

## Safety Awareness Among Pre-Service Teachers of Technical and Vocational Education in Malaysia

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**Abstract:** The main purpose of this study is to investigate the level of safety awareness among pre-service teachers in technical and vocational education. This study focus on tools and equipment arrangement, uses of personal protective devices and years of study in the program in regards to safety awareness. This study utilized survey that was administered to 196 samples of technical and vocational pre-service teachers in Malaysia. The findings shows mean of safety awareness, tools and equipment arrangement are moderate among pre-service teachers. Meanwhile, finding shows that there are significant differences of safety awareness between pre-service teachers' years of study.

**Key words:** Technical and Vocational Education • Pre-Service Teacher • Safety Awareness • Uses of Personal Protective Devices • Tools and Equipment Arrangement

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### INTRODUCTION

Prevention from workshop accidents and injuries among students in technical and vocational programs in school is a primarily concerns of teachers. As many other countries act on occupational safety and health, the Occupational Safety and Health Act 1994 of Malaysia requires that certain precautions have to be observed to protect the safety and health of students, teachers and co-workers when conducting practical in schools workshops. In addition, the Department of Skills Development which responsible to coordinate and regulate the implementation of training skills of national and international standards for the job market also stressed the needs for training young teachers toward safety awareness (Department of Skills Development and Universiti Putra Malaysia, 2010). This is to provide a mechanism for reducing work-related accidents and injuries among students in technical and vocational institutions in Malaysia.

Technical and vocational teachers primarily have responsible for imparting practical skills and knowledge in specific area to students by the use of tools, machine and materials in the workshop. According to O\*Net Dictionary of Occupational Titles (2007) [1], one of responsible of the

teachers of technical and vocational education is to select materials, supplies and equipment for training or project as well supervise students' use of tools and equipment in designated field in a workshop. In order to deliver their tasks, these teachers have vital roles in planning and coordinating the workshop. Among main aspect needs to emphasize by them during planning and coordinating the workshop is safety awareness among their students. Schulte, Stephenson, Okun, Palassis and Biddle (2005) and Xaba (2006) [2] suggested one of the strategies in minimization of work related injuries is through collaborative effort between teachers and students. This goal can be achieve by involving students in activities such as identification of risks, proper workshop practice, creating posters that show appropriate and inappropriate activities and conclusive workshop arrangement. Teacher thus needs to enlist students in planning for safety and establishing safe working procedures. Another suggestion is by Kennedy and Kirwan (1998) that proposes safety awareness can be provided with an appropriate learning towards the utilization, maintenance and managing school workshops.

**Background of Study:** Technical and vocational education teachers have vital roles in planning and

coordinating school workshops (Bush and Andrews, 2013; Kennedy and Kirwan, 1998; Schulte *et al.*, 2005). This means the right practice of safety rules, workshop layout and arrangement of tools, machines, workbenches and the working materials must be designed with emphasized to effectively minimized injury and accident in the workshop. various school workshops including woodworking, electronic, electrical, automobile, building, civil engineering, refrigeration and air conditioning, mechanical machine shop, metal work and fabrication workshop, metallurgical workshop and agricultural workshop. Kennedy and Kirwan [3] suggest that safety management should be regarded very vital to be documented and formalized system of controlling against risk and harm. They also suggest that a comprehensive knowledge of workshop safety procedures is very much essential for technical and vocational education teachers regarding the use of tools, machines and their arrangement in preventing occupational accidents.

Teachers of technical and vocational education should have strong feeling and willing to give careful attention to students and workshop practice to equal good safety awareness (Bush and Andrews, 2013 [4]; Kennedy and Kirwan, 1998; Schulte *et al.*, 2005 [5]). To reinforce safety, teacher should have the following responsibilities in the workshop: 1) instruct student in safe work procedure, 2) train student for all tasks assigned to them and check their progress, 3) ensure that only authorized, adequately trained students operate tools and equipment, 4) reinforce safety regulations, 5) correct unsafe acts and conditions and 6) formulate safety rules and inspect for hazards in workshop.

Griffin and Neals [6] and Saldaria, Herrero, Rodriguez, and Dale (2012) stressed that awareness of possible dangers in workshop is learnt by being thought the right way of doing things and why it can be dangerous to do things in wrong way. For example to hold chisel or use drill incorrectly or correctly is about being aware or unaware of safety [7]. Barrier [8] stated that all schools workshops are different but most of them contain the same kinds of equipment, tool, working areas and storage for hand tools and materials as such general safety awareness must be emphasized. Chin, DeLuca, Poth, Chadwick, Hutchinson and Munby (2010) suggests that teacher's knowledge of teaching and knowledge of technology is part of belief system that lead to safety awareness.

An appropriate behavior of doing things in workshop for being free from dangers and injuries while working requires a continual, systematic, analysis of safety practices and development of safety consciousness

through effective safety education (Chin *et al.*, 2010 [9]; Fruhen, Mearns, Flin and Kirwan, 2013; Griffin and Neals, 2010). The Environmental Health and Engineering Inc (2013) suggest some general safety rules to be observed and practiced by teachers and students at workshop practice for prevention of occupational accidents and illnesses. This cover area of general safety rules when working with machines and tools, personal protective equipment, electrical, fire safety and toxic and hazardous substances. Among general safety rules includes read the operator's manual before using any power tool, do not use any tool unless been trained to do so, inspect tools before each use, replace or repair any damage tools or parts before using, never use damaged tools, do not repair tools unless been trained to do so, always select the correct tool, never force objects into the moving parts of a machine, always secure work pieces with clamps or vice to keep them from moving, keeps hand away from cutting edges and moving parts, never leave machines or power tools running unattended unless machine is fully enclosed and never operate machine tools while using personal electronic devices or wearing headphones.

Chin *et al.* (2010) suggests that based on the nature of activities in the workshop the teachers and students needs to protect themselves and their clothes from dust, oil, paints and other potential materials to cause an injury. Schulte *et al.* (2005) stressed that protection mean wearing adequate protective clothing, safety glasses, hard cover shoes and removing loose jewelry. Bush and Andrews (2013) gives example of activities to support this kind of integration in school workshop as follows: 1) proper arrangement of tools, machine, materials working devices and workbenches in the workshop, 2) reflection and enhancing techniques and workshop maintenance and 3) workshop practice according rules and regulations.

In addition, Schulte *et al.* (2005) suggests other routine such as equipment and tools must be clean after used, working area should be kept clean, all tools must be returned to their proper storage location at the end of the day work and all power tools must be turned off and unplugged when not in use as well as effective arrangement of the workshop. According to Bush and Andrews (2013), the delivery of occupational safety and health is a fundamental part of technical and vocational education. Deal and Kennedy (2010) stated that there is significant difference on size of company in organization culture such as safety awareness and behavior in the workplace. Finding from Saari and Mat Rashid [9] shows that students who attached with multinational company more likely get a job offer compare to their peers who attached with small and medium company.

Technical and vocational education plays important roles in delivering safety awareness and practices among students since this foundation may affect their work experiences for many years to come. In Malaysia, preparation and certification of teachers for occupational safety and health was not a requirement for license to teach in technical and vocational institution. However, there are evidence that pre-service teachers were evaluated for occupational safety and health knowledge in some fashion. Pre-teachers needs to develop a better safety practices in preventing unintentional injuries and occupational death by adapting the culture of using all necessary protective devices for self and others protection against accidents during their training. It is very important for them to set tone for their future students adopt safe work practices as part of their orientation toward work. This study on safety awareness among pre-service teachers of technical and vocational education in Malaysia was aimed at answering four questions as follows:

- What is the level of safety awareness, tools and equipment arrangement and uses of personal protective devices among pre-service teacher in wood work technology workshop?
- Is there any relationship between uses of personal protective devices and pre-service teacher's safety awareness in wood work technology workshop?
- Is there any relationship between tools and equipment arrangement and pre-service teacher's safety awareness in wood work technology workshop?
- Are there differences between pre-service teacher's years of studies in regard to their safety awareness?

#### **MATERIALS AND METHODS**

The study utilizes quantitative approach and specifically a survey design. Subjects of the study are pre-service teachers of technical and vocational education students from universities that offers technical and vocational program. This study is a descriptive study which performs a survey for the aim of identifying the safety awareness among pre-service teachers of technical and vocational education. According to Gliner, Morgan, and Leech (2009) [10] this method is suitable to investigate the pattern between the individuals but it does not allow the researcher to control the variables comparatively, as well as the fact that this method is unable to explain the reason for the relationship and it

only elaborates on the relationship between the variables. In the same vein, Creswell (2014) [11] stated that the survey method can appropriately be used to measure the opinion, attitude and behaviour obtained from the respondents' immediate reactions. The instrument use for this study was developed by researchers based on various theories and literature on occupational safety and health. All item validated by three experts in the area of occupational safety and health. A five-point scale from 'strongly disagree', 'disagree', 'slightly agree', 'agree' and 'strongly agree' has been used to measure the respondents' feedback for every item established for this study. The questionnaire is validated by two experts in the occupational safety and health. The reliability test is also conducted and the result suggests that every item constructed has good reliability with alpha value exceeding 0.78.

#### **RESULTS AND DISCUSSION**

A total of 196 pre-service teachers involved in this study. The frequency, mean and standard deviation is used in determining the level of pre-service teacher's awareness of safety rules, proper use of personal protective devices and proper tools and equipment arrangement. The participants included 50 students of fourth year, 49 students of the third year and 48 students of the second year students respectively. The descriptive analysis was used to find the level of their awareness, which reveals that the mean value or the average level of awareness is 3.97 and standard deviation is .50 with  $n = 147$  while practice of safety of safety rule is 3.25 and standard deviation is .56, the average use of protective devices reveal that the mean score is 3.69 and standard deviation is .503 and proper use of tools and equipment arrangement mean is 3.94 and standard deviation is .53 as shown in Table 1.

The finding shows that the mean of the pre-service teacher's level of safety awareness is 3.97 and standard deviation is .50. According to Zanal, (2008) the result is high. For the practice of safety rules, the finding shows that the mean is 3.25 and standard deviation is .56. The level of the pre-service teachers of practice of safety rules is moderate (Zanal, 2008). For the proper use of personal protective devices the findings shows that the awareness mean level of the pre-service teacher's is 3.69 and standard deviation is .50. The level of awareness is high (Zanal, 2008). Proper tool and equipment arrangement shows the value of mean is 3.94 and standard deviation is .53. The level of awareness is high [12].

Table 1: Mean and standard deviation of safety awareness, proper tools and equipment arrangement, proper use of personal protective devices and practice of safety rules

Variables	Mean	Standard Deviation
Safety awareness	3.97	.50
Use of personal protective device	3.69	.50
Proper tools and equipment arrangement	3.94	.52

Table 2: Pearson correlation of proper use of protective devices and safety awareness

	Safety awareness
Use of protective devices	.38**

N = 146, \*\* $p < .05$ , two tails

Table 3: Pearson correlation safety awareness and proper use and safe keeping of tools

	Safety awareness
Tools and equipment arrangement	.490**

N = 146, \*\* $p < .05$ , two tails

Table 4: One-Way ANOVA comparing pre-service teachers years of study on safety awareness

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>P</i>
Safety awareness				4.944	.008
Between Groups	2	2.379	1.189		
Within Groups	143	34.396	.241		
Total	145	36.775			

**Relationship Between Proper Use of Personal Protective Devices and Safety Awareness:**

The finding shows that there is positive relationship safety awareness and proper use of personal protective devices. The statistical tool used to analyze the data is the Pearson correlation used in measuring the relationship between practice of safety rules and pre-service teacher of safety awareness. Table 2 of Pearson correlational statistics with effect size of 2 tailed significance with  $n = 146$  with  $r$  value. 38 [13].

The finding indicates that there is a significant positive relationship between safety awareness and use of personal protective devices,  $r = .38$ ,  $p < .05$ . According to Cohen (1988), the result is typical. The result shows that students who used personal protective devices tend to have higher safety awareness and vice versa [14].

**Relationship Between Tools and Equipment Arrangement and Safety Awareness:**

A Pearson correlation was computed to examine the relationship between tools and equipment arrangement with safety awareness. The result shows in Table 3. The result indicates that there is significant relationship between proper use and safe keeping of tools and equipment with safety awareness,  $r = .49$ ,  $p < .05$ .

The result shows positive correlation, which considered typical to large effect size (Cohen, 1988). This means that pre-service teachers who tend to use and safe keeping of tools properly were very likely to have high safety awareness.

**Differences Between Years of Studies among Pre-service Teachers and Safety Awareness:**

One way analysis of variance (ANOVA) is used to compare the differences on safety awareness in regards to their years of studies as shown in Table 4. A statistically significant difference was found among the three levels of years of study on safety awareness among pre-service teachers,  $F(2, 143) = 4.94$ ,  $p < .05$ . The mean of safety awareness is 3.92 for second years, 3.96 for third years and 4.03 for fourth year students of pre-service teacher. Post hoc Tukey HSD test indicate that fourth years pre-service teachers and second years pre-service teachers differed significantly in their safety awareness with a medium effect size. Likewise, there were also statistically significant mean differences on safety awareness between the third year’s pre-service teacher and the second year’s pre-service teachers [15].

In conclusion, pre-service teacher in second, third and fourth year have indicated safety awareness. This means that courses that they took had emphasized safety awareness for them to practice, however, the pre-service teacher adherence to practice of safety rules is paramount. The mean value indicated there is a strong need to enhance training on safety rules. The intensity of training should be given to safety rules for all levels of students during studies period. The pre-service teachers when entering workshop should abide all rules such as do not run around in workshop and all “don’ts” and “dos” in the workshop [16].

Even though the mean for personal protective devices indicated high level of uses, pre-service teacher should know that using personal protective devices is mandatory upon users of workshop. Personal protective devices such as goggles, shields, ear-plugs and shoes were design for protection against all harmful dust, particles, nails cut and any dangerous material fallen on one body during practical work in workshop. Pre-service teachers should always be reminded as a role model for their students to follow. Therefore, it is important for them to practice using personal protective devices during working in the workshop or operating machine [17].

As an aspiring future teacher, knowledge on how to properly organize, manage and coordinate school’s workshop is very much important. It is the responsibility

upon the teachers to properly keep equipments, tools and materials safely in the workshop [18]. Even though the research findings indicated that the level of pre-service teachers in using proper tools and equipment arrangement is high level, it is still mandatory to know much about safe keeping of workbenches, tools in drawers, or cabinets. Machine arrangement in the workshop floor should free of dust, oil, scraps dirt and water for safe working environment. The pre-service teachers should be reinforced to uphold all workshop laws, rules and regulations in a well equipped workshops so that the students under this training have first hand exposure and experience before going out to the actual teaching profession as this familiarity will enhance application of the practice of safety rules, proper personal use of protective devices as well proper tools, equipments and material arrangement for the avoidance of accidents and injuries at workplace.

### CONCLUSION

The pre-service teachers should be reinforced to uphold all workshop laws, rules and regulations in a well equipped workshops so that the students under this training have first hand exposure and experience before going out to the actual teaching profession as this familiarity will enhance application of the practice of safety rules, proper personal use of protective devices as well proper tools, equipments and material arrangement for the avoidance of accidents and injuries at workplace.

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