitudes.
- Supervision including audit and review practices with readiness to respond to individual questioning attitudes.
- Responsibility through formal assignment and description of duties and their understanding by individuals.

Elagin, (2003) suggests that problems of accident can also be approached from the opposite direction from looking at a construction site, there is a lot of traffic etc, it might seem that accident must occur every day. The severe physical hazards do give rise to a higher frequency of accidents, but not one that is extremely high. One explanation lies in risk compensation construction workers adopt their behavior in light of the risk they face. In general, this question concern safe and unsafe behavior at work and how risks are perceived at the workplace. The researcher further emphasis that a properly designed and properly executed safe system of work can go along way to helping ensures safety.

Shadrach (2005) elaborated that human error and risky behavior are strongly affected by the technical design and organizational structure and so by social patterns at the workplace. There are many different ways of getting individuals to behave more safely, which have a greater or lesser degree of success. Information campaigns to improve safety are quite common, but they tend to have effects that are both short-term and marginal. The types of technical equipment that may be involved in accidents vary to a very considerable extent ranging from hand-held tools to computer system which control production plants. Even with relatively simple system, designers have to adopt a large number of standpoints and make different decisions. A number of these will concern safety issues either directly indirectly. Another component of the system approach to safety at work involves taking account of the

entire life cycle of the production system. Safety consideration must apply during planning, design, production start, operation and wind-up. The operational phase includes both normal and disrupted production, maintenance and system changes. Elagin, (2003) contributed that the most common way of attempting to promote safer behavior is to introduce stricter rules, with supervision to ensure that they are followed.

Attempt is drawn to a type of erroneous behavior and an attempt is made to correct it. Onuoha (1991) opined that safety habit must be integral parts of college programme for the safety of workers, tools and equipment in a workshop. The inclusion in the college programme will structure and stimulate planning, assessing and protecting tools, equipment and workers in a workshop. Also, the effective techniques for the workshop management are the involvement of workshop staff in planning, directing and controlling training various occupations and in meeting with institution acquiring skills and to maintain consumable materials to be purchased and distributed for practical and utilization. Physical facilities to be organized and given occupational direction so that all acceptable occupational work habits and procedures are successfully executed (LarHarms, 2013).

### **3.5 Effect of Safety on Technological Development**

From a global perspective, accidents are a major health problem in our industries and organizations. Ways has to be provided to reduce the rate to a barest minimum. There are nearly three million fatalities resulting from accidents or poisoning of which two million occur in underdeveloped countries (Karolinska, 2012). Accidents affect technological development in a diverse way, which result to not having enough manpower in production line (UNESCO handbook of training apprentices in industrial training workshops, 2000). The main task of theoretical training is to impart general knowledge of social science to the occupation and develop safety abilities and skills while the main task of practical training is to impart vocational working skills and experience as well as safety and practical abilities necessary for creative and execution of work independently. According to the occupational standard, this further develop high working moral. Onouha (1991) deduced that effect of safety on Technological development may be more dangerous if it is not properly addressed. These can be seen from a global warming as a result of emission of gases from industries, discourages workers or employee from being in the production line due to injuries or accident fair, and also it will in turn not having enough workers in the technological world which may decline technological development. Alcock (2006) observed that an important ingredient for technology development is appropriate teaching/practical equipment with a good safety practice that will guide learners to unleash their technological potential for technological development.

## **III. METHODOLOGY**

This study employed a descriptive survey research. It's involved the use of questionnaire to determine the opinion and perceptions responses of students on safety climate and its relationship to safety practice safety of the work environment and occupational accident in some selected technical colleges in the Northeast region of Nigeria. A random sampling technique was used to select thirty (30) students from each of the technical school from northeast region of Nigeria as the sample of the study. The choice of the above set of respondents as the Population is principally because they are most appropriate group among those directly involved with the implementation and attainment of safety practice.

The study also adopts statistical mean, standard deviation, and tables to analyze and present data respectively.

The formula for calculating mean is explained below: -

$$\bar{x} = \frac{\sum fX}{N}$$

where

$\bar{x}$  = Mean Value

$\Sigma$  = Summation

$f$  = Frequency

$X$  = Score

$N$  = Number of respondents

#### IV. DATA PRESENTATION AND ANALYSIS

The results of the data collected were analyzed using mean statistics. The tables of different variables are presented with corresponding mean and standard deviation. The discussion and interpretation of each table base on the research questions.

**Table 1:** Mean Responses of Students on Safety Climate in Technical Colleges in Northeast Nigeria.

S/NO	ITEMS	MEAN (X)	S. D	DECISION
1	Workshop is well planned with enough working space and access ways	4.34	23.39	Agreed
2	The workshop is well ventilated	4.21	22.71	Agreed
3	Dust, toxic chemicals and gases are discharge appropriately in the workshop.	3.29	18.11	Agreed
4	The workshop has sufficient illumination	3.45	18.80	Agreed

**Source:** Field Survey, 2023

**Table 2:** Mean Responses of Students on Safety Practice in Technical Colleges in Northeast Nigeria.

S/NO	ITEMS	MEAN (X)	S. D	DECISION
5	A safety chart is conspicuously hung on the workshop for student to study	3.64	19.69	Agreed
6	Safety rules and regulations is hung in the workshop for students to study	4.01	21.63	Agreed
7	First aid box is readily available and strategically placed with content clearly labeled.	3.62	19.52	Agreed
8	Students are provided with safety gadgets in the workshop	3.20	19.95	Agreed
9	There is fire extinguisher at any entrance and exist for	3.36	18.60	Agreed
10	Emergency fire outbreak in the workshop. All kinds of accidents are reported immediately to the safety health officer.	3.79	20.43	Agreed
11	There is accident register kept with date and categories of accidents.	3.37	18.22	Agreed
12	Tools and equipment in the workshop are well kept in good operational condition.	3.85	20.90	Agreed
13	Maintenance of tools and equipment are periodically carried out.	3.08	17.07	Agreed
14	Student wears safety gadgets before going into the workshop.	3.28	17.85	Agreed

**Source:** Field Survey, 2023

**Table 3:** Mean Responses of Students on Condition of the Work Environment as Regards Safety in Technical Colleges in Northeast Nigeria.

S/NO	ITEMS	MEAN (X)	S. D	DECISION
15	The workshop is always kept tidy	3.89	21.10	Agreed
16	The workshop is free from obstacle that may cause accident	3.49	19.08	Agreed
17	The bench height, width and length conform to standard.	3.69	19.99	Agreed
18	Sharp blades are guarded to prevent accident in the workshop.	3.86	20.87	Agreed
19	Tools are kept in appropriate place after use.	4.03	21.78	Agreed
20	There are escape ways in the workshop in case of any outbreak.	3.30	18.03	Agreed
21	The workshop floor has high frictional force that prevents sliding.	3.68	19.88	Agreed

**Source:** Field Survey, 2023



**Table 4:** Mean Responses of Students on the Occupational Accidents in Technical Colleges in Northeast Nigeria.

S/NO	ITEMS	MEAN (X)	S. D	DECISION
22	Accidents due to dull edge of cutting tool	3.71	20.09	Agreed
23	Accident due to falling as a result of slippery floor.	3.46	18.85	Agreed
24	Accident due to toxic and inflammable gases explosion in the workshop.	3.31	17.96	Agreed
25	Accidents due to improper use of tools/equipments.	3.44	18.89	Agreed
26	Accidents due to poor condition of a machine.	3.57	19.39	Agreed

**Source:** Field Survey, 2023

## V. DISCUSSION OF RESULTS

Analysis of result of table 1 revealed that safety climate is satisfactory in the technical colleges in the northeast region of Nigeria. This entails that the climate of workshops is conducive and acceptable as far as safety is concerned. This is in line with the findings of INSAG, (1991) which states that the environment and atmosphere of a workshop or industry determine the level of safety in such organization.

The results in table 2 shows that safety is satisfactory practiced in the technical colleges in the northeast region of Nigeria. Alcock, (2006) asserted that safe system of work could go a long way to helping ensure safety. Health and safety Executive, (1989) also found out that safety practice is concerned with perception mental and physical capability of peoples and the interaction of individuals with their job and working environment, influence of equipment and characteristic which influence safety related behavior at work.

Result from table 3 revealed that the condition of the work environment as regard to safety is satisfactory in technical colleges in northeast region of Nigeria. This agrees with the findings of Bird and Loffus, (1976) which found that the condition for individual to work safely could be expressed in terms of three key words. Know, can and will. INSAG, (1991) also observed that technical design and directives do not govern the actual level of safety within a system. It's also including individual commitment, attitudes and perspective on risk is also important.

Table 4 showed that there existed occupational accidents in technical colleges in northeast Nigeria, which is in line with the findings of Onuaha, (1991) who observed that the students are handicap in safety habit which leads to some accidents. Among the accidents observed resulting from faulty safety practices are skin contact injuries were most frequent. Michael and Amos, (2011) also observed from a global perspective that accident is a major health problem in which every year nearly three million facilities resulting from accidents or poisoning which two million occurs in less developed countries. James, (1989) in his study on improving laboratory safety in schools also observed that schools are not doing enough to promote safety in the laboratory and this oversight is endangering lives.

## VI. CONCLUSION

Safety is an aspect that should not be neglected in a workshop. This has to do with protection of lives and properties. Any tool or pieces of equipment not in use should be stored in safe place and not left lying carelessly. In case of any injuries, major or minor, they should be treated as soon as possible (Shadrach, 2005). The most skillful way of performing a job is

typically the safest way, that is to say safety is an attitude of skill, which could be taught (Graw-Hill, 2008). The combination of different technical skills will help in solving the problem of safety.

A combination according to James, (2003) known as “Instruction sheet” will go a long way in improving practical skills acquisition of students. In view of this study, it is deduced that safety is satisfactory practice especially among the technical students in the northeast region of Nigeria. But more effort is needed in the area of accident prevention. Therefore, all stake holders in technical colleges in the northeast region of Nigeria needs to formulate polices that will overcome the entire bottleneck highlighted in this study in order to arouse the interest of students, workshop attendants and teachers on the need to keep a safe working environment.

## VII. RECOMMENDATIONS

According to the findings of the study, to improve the safety climate and its relationship to safety practice, safety of the work environment and occupational accident in technical colleges in the northeast region of Nigeria, the School authorities should put more effort towards improving safety climates in technical college in the northeast region of Nigeria, Safety practice should be encouraged and practice from inception of training or skill acquisition to promote high level of safety in our workshops and industries, government should provide conducive working environment and make safety wears/gadgets available to all technical colleges to minimized accident to the barest minimum and routine maintenance should be carried out on all tools, equipment and machines to reduce or eliminate occupational accidents.

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