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# Guided-Practice on Occupational Health and Safety Competencies of Workers in the Construction Industry in Oyo State, Nigeria

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## Abstract

Construction work and industry, although highly important to Nigeria's developmental processes, is characterized by high level of risks occurrence and hazards. This raises concern about the type of safety training provided in the industry and the instructional method used in imparting such safety trainings. A pretest-posttest control group quasi experimental design was used for the study. The experimental group was exposed to guided-practice training method and lecture method while the control group was exposed to lecture method. Two construction industries were purposively selected based on the criteria of workers' size, number of customers and experience of health risks. The workers in the two organizations who met the study's inclusion criteria were randomised into GpTM (11) and Lecture method (12) (Control) groups while treatment lasted eight weeks. Construction Industry Occupational Health and Safety Competencies Questionnaire ( $r = 0.85$ ) and Occupational Health and Safety Competencies Scale ( $r = 0.78$ ) were used in collecting data for the study. Data analysis was done using ANCOVA at 0.05 level of significance. There was a significant main effect of treatment on the occupational health and safety competencies of workers ( $F_{(1,17)} = 15.693, P < 0.05, \eta^2 = .480$ ). There was no significant main effect of level of literacy on occupational health and safety competencies among participants ( $F_{(1,19)} = .659, p > 0.05, \eta^2 = .034$ ), but the two-way interaction effect treatments and literacy was significant. Guided-practice training method was significant in enhancing the occupational health and safety competencies of construction workers. The training method should therefore be employed regularly in safety trainings to achieve improved health and safety competencies in the Nigerian construction industry.

**Keywords:** guided-practice training method, Occupational health and safety competencies, literacy level, construction workers

## Introduction

The construction industry is one of the most important sectors of any nation's economy because of its centrality to urbanisation and developmental process generally. Thus, Nigeria, like any other nations needs the construction industry to thrive and develop rapidly. Owing to its significance in the economy, it is necessary to give priority to the human resources within the industry (James, Braam and Kingma, 2012). This is because the success of any industry largely depends on the pool of workers operating in it as well as their general welfare. According to the Luxembourg Declaration, organisations depend on healthy, motivated employees for their success (European Network for Workplace Health Promotion, 2005). Generally, the integration of health and safety measures into the total quality management system within the construction sector could significantly contribute to cost-efficiency, quality assurance, environmental sustainability, better employee-employer relation and satisfaction (Okolie and Okoye, 2012).

Occupational health and safety competencies could be described as the ability of the workers to *anticipate, recognize, evaluate and*

*control* occupational health hazards. Occupational health and safety (OHS) is generally defined as the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment (Alli, 2008). Occupational health and safety competencies could be related to safety culture and safety climate which are usually used in a complementary way. Cooper (2000) refers to safety culture as a sub-facet of organizational culture, which is thought to affect member's attitudes and behaviour in relation to an organization's ongoing health and safety performance, while Cox and Cox (1991) argue that it reflects attitudes, beliefs, perceptions, and values that employees share in relation to safety. Also, Wilpert (2000), views the safety culture of an organization as the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of an organization's health and safety management. Safety culture embraces all the activities of the employees toward safety at the work

place. Positive safety culture will encourage high level of safety competencies of the employees at their workplace.

The role of employees in maintaining high level of occupational health and safety has been described in "Good Health Is Good Fortune", a training guide by the Occupational Safety and Health Branch (2005), to be fully cooperating with their employers, complying with proper work practices and taking care of their own and others' safety and health. For example, they should comply with work regulations and instructions; carefully read and understand relevant information, such as instructions and warning labels; carefully and properly use any material, tool, device and personal protective equipment provided; avoid eating, drinking or smoking in any place where there are hazardous materials to prevent poisoning caused by toxic substances entering the body through contaminated food or cigarettes; as well as pay attention to personal hygiene and wash hands before eating or drinking.

Occupational health and safety competencies have been referred to as industrial hygiene, which has been described as the art and science of anticipating, recognizing, evaluating, and controlling workplace conditions that may cause workers' injury or illness. Industrial hygienists use personal and environmental monitoring and analytical methods to detect the extent of worker exposure and employ engineering, work practice controls, and other methods to control potential health hazards (Construction Safety Council, 2012). Occupational health and safety competencies may involve the practices stated in Guidance Notes on Health Hazards in Construction Work (2004) as hazard identification, risk assessment, prevention, control, personal protective equipment and medical surveillance. The workers in the construction industry should have high level of occupational health and safety competencies to be able to identify hazards, assess risk and make use of personal protective equipment effectively and regularly.

The workers need to be trained on the importance of their safety at work as well as their individual roles in maintaining healthy work environment. The methods used for such safety training could therefore play an important role considering the nature of construction workers who are most times adults. The safety organisers may want to consider the use of andragogical methods which include practical and immediate usage of the

knowledge gained and skills acquired. Such methods as guided-practice training methods may readily come to mind for such safety trainings.

Guided practice mean learners use the strategy as the teacher provides targeted and differentiated supports. Guided practice refers to the phase of instruction that immediately follows the presentation of a new skill, concept, or strategy (Golden, Gersten and Woodward, 1990). The facilitator assesses learner's comprehension of a new concept or acquisition of a new skill during guided practice. This is done by assigning a few tasks that require learners to apply the new concept or skill thereby determining if the learners can perform these on their own. If learners demonstrate adequate performance, the facilitator assigns independent work involving the new concept. If, however, learners perform poorly during guided practice, the facilitator provides additional explanations or examples of the concept or provides additional models of how to solve a particular problem (Golden, Gersten and Woodward, 1990).

The awareness level of all the stakeholders at the workplace about the importance and processes of ensuring and maintaining occupational health and safety could be described as generally low in Nigeria. Most of the employers in Nigeria may not have reasonable knowledge of the details of the rules and the legal implications expected of them as employers with regards to keeping a safe workplace. This could also be true of a large percentage of Nigerian employees whose literacy level on health and safety at work is rather poor. The general low literacy level of the majority of casual workers used at construction sites may have a great impact on their health making them to be ignorant or unable to understand the proper usage of the personal protective equipment as well as the safety instructions needed to use the equipment.

The literacy level of the construction workers may be of importance to the occupational health and safety competencies of these construction workers. The literature reveals that most of the construction workers are employees with low level of literacy who possess little knowledge about the risks and hazards at the workplace as well as the various safety techniques needed to keep them away from accidents. The majority seems to lack the knowledge of their rights as employees under the law to make their employers provide adequate and necessary safety equipment and a generally safe workplace for them. They may be particular about making a source of livelihood and may not mind

working under unsafe conditions as long as they can earn a living from it.

Nnedinmaik and Umeadi (2014), while explaining the determinants of compliance with occupational health and safety, identify low level of health literacy as one major determinant. He equally identified lack of proper awareness of the Nigerian construction workers particularly those workers in the informal sector, which constitutes a larger percentage of construction activities in Nigeria. Tanko and Anigbogu (2012), cited in Nnedinmaik and Umeadi (2014) submit that the informal construction sector in Nigeria engages in informal construction activities and this constitutes about 70% of construction outputs. Kalejaiye (2013) posits that the informal construction sector has little or no access to occupational health. Its main methods of project execution involve employing a workforce that do not have ideas of adequate safety practices required. Therefore, it cannot advise the client to comply with OHS regulations. The argument, is that, if 70% of the construction activities are executed through the informal practice, the construction industry is shooting itself in the foot, as it will never conform to OHS regulations; rather, it contributes to most of the unsafe construction activities, thus hindering OHS improvement.

Emphasising the effect of low health literacy level of the construction workers on their occupational health, Nnedinmaik and Umeadi (2014) also stress that lack of awareness and improper medium of information dissemination could also be another reason for non-compliance with OHS laws. This was explained using the argument of Windapo and Oladapo (2012) that lack of knowledge and understanding of OHS regulations determine the level of compliance within construction regulations and that there is lack of awareness in most developing countries (for example, Nigeria) for OHS regulations and practice (Idubor and Osiamoje, 2013).

Therefore, Diugwu, Baba and Egila (2012), contend that lack of knowledge for details and implications hinder OHS management in the construction industry. They found that construction workers in Minna, Nigeria did not know the enforcer of OHS regulations in Nigeria. If workers do not know or understand the regulations, they will not know when their rights have been violated. Pupilampu and Quartey (2012) also note a similar issue that lack of adequate information and statistics hinder the compliance with OHS in Africa; Diugwu,

Baba and Egila (2012) and Idubor and Osiamoje (2013) identify same for Nigeria. Diugwu et al. (2012), argue that OHS information dissemination in Nigeria is ineffective and has minimal impact to target groups, hence blame the government for it. This demonstrates that enacting laws without adequate effort to make it available to the public is as good as not formulating one at all.

When discussing the effect of literacy level on occupational health and safety of workers, Campbell (2008:5) submits that:

*A low level of literacy can jeopardize workers' safety if they cannot understand the health and safety regulations provided to them. Furthermore, low literacy skills can prevent workers from obtaining information about their rights to a safe workplace. Without an understanding of their rights or the ability to assert them, workers with low literacy skills will continue to operate in unsafe work environments... Campbell (2008:5)*

This submission confirms that literacy level has a lot of impact on workers' occupational health and safety as the workers with low literacy level tend to have problems with the interpretation of some safety rules and exercise of their rights. The literature has also documented many benefits of increasing the literacy skills of workers and particularly with respect to occupational health and safety. Literacy skills, according to Bloom and Lafleur (1999), form the foundation on which advanced training, including safety training, is built and are key to increasing employees' capacity to acquire the technical and job-specific skills they need to be high performers. In a research conducted in the United States for the U.S. Department of Education, the Conference Board, as reported by Bloom and Lafleur (1999), found that training also "gives employees a better grasp of workplace dangers and safety issues," leading them to appreciate the health and safety-related consequences of their actions. The result of workplace education programmes, the study concluded, is fewer accidents, less lost work time due to injuries, reduced workers' compensation payments, and better compliance with OHS regulations

#### **Statement of the problem**

Consultants to construction companies and their workers' unions organise training programmes for the workers in construction industry in order to

reduce hazards that they face in the workplace. Most of the seminars and workshops are mere suggestions which workers at training programmes observed did not meet their training needs. Unfortunately, most of the workers are unable to effectively implement safety rules. One then wonders if the methods used for the safety training is faulty and requires a change in the safety education methodological process to enable the construction workers to display improved competencies with regard to their occupational health and safety issues.

The process of ensuring safety at the construction sites filled with risks and hazards raises serious concern about the type of safety training provided in the industry as well as the instructional methods used in imparting such safety training. There is therefore a need to replace the old methods of training with more practice-oriented methods so that workers in the construction industry will competently display their knowledge of safety at work and behave safely at all times in order to stay healthy and safe at the workplace.

Several studies have been done to examine the occupational health and safety of Nigerian workers. Most of these studies have focused largely on the causes of the hazards, their prevention and control; management's commitments, enforcement of occupational health and safety legislations; and provision of safety training. Little has been done to examine the effects of the methods which are used in imparting safety knowledge and skills in order to improve the workers' occupational health and safety competencies. This situation raises the following pertinent questions: Can the high prevalence and increasing occurrence of these hazards and accidents in the construction industry be curtailed with the current practice of using annual seminars and workshops to impart safety? Can syndicate instructional method ensure occupational health and safety of construction workers? This study therefore, examined the effects of guided-practice training method on occupational health and safety competencies of workers in construction industry in Oyo State, Nigeria. The moderating effect of employees' literacy level was also determined.

#### Objectives of the study

The objectives of this study is to:

- i. investigate the effects of guided-practice training method on occupational health and safety competencies of workers
- ii. examine the effects of literacy level of workers

on occupational health and safety competencies of workers

- iii. assess the two way interaction effect of treatment and literacy level on occupational health and safety competencies of workers

#### Hypotheses

The following hypotheses were raised to serve as anchor for this study:

HO<sub>1</sub>: There is no significant main effect of guided-practice training method (treatment) on occupational health and safety competencies of workers in the construction industry.

HO<sub>2</sub>: There is no significant main effect of literacy level on occupational health and safety competencies.

HO<sub>3</sub>: There is no significant two-way interaction effect of treatment and literacy level on occupational health and safety competencies of workers.

#### Methodology

A pretest-posttest control group quasi experimental design was used for the study. The design employed 2x3 factorial matrix to enable the researcher consider the effect of moderating variable of literacy level alongside the effects of the instructional method on the construction workers' occupational health and safety. While the experimental group was exposed to guided-practice training method, lecture method was conducted on the control group. The population of the study comprised of all the construction workers in Oyo State. Two construction industries were purposively selected based on the criteria of workers' size, number of customers and experience of health risks. The workers in the three organizations who met the study's inclusion criteria were randomised into, GpTM (11-L.D'Alberto and Co Limited) and Lecture method (12-Ciroco Nigeria Limited) (Control) groups making a total number of 23 participants. The inclusion criteria for the study were:

- i. Participants who were construction workers actively engaged by the construction organisation at the time of carrying out the research.
- ii. Participants who showed willingness and readiness to take part in all the activities and processes of training throughout the period of the research without any force.

The main instruments used were Construction Industry Occupational Health and Safety Questionnaire (CIOHSQ), Occupational Health

and Safety Competencies Scale(OHSCS), and Syndicate Training Method (STM), Guided-Practice Training Method (GPTM). The The CIOHSQ tested the knowledge and awareness of the construction employees regarding the occupational health and safety of their workplace while OHSCS contained questions which are aimed at obtaining data from participants on the effects of the guided-practice instructional method on their occupational health and safety competencies.

The instruments were subjected to pilot test using a sample of twenty respondents of construction workers in Ijebu-Ode, Ogun State,

Nigeria to validate the instruments. The reliability co-efficient obtained were 0.85 and 0.78 for the two scales respectively. Data were analysed using ANCOVA and Scheffe post hoc tested at 0.05 level of significance.

#### Results

HO<sub>0</sub>: There is no significant main effect of guided-practice training method (treatment) on occupational health and safety competencies of workers in the construction industry

**Table 1: Summary of 2x3 Analysis of Covariance on participants' Occupational Health and Safety Competencies and Control Group**

Source	Type III Sum of squares	Df	Mean Square	F	Sig.	Partial Eta Squared	Remark
CorrectedModel	2004.589 <sup>a</sup>	6	334.098	3.469	.020	.550	
Intercept	1214.587	1	1214.587	12.610	.002	.426	
Pretest	1.305	1	1.305	.014	.909	.001	
Treatment	1511.527	1	1511.527	15.693	.001	.480	S
Error	1637.370	17	96.316				
Total	35107.000	24					
Corrected Total	3641.958	23					

R Squared= .550 (Adjusted R Squared = .392)

The table above showed the effect of treatment on occupational health and safety competencies among construction workers and the result showed that there was significant main effect of treatment on occupational health and safety competencies among the participant ( $F_{(1, 17)} = 15.693, P < 0.05, \eta^2 = .480$ ).

This means that there was significant difference in the mean scores of the occupational health and safety competencies of the participants exposed to treatment when compared with the control group. Hence, hypothesis one is hereby rejected.

**Table 2: Scheffe Post-hoc Pairwise Analysis showing the significant differences among treatment group and the control group on occupational health and safety competencies**

Treatments	N	Subset for alpha = 0.05
Guided-practice Method	11	59.982
Control	12	43.230
Sig.		.045

The result further showed the effectiveness of the treatment by using Scheffe Post-Hoc analysis as shown in the table 2 revealed that Guided-practice method ( $\bar{X} = 59.982$ ) is more effective than control group ( $\bar{X} = 43.230$ ).

#### Discussion of Findings

This finding encourages the use of safety methods which will promote active participation and immediate use of the knowledge and skills acquired by the construction workers like guided-practice method. Lack of such practice-oriented methods and

the use of lecture method without adequate participation and practice will affect the occupational health and competencies of the workers negatively. This is corroborated by Ahmed and Newson-Smith (2010), who sees lack of basic professional training in occupational health and safety as one of the main reasons for not implementing the safety policy by most developing countries. Bindra and Rinehart (2008) also assert that incomplete or no safety training for workers and no access to training and skill-building opportunities constituted part of the occupational health and safety

issues in construction. This further corroborates this finding that when appropriate training methodology is employed for safety training, there will be achievement of safety objectives but this will not happen when incomplete safety training with the use of defective methodology is used.

A safety training conducted without appropriate methods which can enhance improvement in occupational health and safety competencies and effective achievement of the training goals could be termed as non-professional training which will serve as a deterrent to the process of maintaining a safe workplace for workers, Idubor and Oisamoje (2013)

aver that an organisation with safety culture will have a lower accident rate than one without safety culture. Therefore, in a workplace where the workers' occupational health and safety competencies are not maintained and improved with the use of appropriate safety training methods, there is bound to be a high rate of accident owing to poor safety culture or lack of competencies in health and safety issues.

H<sub>0</sub>: There is no significant main effect of literacy level on occupational health and safety competencies.

**Table 3 Analysis of Covariance showing effect of literacy level on participants' Occupational Health and Safety Competencies and Control Group**

Source	Type III Sum of squares	Df	Mean Square	F	Sig	Partial Eta Squared	Remark
Corrected Model	2004.589 <sup>a</sup>	6	334.098	3.469	.020	.550	
Intercept	1214.587	1	1214.587	12.610	.002	.426	
Pretest	1.305	1	1.305	.014	.909	.001	
Literacy	263.124	2	131.562	1.366	.282	.138	NS
Error	1637.370	17	96.316				
Total	35107.000	24					
Corrected Total	3641.958	23					

**R Squared = .550 (Adjusted R Squared = .392)**

**Source:** Author

Also, result showed that there was no significant main effect of level of literacy on occupational health and safety competencies among participants ( $F_{(2,17)} = 1.366, p > 0.05, \eta^2 = .138$ ), the hypothesis is therefore accepted and conclude that the main effect of literacy has no significant main effect on occupational health and safety competencies among the participants.

### Discussion of findings

Table 3 indicates that there was no significant main effect of literacy level on workers' occupational health and safety competencies ( $F_{(1,19)} = .659, p > 0.05, \eta^2 = .034$ ). Hence, the null hypothesis was accepted. This denotes that there is no significant difference in the occupational health and safety competencies of high-, medium- and low literacy-workers.

This contradicts the work of Nnedinmaik and Umeadi (2014), who identified low level of health literacy as well as lack of awareness of the Nigerian construction workers, particularly involving those workers in the informal sector which constituted a larger percentage of construction activities in Nigeria, as part of the causes of non-compliance with occupational health and safety. This then means that

construction workers with high literacy level tend to imbibe safety culture and comply with occupational health and safety rules than workers with low literacy level. This finding also negates the study of Windapo and Oladapo (2012) who note that knowledge and understanding of OHS regulations determine the level of compliance within construction regulations.

This study shows that the level of literacy had no impact on the occupational health and safety competencies of these workers because it is not statistically significant. The insignificance of the literacy level of the participants could also be attributed to the fact that most of the construction workers, including those with low level of literacy, had general knowledge on the hazards associated and peculiar to their job because of their experience. Their level of ignorance was mainly on the operation of Occupational Health and Safety Acts, which covers their rights as employees to health and safety at work. It was observed that both the temporary and permanent workers were ignorant of the duty of the Federal Ministry of Labour and Productivity to enforce their rights to safety.

Furthermore, this finding also negates by Diugwu,



Baba and Egila (2012) that lack of knowledge for details and implications hinder OHS management in the construction industry. Also, Puplampu and Quartey (2012) confirmed the finding that lack of adequate information and statistics hinder the

compliance with OHS in Africa.

**Ho3:** There is no significant two-way interactive effect of treatment and literacy level on occupational health and safety competencies of workers.

Table 4 Analysis of Covariance (ANCOVA) showing two-way interaction effect of treatment and literacy level on occupational health and safety competencies of workers

Source	Type III Sum of squares	Df	Mean Square	F	Sig	Partial Eta Squared	Remark
Corrected Model	2004.589 <sup>a</sup>	6	334.098	3.469	.020	.550	
Intercept	1214.587	1	1214.587	12.610	.002	.426	
Pretest	1.305	1	1.305	.014	.909	.001	
Treatment*Literacy	112.518	2	56.259	.584	.568	.064	NS
Error	1637.370	17	96.316				
Total	35107.000	24					
Corrected Total	3641.958	23					

**R Squared**= .550 (Adjusted R Squared = .392)

Moreover, result revealed that there was no significant interaction effect of treatment and literacy on occupational health and safety competencies among participants ( $F_{(2, 17)} = .584$ ,  $p > 0.05$ ,  $\eta^2 = 0.064$ ), the hypothesis is therefore accepted and conclude that there was no significant interaction effect of treatment and level of literacy in occupational health and safety competencies among the participants in which high level of literacy gained most in the treatment.

### Discussion of Findings

The results in Table 4 indicated that there was no significant interaction effect of treatment and literacy level on workers' occupational health and safety competencies ( $F_{(1, 17)} = .278$ ,  $p < 0.05$ ,  $\eta^2 = 0.005$ ). Therefore, the null hypothesis was accepted. This showed that the literacy level of workers influenced the effectiveness of treatment in enhancing occupational health and safety competencies regardless of their literacy level. This finding revealed that literacy level did not significantly moderate the efficiency of the treatment in improving the occupational health and safety competencies of the participants. This is in support of hypothesis two of this study. However, this finding negates Bloom and Lafleur that advanced training, including safety training, is key to increasing employees' capacity to acquire the technical and job-specific skills needed to be high performers.

### Conclusion

The process of achieving high level of occupational health and safety competencies among the workers especially in hazard-prone industries like the

construction requires the use of appropriate method of training. This study established that guided-practice training method enhanced the occupational health and safety competencies of the workers. It also showed that workers with different literacy levels can benefit from safety training targeted at improving their occupational health and safety competencies if only the organizers will make use of appropriate training method. The non-implementation of the extant rules and regulations make Nigerian workers especially in the construction industry prone to unfavourable conditions of service thereby negatively affecting their dignity of labour. The non-implementation by the employers may also be tied to lack of awareness of these existing rules among the employees. The following recommendations are therefore made arising from the findings of this study:

### Recommendations

Occupational health and safety training should be conducted by experts in the specialized field of safety education. Safety education should not be left to any resource person selected on the whims of educational consultants without justification of expertise and experience. The finding that guided-practice training method significantly affects occupational health and safety is instructive to all safety trainers and organizers of workers educational programmes. Deliberate efforts have to be made in ensuring that participants of training programmes on safety are made to apply the acquired skills and knowledge while they are being guided.

Likewise, the guided-practice training method should be employed in safety training because it

promotes coaching, mentoring, observational and pragmatic learning. Safety training process should ensure that these basic essential components are used for improving occupational health and safety competencies of the workers.

The Federal Ministry of Labour and Productivity needs to provide information and monitor through regular inspection. This will make the construction organisations carry out regular or periodic safety training and also make use of appropriate methods of facilitation to ensure effective training programme. There is also a need for the Federal Ministry of Labour and Productivity to sensitise, from time to time, the construction workers on their rights and responsibilities as employees and as provided for in the Occupational Health and Safety Acts to which the Nigerian government is a signatory.

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