

AN INTERVENTION STUDY ON  
OCCUPATIONAL SAFETY AND HEALTH  
MANAGEMENT AT A VOCATIONAL  
COLLEGE IN PERAK

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Bachelor of Occupational Safety and Health with  
Honours

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Thank you Allah for this opportunity. Without You, I am nothing. To my mother, without you I will not be here. To my father, without you, I am lost. To my supervisor, without you I cannot done this. To my friends, without you I am nothing but alone. Thank you all for everything. All of you deserve everything good in this world. Love you ♥.

## ABSTRAK

Ini adalah kajian campur tangan mengenai pengurusan keselamatan dan kesihatan pekerjaan di sebuah sekolah vokasional di Perak. Statistik menunjukkan bahawa kadar kemalangan di Eropah adalah tinggi di kalangan pekerja muda. Oleh itu, kajian ini dijalankan dengan harapan dapat mengurangkan kadar insiden di kalangan pekerja muda atau bakal - bakal pekerja muda. Objektif pertama kajian ini adalah untuk menentukan tahap pelaksanaan pengurusan keselamatan dan kesihatan pekerjaan (OSH) di sekolah. Kedua, untuk mengukur tahap pengetahuan dan kesedaran yang dimiliki pelajar terhadap pengurusan keselamatan dan kesihatan pekerjaan (OSH) di sekolah dan ketiga, untuk mengukur keberkesanan campur tangan pengurusan kesihatan dan keselamatan pekerjaan (OSH) yang telah dilakukan ke atas pelajar . Reka bentuk penyelidikan untuk kajian ini adalah reka bentuk kajian intervensi di mana reka bentuk kajian pra-pasca telah digunakan. Populasi kajian ini adalah para pelajar kolej kejuruteraan tersebut. Instrumen kajian yang digunakan adalah peranti rakaman, senarai semak pemerhatian, soal selidik dan Perisian SPSS. Hasilnya, semua objektif telah dicapai. Tahap pelaksanaan pengurusan keselamatan dan kesihatan pekerjaan di kolej kejuruteraan adalah di atas purata. Tahap pelaksanaan pengurusan keselamatan dan kesihatan pekerjaan (OSH) di kolej kejuruteraan mencapai tahap 4 atau fasa hampir selesai. Sementara itu, tahap pengetahuan dan kesedaran pelajar juga melebihi purata. Tahap pengetahuan dan kesedaran pelajar vokasional adalah tinggi mengikut tahap tafsiran yang dirujuk dalam kajian ini. Intervensi yang dilakukan kepada pelajar adalah berkesan kerana lebih daripada separuh daripada soalan dalam soal selidik menunjukkan perbezaan antara pra-intervensi dan pasca-intervensi. Untuk kesimpulan, tahap pelaksanaan pengurusan keselamatan dan kesihatan pekerjaan (OSH) di kolej vokasional hampir selesai. Sementara itu, pengetahuan dan kesedaran pelajar terhadap pengurusan keselamatan dan kesihatan pekerjaan (OSH) tinggi dengan minimum purata 3.5 ke atas. Akhir sekali, campur tangan yang dilakukan terhadap pengurusan keselamatan dan kesihatan pekerjaan (OSH) kepada pelajar adalah berkesan. Cadangan untuk kajian ini adalah menambahbaik pendidikan keselamatan di sekolah dan memastikan keberkesanan pendidikan dan latihan keselamatan dan kesihatan pekerjaan.

## **ABSTRACT**

This is an intervention study on occupational safety and health management at a vocational school in Perak. Statistics show that accident rates in Europe are high among young workers. Thus, this study was carry out in hope to lessen the rate of incident among young workers or soon-to-be young workers. The first objectives of this study were to determine the level of occupational safety and health (OSH) management implementation in school. Second, to measure level of knowledge and awareness the students have on occupational safety and health (OSH) management in school and third, to measure the effectiveness of the intervention of occupational, safety and health (OSH) management that had been done on the students. The research design for this study is interventional study design where pre-post study design was used. The study population was the students of the vocational college. The research instrument used were recording devices, observation checklist, questionnaires and Statistical Package for the Social Sciences (SPSS) Software. For result, all objectives were achieved. The level of implementation of the occupational safety and health management at the vocational college was above average. The level of implementation of occupational safety and health (OSH) management in the vocational college reached level 4 or close to completion. Meanwhile for level of knowledge and awareness of the students were also above average. The knowledge and awareness level of the vocational students were high according to the interpretation level referred to in the study. The intervention done to the students was effective based on the result because more than half of the questions in the questionnaires showed difference between pre-intervention and post-intervention. To conclude, the level of implementation of occupational safety and health (OSH) management in the vocational college is close to completion. Meanwhile, the knowledge and awareness of the students on occupational safety and health (OSH) management high with average mean of 3.5 above. Lastly, the intervention done on occupational safety and health (OSH) management to the students was effective. Recommendation for this study were safety education improvement in school and the effectiveness of occupational safety and health education and training.

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## **LIST OF ABBREVIATIONS**

ILO	International Labour Organization
NADOPOD	Dangerous Occurrence, Occupational Poisoning and Occupational Disease
NIOSH	National Institute of Occupational Safety and Health
OSH	Occupational Safety and Health
OSHMS	Occupational Safety and Health Safety Management System
PPE	Personal Protective Equipment
SPSS	Statistical Package for the Social Sciences
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background of Study

Based on the Merriam-Webster, school means an organization that provides instruction: such as; an institution for the teaching of children; college, university, while vocational means of, relating to, or undergoing training in a skill or trade to be pursued as a career, meaning said vocational school a school in which people learn how to do a job that requires special skills (Merriam-Webster, 2018). Student will spend 9-hours in the schools or institutions learning special skills to expose them to the working world, since vocational schools were intended to prepare the student to work after they graduate or end their school. Just few weeks ago, a pupil was found dead because of a blade from a lawn mower cut through her head causing her brain to fall out of her head. This tragic accident is one of many more accidents that had happen in education institution these past few years. Tan Sri Lee Lam Thye said, in the span of five years, 31 accidents in school were reported or even higher he believed so. The President of the National Institute of Occupational Safety and Health (NIOSH) also said that if the school had practices the occupational, safety and health culture in school and did the safety audit more often, all of the accidents may be avoided (Bernama, 2017).

This study was carried out to at least, even for a little – to spread awareness on the important of occupational, safety and health management in educational institution.

#### 1.2 Problem Statement

According to Kirwan (1998), safety management relates to the actual practices, roles and functions associated with remaining safe. The management of safety in schools is an essential aspect to guarantee the protection of all the students, teachers and other staff from the risk and hazards of the school environment. The whole school

community plays an important role in school safety assurance (Vicario, 2012). In order to prevent danger situations in schools, safety conditions are to be regarded, in all of the aspects: the school physical environment (building, playgrounds, equipment and surroundings) and the social environment (quality of relationships) (CECC - UNICEF, 2008).

According to Department of Education and Training of Queensland Government, 14 hazards and risks can be found in schools' activities that might also affect the teachers, staff and other people besides the students. The hazards and risks are built environment, chemicals and hazardous substances, curriculum activities, driver and vehicle safety, dust, electrical, equipment and machinery, emergency planning, first aid, infection control, manual handling and ergonomics, noise, playground and outdoor areas, and working at heights (Department of Education and Training of Queensland Government, 2014). What can be found in the common school may be doubled, the amount of hazards and risks that can be found in the vocational school since vocational schools are institutions that exposing the students towards special skills that requires lots of handy work. 239 students of vocational program in Sweden participated in a study where questionnaires were given out, and one of the questions is "What are the five biggest risks in the profession you are being educated for?" The answers given out by the students were then been grouped to five categories: accidents, chemical risks, physical risks, physical workload, and psychosocial risks (Andersson, Gunnarsson, Rosèn, & Moström, 2014). Indirectly, these are also what the students were and even teachers were exposed to at the vocational school although the severity and the seriousness of the risks might different or lower than compare to work place.

All of this questions raised during the observation of Malaysia own education institutions and by discussion with lots of educational people. According to Tan Sri Lee Lam Thye, President of the National Institute of Occupational Safety and Health (NIOSH), in the span of five years 31 accidents happened in school and he believed that it might be higher. He also stated that all of these incidents might be avoided if all school practice the occupational, safety and health culture and did the safety audits more often as suggested by the NIOSH (Bernama, 2017).

Young workers are defined as being a particularly vulnerable category whose needs should be taken into account as a priority. The statistics show that accident rates

in Europe are high among young workers (see Figure 1.1). Possible reasons for higher occupational accident rates and health problems include young workers' lack of experience, their physical and psychological immaturity and lack of awareness of health and safety issues, and the failure of employers to allow for these factors by providing appropriate training, supervision and safeguards, and by placing young people in work situations that are appropriate to them (OSHA, 2007). A WHO report (WHO, 2005) highlights that 'Young workers face the same workplace hazards as adult workers, but are less experienced and aware of risks, less likely to ask for and comply with safety regulations, and less likely to receive technical training'. Recently, emphasis has again been placed by the WHO Executive Board on risks at work encountered by young people (WHO, 2011).

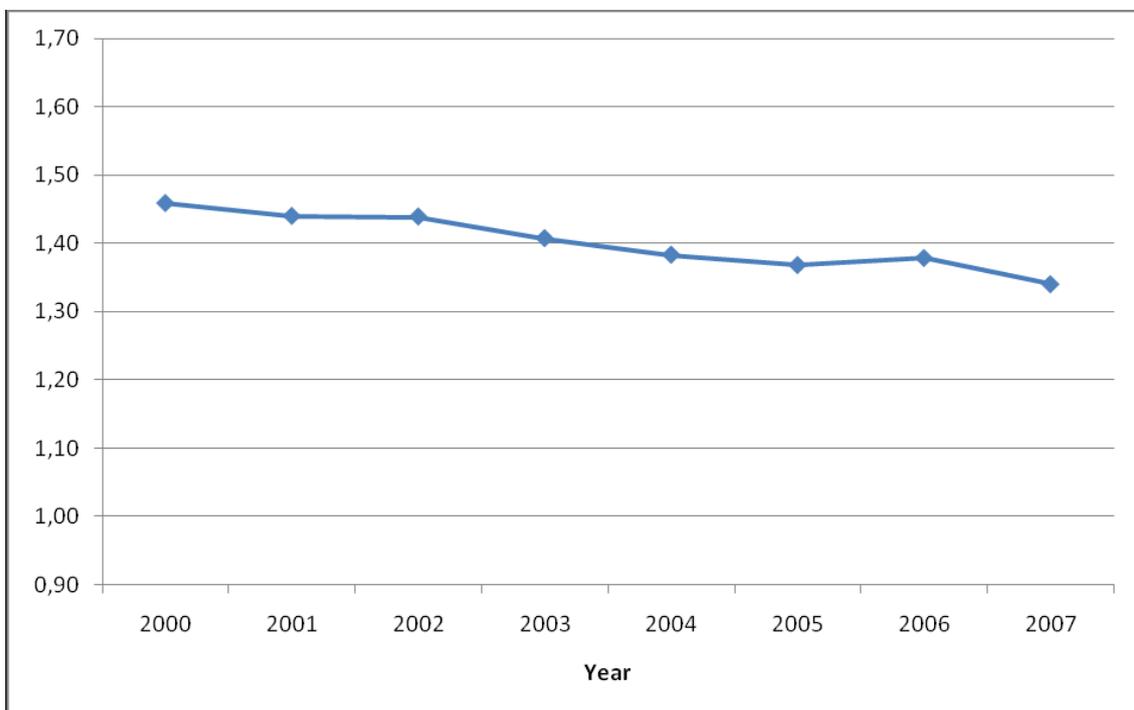


Figure 1.1 Ratio of Standardised Incidence Rate (SIR) of workers aged 18–24 to SIR of the total EU 15 active population  
Source: EUROSTAT (2013)

In order to remedy this situation, it is important firstly to improve the working conditions encountered by young people in their working lives. It is also crucial to educate and train young people even before they come into the job market, so that they can take a prevention culture on board as early as possible. The skills and knowledge acquired in this field will enable them to be stakeholders in occupational risk prevention. This is the approach chosen by the Community Strategy 2007-12, which

aims not only at reducing accidents and ill health to young workers but also at helping to improve the safety culture in workplaces in the longer term (European Agency for Safety and Health at Work's Topic Centre OSH, 2013).

The key to risk education in school is that young people not only acquire knowledge, but also develop, through active learning, skills and abilities to spot hazards and propose solutions and the positive attitudes and behaviours required for a good safety culture. This learning will be more effective if the pupils' own learning environment is used as part of their risk education and if it represents a positive 'role model' in terms of good OSH management.

Thus, why this research is important to be carried out because without knowledge and awareness of safety management people that associate with the institution such as the teachers and students may be exposed to lots of hazards and increase the risks of them to get injury or get into accident. Indirectly, the students will get exposed to safety management even before they enter the working field and all these will not go to drain. The knowledge and awareness of safety management will create a better youngling in working area while helping them to find their footing and lower the risks of accidents in work place (European Agency for Safety and Health at Work, 2007).

### **1.3 Research Questions**

Research questions are use as guidance for this entire study. It helps the study to be focused and cleared on the right path. The research questions of this study are as follow:

- i. To what extend are the occupational, safety and health (OSH) management principle is being applied throughout the school?
- ii. How much do the students know and aware about occupational, safety and health (OSH) management in school?
- iii. How effective the intervention on occupational, safety and health (OSH) management that being done to the students is?

## **1.4 Research Objectives**

The objectives of the study are listed as below:

- i. To determine the level of occupational, safety and health (OSH) management implementation in school;
- ii. To measure level of knowledge and awareness the students have on occupational, safety and health (OSH) management in school; and
- iii. To measure the effectiveness of the intervention of occupational, safety and health (OSH) management that had been done on the students.

## **1.5 Scope of Study**

One of the areas that this research had been focused on would be the vocational college since this research was based on the students' knowledge and awareness on occupational, safety and health management. This research would like to know what are the activities done in the college and what are the hazards and risks the occupants were exposed to. By including, vocational college as one of the focus area would made others understand the relevancy of doing occupational, safety and health management in vocational college. Second, the research would be focusing on OSH management in vocational college since the interventions done were based on the OSH management in the college. This area was very important since all the objectives were revolved around OSH management, where first, the research had been focusing on what is OSH management itself. This was to test the knowledge and awareness of the sample. The application of OSH management in anywhere possible and the intervention regarding OSH management had also been studied properly to ensure no error occur in this research.

The research also focused a little bit in risk assessment where observational skills was used to achieve the first objective. Observational skill was important when carrying out risk assessment so that all risks and hazards were covered and had been discussed and included in the intervention session later. Pilot study is also one of the areas that had been focused on; questionnaires develop in this research need to be validated first so that it is suitable to be used during the intervention. It is also to ensure

the questions come out reach certain level and the content in the questionnaires match with the objectives. Since this research is about an intervention study, of course intervention study would be one of the focus areas. To avoid error in results and along the intervention were done; study on intervention study should be done. How to carry out intervention study or what should be included in the intervention are among the things that need to be understand first. Understanding in intervention study also important to ensure that when the intervention session was carried out, the quality of the study, results can be maximised, and the amount of errors and mishaps can be minimised.

## **1.6 Significance of Study**

The reason this study was conducted was because the significant increase in the number of incidents happened in school lately and, sadly, most of the incidents can be avoided. Thus, why this intervention needed, to lower the number of incidents happened in the school in our country. Besides, according to a research, young people were the most to involve in incidents at the workplace (Andersson et al., 2014). By carrying out this research, the hope is so other people would be intrigued to participate in continuing or expanding this kind of research so that our education institution can be safer places as it should be. Since the research in this area is still so little, the lack of knowledge may be one of the contributing factors to the statistics.

By carrying out this research, the research aims to give back to the community as much as they can. The knowledge and awareness gained from this research can be applied and spread to others by the participating vocational college. By then, other vocational college can follow suits in creating a safer education institution for their occupants. However, the results not only can be used in vocational college but also other educational institution. The impact to the larger might be a little bit insignificant but the thought also counts thus, this research aims to help other people in not only educational sector but also other community.

## **1.7 Conceptual Framework**

Figure 1.2 shows the illustration of conceptual framework of this study regarding the intervention study on occupational, safety and health management at a

vocational college. This conceptual framework might help in giving the idea on how to conduct the study based on the objectives of the study.

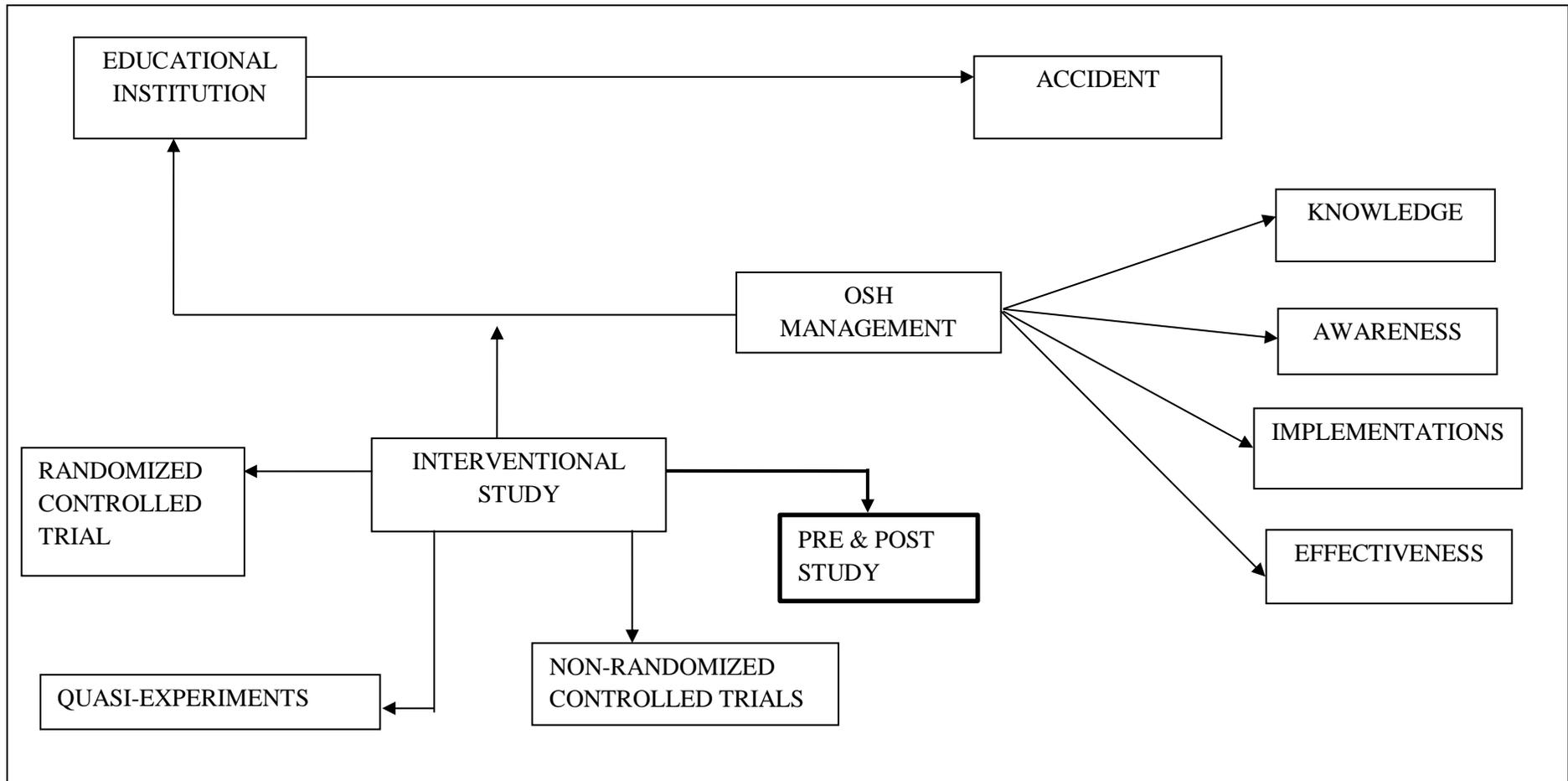


Figure 1.2 Conceptual Framework

## **1.8 Operational Definitions**

### **1.8.1 Intervention**

Interventional study designs, also called experimental study designs, are those where the researcher intervenes at some point throughout the study (Thiese, 2014).

### **1.8.2 Occupational Safety and Health Management**

An OSHMS is a logical toolbox that is flexible and can be tailored to the size and activity of the organisation and be focused on general or specific hazards and risks associated with such activity. Its complexity can range from the simple needs of a small enterprise running a single product process where hazards and risks are easy to identify, to multiple hazard industries such as mining, nuclear power, chemical manufacturing, or construction (International Labour Organization, 2011).

### **1.8.3 Vocational College**

Based on the Merriam-Webster, school means an organization that provides instruction: such as; an institution for the teaching of children; college, university, while vocational means of, relating to, or undergoing training in a skill or trade to be pursued as a career, meaning said vocational school a school in which people learn how to do a job that requires special skills (Merriam-Webster, 2018).

### **1.8.4 Accident**

Accident is an occurrence arising out of or in connection with work, which results in fatal injury or non-fatal injury (NADOPOD, 2004).

### **1.8.5 Cronbach's Alpha**

Cronbach's alpha is a measure used to assess the reliability, or internal consistency, of a set of scale or test items. In other words, the reliability of any given measurement refers to the extent to which it is a consistent measure of a concept, and Cronbach's alpha is one way of measuring the strength of that consistency (Goforth, 2015).

### **1.8.6 Triangulation**

Methodological triangulation involves the use of multiple qualitative and/or quantitative methods to study the program. For example, results from surveys, focus groups, and interviews could be compared to see if similar results are being found. If the conclusions from each of the methods are the same, then validity is established (Guion, Diehl, & McDonald)

### **1.8.7 Knowledge**

Sveiby (1997) defines knowledge as “a capacity to act”; this makes the important distinction between the behavioural potential, which cannot be directly observed, and the observable performance or behaviour (Sveiby, 1997). Knowledge has been conventionally defined as beliefs that are true and are justified. It is reasonable to think of a “true” belief as one that is in accord with the way in which objects, people, processes and events exist and behave in the real world (Hunt, 2003).

### **1.8.8 Awareness**

Having knowledge or discernment of something; attentive and well informed (American Heritage Dictionary of the English Language, 2011).

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter discussed further significant information from the journals, books, act and website that related to the study. The literature from all the reading materials reviewed in this chapter. This chapter focused on introduction to OSH management, awareness and knowledge of OSH management in school, implementing OSH management, and intervention of OSH management in school.

#### 2.2 Occupational Safety and Health Management

Young workers are defined as being a particularly vulnerable category whose needs should be taken into account as a priority. The facts show that accident rates in Europe are high among young workers.

In order to remedy this situation, it is important firstly to improve the working conditions encountered by young people in their working lives. It is also crucial to educate and train young people even before they come onto the job market, so that they can take a prevention culture on board as early as possible. The skills and knowledge acquired in this field will enable them to be stakeholders in occupational risk prevention (European Agency for Safety and Health at Work's Topic Centre OSH, 2010).

Health and safety risks are needed to identify, assess, and take certain action to eliminate or minimize the probability of occurrence. In order to reduce the accident or incident level and subsequently cut losses, it is important to ensure that safe working practice is being observed (Radhlinah, 2000). Safe operation and accident prevention form a good business practice. OSH management system (OSHMS) in the context of construction is the discipline of preserving the health of those who build, operate, maintain and demolish engineering works and of others affected by those works. It is also primarily designed to protect the health and safety of individual workers or

members of the public. Traditionally, the responsibility of safety falls on the individual (Bakri, Zin, Misnan, & Mohammed, 2006).

Table 2.1 Years of Establishment of Companies

		Size of company			Total	Percentage
		Big	Medium	Small		
Years	Less than 5 years	0	0	1	1	2.9%
	5-10 years	0	11	1	12	35.3%
	11-15 years	1	9	0	10	29.4%
	Over 15 years	7	4	0	11	32.4%
	Total	8	24	2	34	100.00%

Source: (S. Mamter, 2014)

Table 2.1 shows that, the highest percentage of respondents answered this questionnaire are from the company established for 5-10 years that represent 35.3%. While the lowest percentage is the company establish for a period less than 5 years, which represent 2.9%. It is due to the fact that, they were new in the construction industry, so that they have a reason for not complying with the OSHA provisions because they have less knowledge about safety in construction industry (S. Mamter, 2014).

The implementation of the OSHMS must be applicable to all levels of organizations. It must conform to the existing laws and regulations related with safety and health at the workplace. Hinze (1997) claimed that managing safety essentially involves four levels: the company policy level, project management level, site management level, and individual level. Failure at each level is the reason for the occurrence of accidents. Failure at the first level will increase the probability of failures at the second level and so on. Improper OSH management leads to poor safety records. It is hard to achieve the aim of ‘zero accident’ due to the rough and tough nature of the industry. Overall, OSHMS mainly rely on continual monitoring of indicators of performance of the relevant processes, and continuous improvements in these processes.

Occupational safety and health (OSH) is an interdisciplinary field that encompasses among others, the disciplines of industrial hygiene, occupational medicine, occupational nursing, engineering, epidemiology, and toxicology (Levitt and Samelson, 1993). It includes the surroundings and conditions that affect employees and other related persons at workplace. Although working environment has improved

considerably during recent decades, but occupational accidents still occur. The prevention of work related injuries remained as a major problem faced by all types of organization. OSH management system (OSHMS) is an integral part of the overall management system of the organization. It facilitates the management of the OSH risks associated with the business of the organization.

Glendon and McKenna (1995); Caborn (2005) also identified four critical indicators of safety culture. They are:

- i. Effective communication, it leads to commonly understood goals and means to achieve them at all levels.
- ii. Good organizational learning, whereby organizations are able to identify and respond appropriately to changes.
- iii. Organizational focus upon health and safety, how much time and attention is essentially paid to health and safety.
- iv. External factors, including the financial health of the organization, the prevailing economic climate and impact of regulation and how well these are managed.

The South Australian Safety Achiever Bonus Scheme defines an OHSMS as an 'orderly arrangement of interdependent activities and related procedures that drives an organization's OHS performance'. Broadly, an OHSMS is a planned, documented and verifiable method of managing hazards and associated risks (Bryan, 1999). It is can also be defined as the plan to reduce and eliminate hazards and risks at workplace (Bakri et al., 2006).

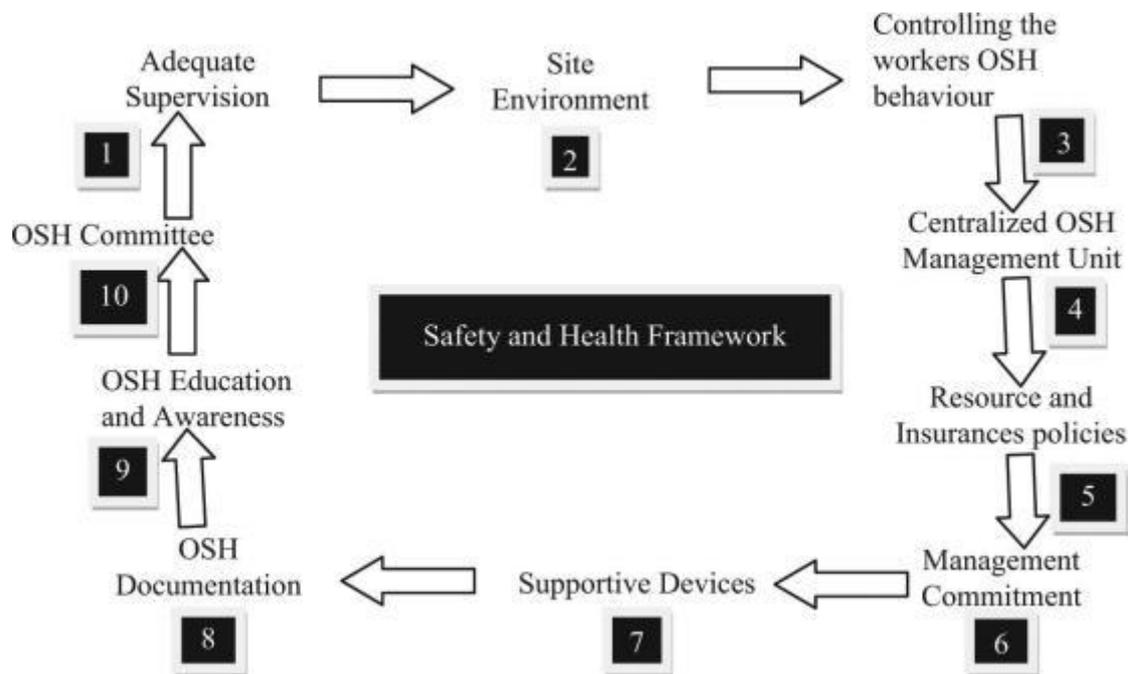


Figure 2.1 Safety and Health Framework  
 Source: De Silva & Wimalaratne (2012)

Figure 2.1 shows the safety and health framework suggest by Nayanthara De Silva and P.L.I. Wimalaratne in their research on safety and health framework. This framework can be used as guideline when conducting the intervention.

Accident frequency and severity rates are not always the only measures to use for evaluating the effectiveness of a health and safety program. Cases of occupational disease are often under-reported in these statistics. The emphasis is usually on injury-producing accidents, not all events. Since accidents/incidents are rare events, in small organizations the basis for comparison may be limited.

It is desirable to use an audit as a before-the-fact measure of the effectiveness of an OSH program. An audit uses a checklist in which each element is subdivided into a series of questions. Each question is given a weighting factor depending on its importance. Records, observations, interviews, and questionnaires are used to evaluate performance for each sub-element.

Annual audits appear to be more common, but reviewing critical elements in the program more frequently may be advisable. The audit team, which should include representation from the joint health and safety committee, must receive appropriate training in audit procedures.

The audit identifies weaknesses in the health and safety program. Little is achieved unless a procedure is established to ensure prompt follow-up on deficiencies. This procedure should include provision for target dates for remedial action and checks to confirm completion (Canadian Centre for Occupational Health & Safety, 2015).

### **2.3 OSH Management in School**

A systematic approach to managing safety and health risks is important. Ethically, it is the right thing to do. Part of a school's overall values is to keep staff and visitors safe and help pupils to become the 'risk aware, but not risk averse' citizens of tomorrow. Operationally it helps avoid costly accidents, disruption losses and damage to the school's morale and reputation. Moreover, of course, it enables the school to comply with their duties under health and safety law.

Aiming for high standards of health and safety is the right thing to do and is not legal compliance. Achieving and proving excellence in the way health and safety risks are managed have massive benefits for any educational institution.

For example,

- i. Serious preventable injuries
- ii. Work related illnesses like stress and back pain;
- iii. Lost workdays due to work-related illness and workplace injury; and
- iv. The cost and disruption of damage-only accidents.

Uninsured losses due to accidents invariably outweigh any accident costs recovered through of insurance. They can include:

- v. Lost staff time;
- vi. Sick pay;
- vii. Damage or loss of equipment and materials;
- viii. Repairs to buildings and facilities;

- ix. Additional staff costs, overtime working and temporary cover;
- x. Teaching delays;
- xi. Investigation time;
- xii. Fines;
- xiii. Legal costs.

It is because assuring health and safety goes to the heart of the way a school or college is run, an ambitious approach to reducing accidents and safeguarding health speaks volumes about its overall ethos and professionalism. A responsible attitude to safety will not only act as a motivator internally amongst staff and students - who will be reassured that their well-being is of paramount interest – it will also serve to attract new talent. In addition, it provides a very practical platform for teaching young people how to stay safe by becoming the risk aware - but not risk averse – citizens of tomorrow.

Schools and colleges play a crucial role in preparing children and young people to be able to recognize and manage risk (The Royal Society for the Prevention of Accidents, 2012)

#### **2.4 Awareness and Knowledge on OSH Management in School**

Standards for protecting students should be at least as stringent as those taken for employees, not only because of the ethical and legal duty of universities to protect students, but also because the students have had less training. Developing a safety and health programme or system in school can reduce the risk of injury and create a safety work style besides enhancing safety-awareness among children, teachers and staffs. A programme is defined as a set of projects planned with the specific objectives in mind usually run over a long-term period (Sills, 1998).

There is a body of evidence indicating an association between occupational health and safety (OHS) training and a lower incidence of workplace injuries, but other research indicates that young workers often receive little or no training. The limited

knowledge among young people about workplace hazards, together with inconsistency in the provision of workplace OHS training indicate a need for introductory OHS education in schools. Ideally, such education should be complementary to that provided in workplaces, in the community and in the home by parents. Key informants of the situation in schools are the teachers themselves. However, teacher perspectives, as well as parent perspectives have received little attention in the literature.

## **2.5 Implementing OSH Management in School**

Majority of primary schools in the district surveyed did not have any specific safety and health programme. Some specific activities prescribed were emergency response planning and trainings such as fire drills and safety guidelines in laboratories used by teachers, staffs and students. Some schools though held campaigns to promote a safe and healthy lifestyle among students and teachers. Currently, the Ministry of Health is holding some health programmes among schoolchildren, which specifically for immunization and medical surveillance among students (Hamzah & Ariff, 2009).

NIOSH has initiated a programme called “OSH in School” to raise awareness among students and teachers of the importance of ensuring safety and health in school. The programme views the school as a workplace in accordance with the Occupational Safety and Health Act (OSHA) 1994. The application of OSHA to schools as places of work aims to make them safe and healthy for teachers, students and visitors.

OSH in School aims to ensure safety, health and welfare for those at work; protect the students against risk to safety and health in connection with the activities of persons at work; and establish a safe and healthy working environment involving the office, laboratory, canteen, toilets, hostels, and fields. NIOSH has successfully introduced the programme to more than a dozen schools in the country with sponsorship from corporate organisations. Through the programme, NIOSH hopes to recommend to the school administrators that good OSH management is a solution to all problems related to safety in their environment. This way, they will be more aware of the potential safety and health hazards and more capable of dealing with them. This can be done through OSH education, awareness, training and exhibitions, which are NIOSH’s core businesses. Instilling awareness on the importance of a safe and healthy workplace in school will also give the students, who will join the workforce in the

future, a good grounding in occupational safety and health. With greater safety and health awareness in schools, unnecessary deaths can be prevented and parents will be assured of the safety of their children (The Star Online, 2016).

Education has an essential role to play in enabling the great majority of people to tend towards that state, by preparing new generations for their adult lives. For young children (nursery, infant, primary, secondary), education will address general concepts of health, safety and well-being as well as social aspects. Then, for teenagers and young adults (vocational education, higher education), the focus will be on gradually acquiring social and professional skills promoting the concept of health, safety and well-being at work, and in life in general as an adult and citizen.

This requires work not only on the content of the teaching, but also on the places where the teaching is carried out. The environment in which children and young people are educated should be exemplary. Firstly, educational establishments should be healthy and safe. Pupils and students can then engage in a more comprehensive approach covering not only the facilities and equipment, but also the procedures, the management, and the very culture of the education institution. Pupils should play an active role in the health and safety aspects of their school environment as part of learning and also so that they feel ownership of their environment and how it is managed and feel motivated to play their part in school safety and health.

### **2.5.1 A Whole School Approach to OSH**

First, combines risk education and managing safety and health in schools for both pupils and staff. By combining risk education and managing safety and health in schools we can covered a whole lot in safety perspectives. These will ensure that the pupils and the staff will have knowledge on both risk management and safety management in school. Second, brings together risk education, health education, safety management and the healthy school concept. These mean the keywords mentioned will be included in their syllabus as for the pupil while it will be included in their work scope for the staff and the teachers.

Third, the important key is to actively involves staff and pupils in school safety management so that they can take care themselves first before caring about others. By having basics of safety management, safety management in school would be easier to

carry out and may lessen the rate of incidents in the school. Forth, trains and involves teachers in OSH management in their schools, improving their understanding of OSH and developing practical skills, which improves their ability to provide risk education to pupils. The teachers in the school need to have knowledge, skills to ensure that the safety management in school can be properly manage, and to ensure they can guide the students and staff regarding safety in school. The teachers can also develop the students' understanding of OSH and its importance by giving out example. Thus, the students can see the big picture of what will and will not happen if safety management are not carry out. The school may involve their pupils in hazard spotting and also proposing solutions for the hazards indirectly developing their skills and also giving them ownership over school safety rules and lastly integrates risk education and school safety and health throughout the school's activities and the way it functions, to become part of school life. It is not an addition or an extra.

The figure 2.2 shows the model of a whole school approach to OSH. It shows how the safety management need to has two-way communication to ensure the safety management in the school can be carried out properly.

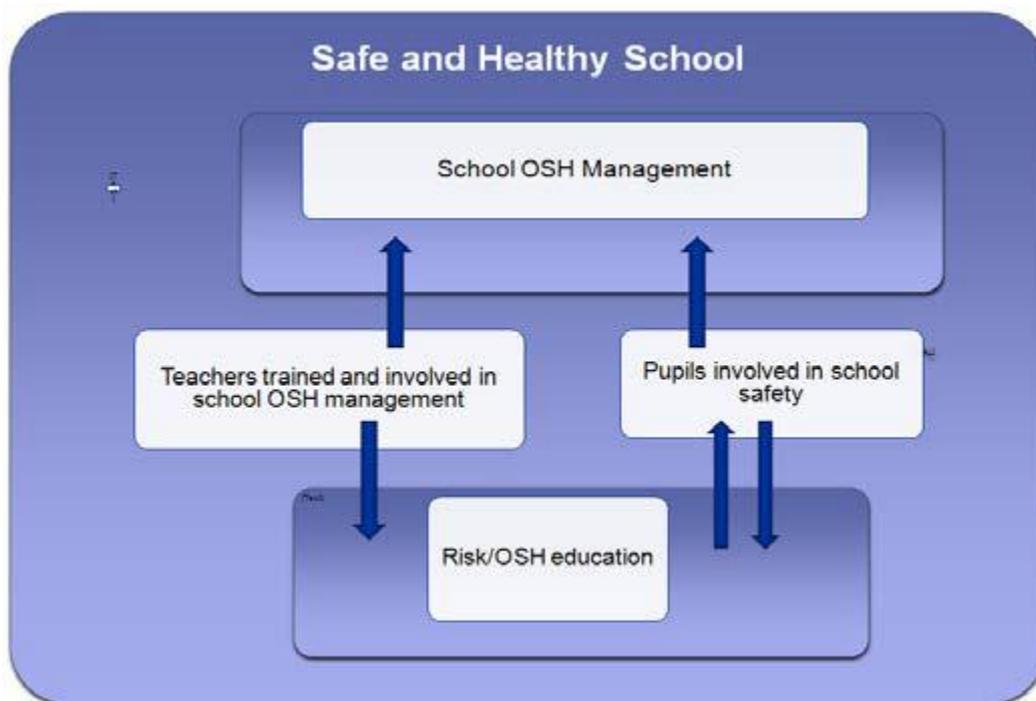


Figure 2.2 Model of a Whole School Approach to OSH  
 Source: European Agency for Safety and Health at Work's Topic Centre OSH (2010)

A Whole-School Approach to OSH leads to:

- i. Improved staff and pupil health and safety
- ii. An improved learning environment, which has a positive impact on learning as a whole.

### **2.5.2 Success Factors**

First, involvement and participation of staff and trade unions. Second, involvement of pupils or students in hazard identification and solution proposals to improve their education and their compliance with safety school rules. Third, creation of consultative forums for pupils and students, parents and staff. Forth, the commitment of school management staff on ensuring the programme done properly. Motivation of staff, head of school and pupils are also important in ensuring the programme implemented was successful. The school also need to send staff to training and development of teachers on OSH education skills. Next is partnerships, networking, and existence of external support (national regulations or programmes, actions taken by local authorities, etc.) and/or funding. Legal framework or statutory requirements (e.g. for risk education, pupil involvement in school safety management). Simple, practical tools and support, taking account of school's many obligations and commitments. Specific actions tailored to the type of school, ages of children and the context or environment that it operates in and lastly being sensitive to the demands placed on schools and taking account of synergies between different teaching and school management areas (European Agency for Safety and Health at Work's Topic Centre OSH, 2010).

### **2.5.3 Problems Faced**

Lack of time: a heavy curriculum (therefore, it is important to introduce health and safety as a transversal topic and use active education). Lack of interest of the school's management staff, other staff, pupils and students, or the public. Insufficient parent involvement in the implemented programmes. Difficulties when no national regulation exists. Schools may lack effective management systems or economic factors that have an impact on available resources, or school located in an area that faces

particular economic and social difficulties. Lastly, time lags between intervention and outcomes (European Agency for Safety and Health at Work's Topic Centre OSH, 2010).

#### **2.5.4 Summary**

For schools, having pupils and students involved in risk management of their own environment helps them comply with their duties regarding OSH management, be it within the school as a whole, or on specific risks such as violence to staff.

Training and involving teachers in occupational safety and health in schools helps to give them the knowledge and confidence to teach risk education to pupils.

Leadership from the head, showing commitment to a safe and healthy school environment, is important for both teachers and pupils. On the contrary, if risk education takes place within a crumbling school or a bullying atmosphere for staff or pupils, then lessons will not be transferred out of the classroom, and a safety culture will not be developed in the next generation of workers.

Sometimes a stepwise approach is best and interventions must be tailored to the context of the school. Experiences gained from tackling one issue, such as violence to staff or other pupils by pupils, can be transferred to broader projects.

External support in terms of programmes, resources and guidance is important to help schools that wish to get started. OSH authorities can use their activities to support the implementation of occupational safety and health legislation in schools as an effective means to promote risk education in schools.

As in all areas of OSH, success is most likely where staff, head teachers and, in this instance, pupils and parents are involved in developing and implementing solutions. Positive attitudes and experiences towards participation and engagement in OSH, a key component of a good safety culture, can be developed in schools through actively involving pupils in appropriate ways in safety management in their schools, as is required in Sweden, for example.

The use of health and safety champions in schools or peripatetic OSH teachers can be an effective way to develop expertise and stimulate activity.

Schools have many demands placed upon them. Therefore, synergies that help schools to achieve more than one objective at the same time are especially important. This is the case if risk education is combined with school safety management, or in situations in which both are also integrated into the school's health programme and health education. Furthermore, synergies can go beyond the school gate, as can be seen in interventions that bring pupils and drivers together to tackle the issue of violence in school buses.

The whole-school healthy schools programme presents a proper framework in which to include risk education and create safe and healthy schools as required by OSH legislation. The prevention of bullying and harassment is a particular area of overlap between mental health promotion and OSH in schools and is one, which requires a Whole-School Approach covering the dignity and respect of staff and pupils. There is a lot of scope for combining health, safety and well-being at school with sustainable development/environmental issues and their education in schools, where a Whole-School Approach is also advocated.

Therefore, the Whole-School Approach should be a means of uniting the various fields of interest encountered in this report: occupational safety and health, public health and accident prevention, and sustainable development. This 'combined' Whole-School Approach - a holistic and transversal approach - seems to be well suited to handle the complexity and interdependency of the various issues to be taken into account. Synergies can be used to save time and resources as well as to educate about the interactivity in the world and the need for joined-up approaches.

To achieve such a 'combined' Whole-School Approach requires close cooperation and working between OSH, these other policy areas and education policy in order to develop joined-up approaches that will be appropriate for schools and practical for them to implement.

Tools are needed to help schools to implement an integrated approach, not only tools combining risk education and OSH management, but tools which guide them in implementing a 'combined' Whole-School Approach.

Lastly, this is an emerging field, therefore the continued exchange and sharing of practices, including at the local level, is very important. Networking at local level can be essential to provide support as well as information and ideas.

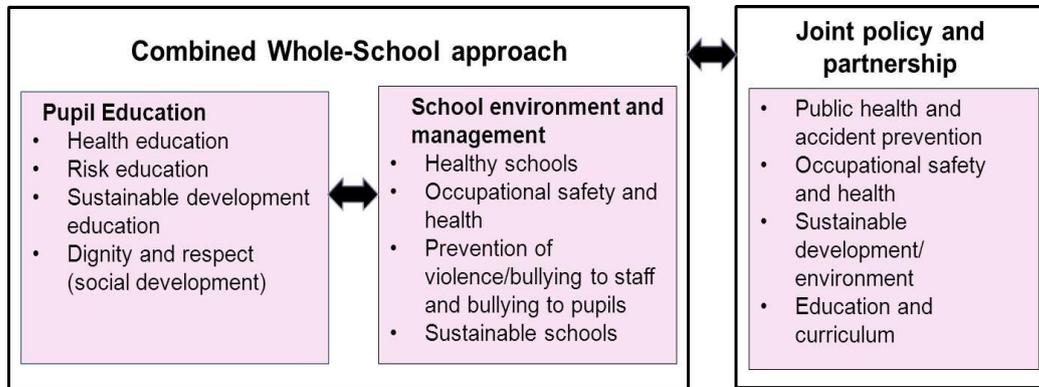


Figure 2.3 Model of a ‘combined’ Whole-School Approach  
 Source: European Agency for Safety and Health at Work’s Topic Centre OSH (2013)

## **CHAPTER 3**

### **METHODOLOGY**

#### **3.1 Introduction**

This chapter purpose is to explain and describe the method and procedures that has been used to develop the design, analysis, instrument and measurement of the research. This research method has been developed to achieve the three objectives of this study, which aim to determine the level of OSH management implementation in school. Secondly, to measure level of knowledge and awareness the students have on OSH management in school. Lastly, is to measure the effectiveness of the intervention of OSH management on the students.

#### **3.2 Research Design**

The research design for this study is interventional study design where pre-post study design was used. An interventional study is where the researcher intervenes at some point throughout the study and it is used to evaluate study questions related to either therapeutic agents or prevention. Prevention can include changes to engineering controls, protective equipment, policy, managements or any element that should be evaluated as to a potential cause of disease or injury (Thiese, 2014).

The research design was chosen because of the objectives where this research focusing in pre and post of the intervention where OSH management is the subject. Qualitative and quantitative methods were used in this study. The qualitative data were collected through document analysis, observation, and questionnaires whereas quantitative data was analysed and calculated using the Statistical Package for the Social Sciences (SPSS) software.

### **3.3 Study Area**

This study had been conducted at a vocational college in Perak. The study area had been chosen since vocational college was more industrial-based and has more risks and hazards compared to other school.

### **3.4 Study Population**

The study population in this study would be the occupant in the vocational college where in this study it would be the students. Checklist and questionnaires had been used on the students to measure their knowledge and awareness toward OSH management.

### **3.5 Study Sample Size**

In this study, the sample was chosen based on purposive sample method. A purposive sample is a non-probability sample that is selected based on characteristics of a population and the objective of the study. Purposive sampling is also known as judgmental, selective, or subjective sampling.

This type of sampling can be very useful in situations when you need to reach a targeted sample quickly, and where sampling for proportionality is not the main concern. There are seven types of purposive samples, each appropriate to a different research objective (Crossman, 2018).

The data sampling size was based on the Krejcie and Morgan table as shown in Figure 3.1. Since the population of student is 900, the sample size for the student would be 269.

Table 3.1									
<i>Table for Determining Sample Size of a Known Population</i>									
N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	1000000	384
<i>Note: N is Population Size; S is Sample Size</i>					<i>Source: Krejcie &amp; Morgan, 1970</i>				

Figure 3.1 Krejcie & Morgan Table  
Source: Krejcie & Morgan (1970)

### 3.6 Research Framework

Figure 3.2 shows the research framework for the objectives of an intervention study on OSH management in a vocational college. The research done were carried out one by one with the guide from Research Gantt Chart that can found in Appendix A.

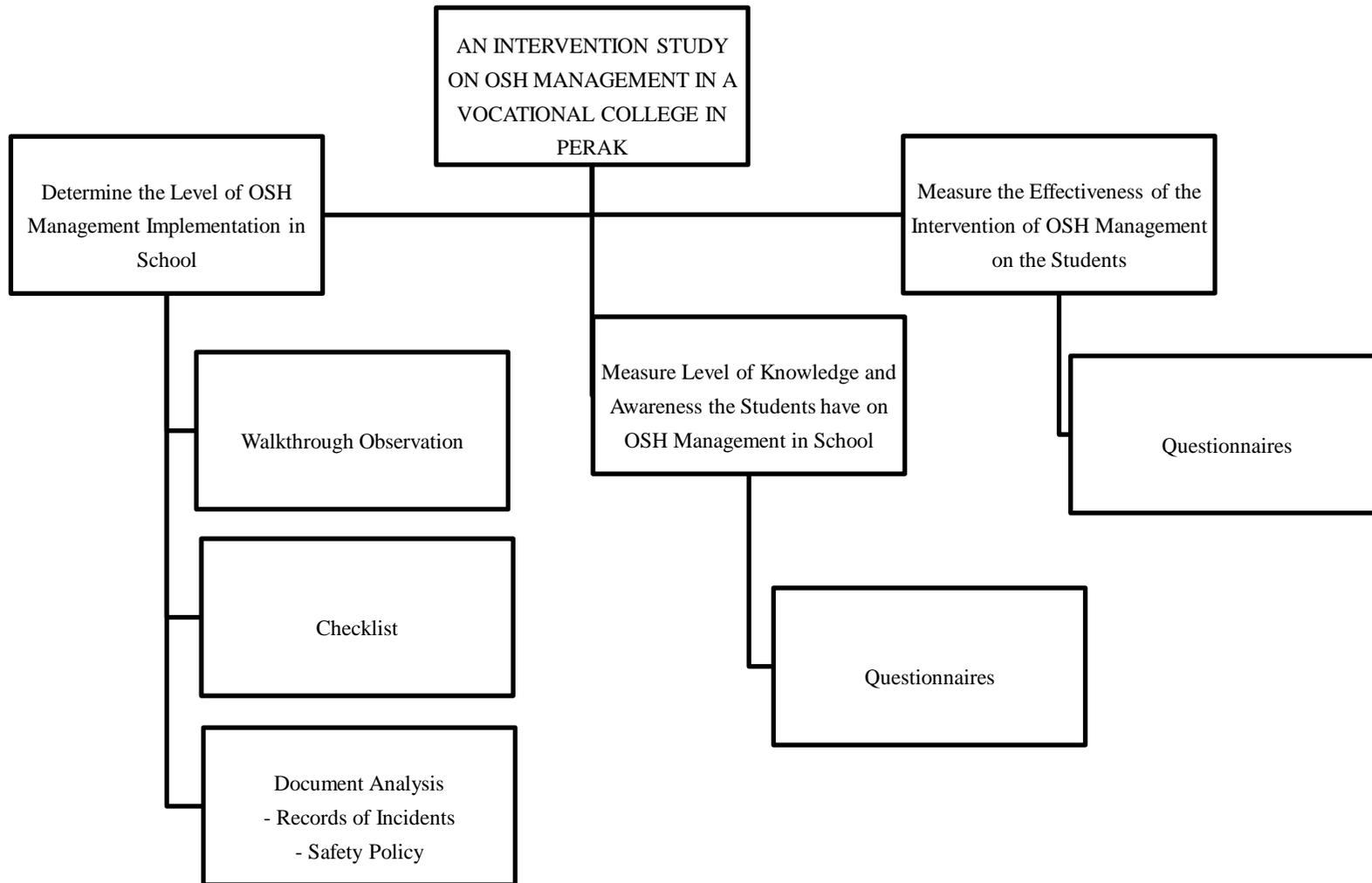


Figure 3.2 Research Framework

## **3.7 Research Instruments**

### **3.7.1 Recording Devices**

Many qualitative studies collect audio or video data (e.g. recordings of interviews, or talk in consultation), and these are usually transcribed into written form for closer study. Transcribing appears to be a straightforward technical task, but in fact involves evaluation about what level of detail to choose. Representation of audible and visual data into written form is an interpretive process, which is therefore the first step in analysing data (Bailey, 2008).

The instruments used for transcribing in this study include voice recorder, video recorder and photography. All the data that have been captured and collected was transcribed for analysed process.

### **3.7.2 Observation Checklist**

The observation checklist had been used when conducting the walkthrough observation before starting the intervention to gather information regarding OSH management and other safety policy that had been implemented at the school. The checklist was based on several checklists where it had been established to measure the level of OSH management implementation in the school. The checklist contained various aspect of safety that a school should have such as emergency plan. The example of checklist can be found on Appendix A.

### **3.7.3 Questionnaires**

A survey or questionnaire is a research instrument consisting of a series of questions for gathering information from respondents. Questionnaires can be thought of as a kind of written interview. The questionnaires can be carried out: face to face, by telephone, computer or post. Closed questions can also provide ordinal data (which can be ranked). This often involves using a continuous rating scale to measure the strength of attitudes or emotions. For example, strongly agree / agree / neutral / disagree / strongly disagree / unable to answer (McLeod, 2014).

The questionnaire will consist of closed questions type where safety knowledge, safety awareness will be asked to the teachers and students. It will have Likert-scale questionnaire with range from 1 = strongly disagree to 5 = strongly agree and also 1 = rarely or none of the times to 5 = most or all of the time.

The questionnaires that had been used in this study will assess students' safety knowledge, safety perceptions, safety attitude and safety behaviour so that the level of knowledge and awareness of them can be measured. The scoring of the questionnaires will be Likert Scale ranging from 1 = strongly disagree to 5 = strongly agree and also 1 = rarely or none of the times to 5 = most or all of the time. To interpret the data, the mean of three and above was used to denote agreement while below three denotes disagreement.

The questionnaires were based on the previous studies where safety intervention or safety measurement is the variables and was used to gain the level of knowledge and awareness of the students on OSH management. There were many steps to establish a questionnaire so first face validity was needed. Then, the questionnaires created beforehand were sent to another school as a pilot study. Then, the result was cleaned out and principal component analysis was applied to check the validity of the questions asked. Lastly, Cronbach's Alpha test was done to ensure the internal consistency of the questionnaires (Collingridge, 2014). The example of the questionnaires can be found in Appendix B.

The questionnaires were divided into section, Section A and Section B. Section A would be used to collect data on students' awareness on occupational safety and health management while Section B would be used to collect data on students' knowledge on occupational safety and health management. The questionnaires were used in both pre-intervention and post-intervention.

#### **3.7.4 SPSS Software**

In this study, SPSS Software was used when analysing the data gained to measure the level of knowledge and awareness, the level of implementation and the effectiveness of the intervention. In SPSS Software, this study had used various type of measuring such as frequencies analysis, reliability analysis and Wilcoxon Rank-Sum Test.

## **3.8 Data Collection**

### **3.8.1 Observation**

Observation is one of the very important methods for obtaining comprehensive data in qualitative research especially when a composite of both oral and visual data become essential to the research. A researcher obviously needs an audio-visual recorder for a complete collection of such comprehensive record (Godfred, 2015).

Observation is needed to ensure that nothing left behind since maybe there is no documentation of OSH management or any safety policy in the school but it is being applied throughout the school and it will make the task easier when observation checklist need to be used. The observation technique was used to carry out the observation checklist for first objective. The checklist was done by walking throughout the whole college and observed the elements that had been stated in the checklist. The observation method was used to support the checklist that had been used as an instrument for objective one.

### **3.8.2 Document Review**

Document analysis is a social research method, is an important research tool in its own right, and is an invaluable part of most schemes of triangulation. It refers to the various procedures involved in analysing and interpreting data generated from the examination of documents and records relevant to a particular study. Document analysis was used as the main method of data collection and analysis. Interviewing was an additional method; however, the interviews eventually became documents after each interview was transcribed and converted into written form (Owen, 2014). The example of documents that had been reviewed were the safety policy of the vocational college.

### **3.8.3 Semi-structured Interview**

Semi-structured interviews are non-standardized and are frequently used in qualitative analysis. The interviewer does not do the research to test a specific hypothesis (David and Sutton, 2004). Within each topic, the interviewer is free to conduct the conversation freely, to ask the questions the researcher deems appropriate in the words the

interviewer considers best, to give explanation and ask for clarification if the answer is not clear, to prompt the respondent to elucidate further if necessary, and to establish their own style of conversation (Kajornboon, 2005).

#### **3.8.4 Survey**

First, the questionnaires were given out to the students a week before the intervention took place. There was explanation given to the students before the students answered the questionnaires to avoid any confusion and to ensure that all students understand the questions beforehand. The session took at least 20 minutes to end. Then, the questionnaires were collected and the data were key in into the SPSS. After a week, intervention process took place and followed by post-intervention questionnaires. However, the questionnaires were given out after the intervention done., the same process took place at the time. Then, the questionnaires were collected to be key in into the SPSS as post data. The example of the questionnaires can be found in Appendix B.

### **3.9 Intervention**

#### **3.9.1 Introduction**

Quasi-experiments are studies that aim to evaluate interventions but that do not use randomization. Similar to randomized trials, quasi-experiments aim to demonstrate causality between an intervention and an outcome. Quasi-experimental studies can use both pre-intervention and post-intervention measurements as well as non-randomly selected control groups. In medical informatics, the quasi-experimental, sometimes called the pre-post intervention, design often was used to evaluate the benefits of specific interventions. In general, the higher the design is in the hierarchy, the greater the internal validity that the study traditionally possesses because the evidence of the potential causation between the intervention and the outcome is strengthened (Shadish, Cook, & Campbell, 2002).

### **3.9.2 Threats**

Shadish, Cook and Campbell (2002) outline nine threats to internal validity that are outlined in. Internal validity is defined as the degree to which observed changes in outcomes can be correctly inferred to be caused by an exposure or an intervention.

#### **3.9.2.1 Threats to Internal Validity**

These were the threats to internal validity in an intervention study:

- i. Ambiguous temporal precedence: Lack of clarity about whether intervention occurred before outcome
- ii. Selection: Systematic differences over conditions in respondent characteristics that could also cause the observed effect
- iii. History: Events occurring concurrently with intervention could cause the observed effect
- iv. Maturation: Naturally occurring changes over time could be confused with a treatment effect
- v. Regression: When units are selected for their extreme scores, they will often have less extreme subsequent scores, an occurrence that can be confused with an intervention effect
- vi. Attrition: Loss of respondents can produce artifactual effects if that loss is correlated with intervention
- vii. Testing: Exposure to a test can affect scores on subsequent exposures to that test
- viii. Instrumentation: The nature of a measurement may change over time or conditions
- ix. Interactive effects: The impact of an intervention may depend on the level of another intervention

(Shadish, Cook, & Campbell, 2002)

### **3.9.3 Intervention Design**

As shown below in Figure 3.3, the intervention design was made to clarify more on the intervention that was done in this study. As shown below, the intervention design was separated into three parts: pre-intervention, intervention and post-intervention. In the pre-intervention phase, the instrument that was used was questionnaires. The questionnaires were given out to the students before the intervention phase took place. The questionnaires contained 25 questions with three socio-demography questions. The questionnaires given were to assess the students' knowledge and awareness on occupational safety and health management in school.

In the intervention phase. The major purpose of the intervention was to spread and increase the level of knowledge and awareness on occupational safety and health management to the students. It is to achieve the objective number three, which is to measure the effectiveness of the intervention of occupational safety and health management that had been done to the students. The intervention done was in the form of safety talk. Based on the research of relative effectiveness of worker safety and health training methods, safety talk or lecture was the least engaging in term of basis of learners' participation in the training process. However, even though it is the least engaging methods, it still achieved 0.63 for the mean overall effects associated with safety and health training interventions (Burke, et al., 2006). This proved that even though safety talk or lecture was the least effective in the type of intervention, it still could be carry out to achieve objective number three. Table 3.1 showed the intervention timeline where it was divided into three parts: pre, intervention and post.

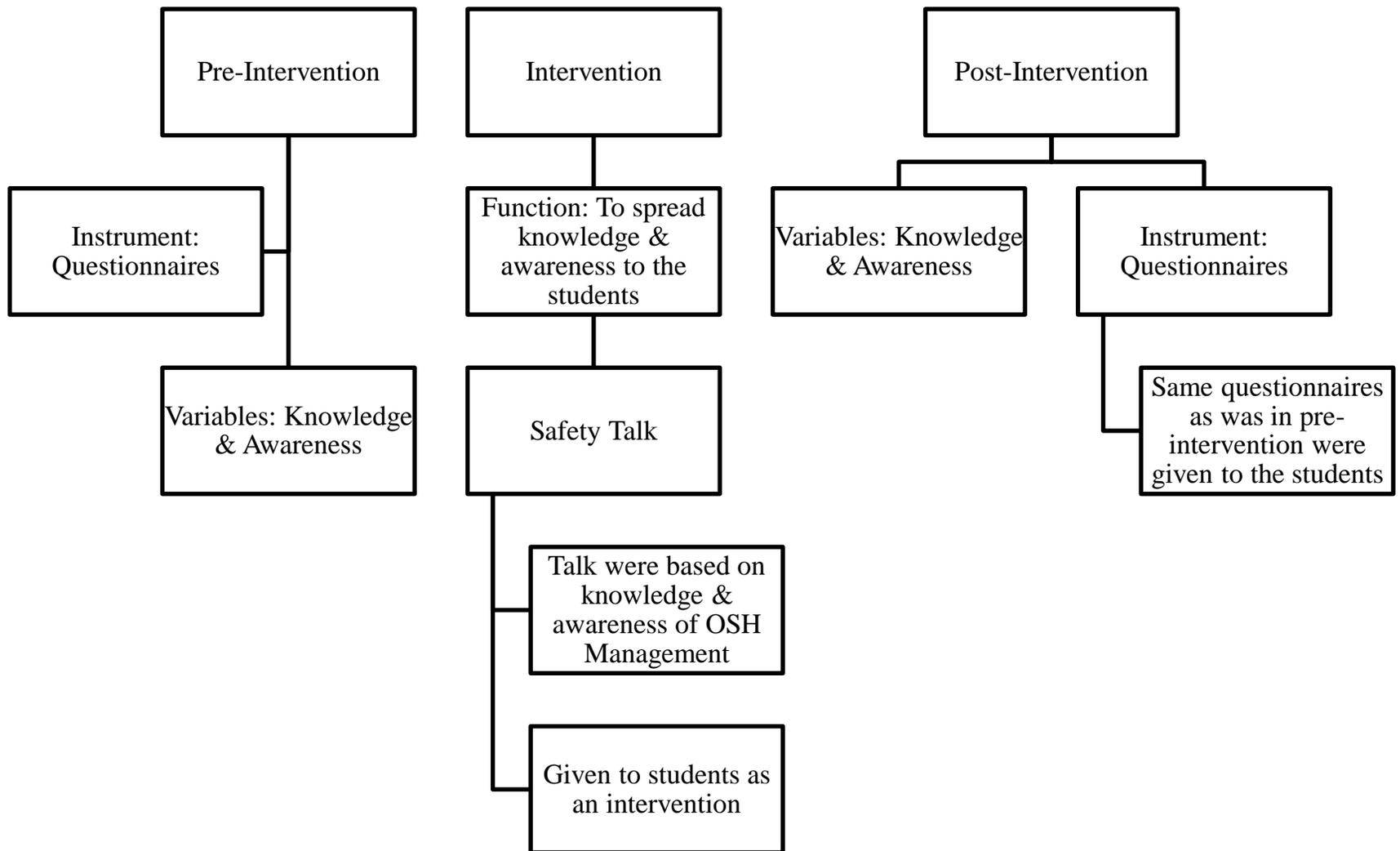


Figure 3.3 Intervention Design

Table 3.1 Intervention Timeline

Phase	Explanation
Pre-Intervention	<p>Questionnaires</p> <ul style="list-style-type: none"> <li>• Briefing and carrying out the questionnaires session together with the facilitator</li> <li>• To avoid false data and miscommunication regarding the questionnaires</li> <li>• Together the students answered the questionnaires based on the facilitator guides.</li> <li>• Since questionnaires was carried out together, data can be collected at the same time in estimated 30 minutes.</li> <li>• The data collected would be the pre of this intervention.</li> </ul>
Intervention	<p>Safety talk (Part A)</p> <ul style="list-style-type: none"> <li>• Safety talk was given by someone from the ump or OSH student themselves</li> <li>• The talk consisted of OSHA 1994, FMA 1967, emergency situation, usage of PPE, types of hazards &amp; how to identify it.</li> <li>• The purpose of the safety talk was to spread knowledge &amp; awareness on the OSH management</li> <li>• Safety talk was given to all students who had taken the questionnaires before.</li> </ul>
Post-Intervention	<p>POST</p> <ol style="list-style-type: none"> <li>1. Questionnaires           <ul style="list-style-type: none"> <li>• The same questionnaires were give again to the student to act as the post of the intervention.</li> <li>• The process is the same where facilitator would assess the students in answering the questionnaires.</li> <li>• Short briefing was given before answering the questionnaires the same as before.</li> </ul> </li> </ol> <p>Data was collected as post intervention.</p>

### 3.10 Data Analysis

All the data obtained had been analysed by SPSS Software. This subchapter explained more on the process in SPSS Software to measure the level of knowledge and awareness of the teachers and students, level of implementation of OSH management and to measure the effectiveness of the intervention.

#### 3.10.1 Weighting

Weighting is a correction technique that is used by survey researchers. It refers to statistical adjustments that are made to survey data after they have been collected in order to improve the accuracy of the survey estimates. There are two basic reasons that survey researchers weight their data. One is to correct for unequal probabilities of selection that

often have occurred during sampling. The other is to try to help compensate for survey nonresponse (Lavrakas, 2008). The pre-intervention sample gained was 200 but for post-intervention, the sample gained was 153. So, weighting method was used to balance out the sample value. The table 3.2 show the number of samples and each of its factor. The table was adapted from Brem (2014).

Table 3.2 Sample Size and Factors

	<b>Pre-Intervention</b>	<b>Post-Intervention</b>
Sample	200	153
Factor	1.345	1.76
Total	269	269

Source: Brem (2014)

### 3.10.2 Statistical Package for Social Sciences (SPSS) Software

Statistical Package for Social Sciences (SPSS) was used for data management and analyses. To give general descriptions of the data, descriptive statistics including frequencies, means, standard errors of mean, medians, and standard deviations were performed. P-value less than 0.05 was considered statistically significant (Verma, Wong, Chakravarthi, & Barua, 2014)

The higher the percentage of the performance measures that show significantly ( $p < 0.05$ ) favourable changes, the more confident we can be in the effect of the interventions (Hale, Guldenmund, Loenhout, & Oh, 2010).

### 3.10.3 Descriptive Statistics Interpretation Level

Interpretation level was used to give the mean score to its own ranking. The interpretation level was based on Wiersma (2000) where the interpretation levels were divided into three levels. Table 3.3 was adopted from Wiersma (2000).

Table 3.3 Interpretation Mean Scores of Descriptive Statistics

<b>Mean Score</b>	<b>Interpretation Level</b>
1.00 – 2.49	Low
2.50 – 3.49	Moderate
3.50 – 5.00	High

Source: Wiersma (2000)

### **3.10.4 Wilcoxon Rank-Sum Test**

The Wilcoxon Rank-Sum Test was often described as the non-parametric version of the two sample t-test (University of Virginia Library, 2018). It is used to test whether two samples are likely to derive from the same population. The test was used to determine whether two independent samples were selected from populations have the same distribution. The test was used because of the intervention sample did not affect post-intervention sample. Beside, Wilcoxon Rank-Sum Test used because this study used non-parametric test due to limited study to be referred for normal distribution value and the sample is not homogenous. A statistical test, in which specific assumptions are made about the population parameter is known as parametric test while statistical test used in the case of non-metric independent variables, is called non-parametric test (Surbhi, 2016). The full result can be found on Appendix D.

### **3.11 Reliability and Validity**

To ensure that all data that will be gained in this study are reliable and valid, there are some measures that will be taken to ensure that such as triangulation, pilot study and Cronbach's Alpha.

#### **3.11.1 Pilot Study for Survey**

Pilot study can be defined as a 'small study to test research protocols, data collection instruments, sample recruitment strategies, and other research techniques in preparation for a larger study. A pilot study is one of the important stages in a research project and is conducted to identify potential problem areas and deficiencies in the research instruments and protocol prior to implementation during the full study (Lancaster, Dodd, & Williamson, 2004) (Kraemer, Mintz, Noda, Tinklenberg, & Yesavage, 2006). It can also help members of the research team become familiar with the procedures in the protocol, and can help them decide between two competing study methods, such as using interviews rather than a self-administered questionnaire (Abu, Fracgp, Mmed, & Fracgp, 2006). In this study, the pilot study will be used to ensure that others can understand the question that will be built and any confusion can be avoided beforehand.

### 3.11.2 Cronbach's Alpha Reliability Test

Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered a measure of scale reliability. A "high" value for alpha does not imply that the measure is unidimensional. If, in addition to measuring internal consistency, you wish to provide evidence that the scale in question is unidimensional, additional analyses can be performed. Exploratory factor analysis is one method of checking dimensionality. Technically speaking, Cronbach's alpha is not a statistical test – it is a coefficient of reliability (or consistency) (Bruin, 2011).

Cronbach's alpha is a measure used to assess the reliability, or internal consistency, of a set of scale or test items. In other words, the reliability of any given measurement refers to the extent to which it is a consistent measure of a concept, and Cronbach's alpha is one way of measuring the strength of that consistency.

Cronbach's alpha is computed by correlating the score for each scale item with the total score for each observation (usually individual survey respondents or test takers), and then comparing that to the variance for all individual item scores.

In interpreting a scale's  $\alpha$  coefficient, a high  $\alpha$  is both a function of the covariance among items and the number of items in the analysis, so a high  $\alpha$  coefficient isn't in and of itself the mark of a "good" or reliable set of items; the  $\alpha$  coefficient can be increased simply by increasing the number of items in the analysis. In fact, because highly correlated items will also produce a high  $\alpha$  coefficient, if it's very high (i.e.,  $> 0.95$ ), there will be risk in redundancy in the scale items (Goforth, 2015). Figure 3.4 shows an example of Cronbach's Alpha range.

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

Figure 3.4 Cronbach's Alpha internal consistency  
Source: (Tavakol & Dennick, 2011)

Based on the reliability analysis done by SPSS, the result of reliability analysis or Cronbach's Alpha were shown in Figure 3.5 below.

Reliability Statistics	
Cronbach's Alpha	N of Items
.702	25

Figure 3.5 Reliability Analysis Result

As shown above, the Cronbach's Alpha result was 0.702 for 25 questions in the questionnaires. Based on the Cronbach's Alpha internal consistency in Figure 3.3 the result gained would be in acceptable range thus ensured that the questionnaires were valid enough to be used as an instrument in collecting data. The full result of the reliability analysis can be found in Appendix D.

### 3.11.3 Triangulation for Qualitative Data

Triangulation is a measurement technique often used by surveyors to locate an object in space by relying on two known points in order to "triangulate" on an unknown fixed point in that same space (Hesse-Biber & Mertens, 2012). By using triangulation, document analysis was done together with the walkthrough observation and interview. By combining this three data collection technique, the data collected can be verified and

validate. The document used in this technique were the vocational college safety policy and incidents records. By going through the safety policy of the vocational college, the implementation of the occupational safety and health management can be found throughout the college.

### **3.12 Study Ethics**

All participants who participated in the study were made to understand the purpose of the study, verbally assured of confidentiality for their responses and that they should not write anything on the questionnaire that could reveal their identity (Mogopodi, Paphane, & Petros, 2015). During data collection at site, all the regulations and requirements needed should always adhered to, to ensure the privacy and the right of the students. In order to ensure privacy concern, the semi-structured interview session and all personal data gathered such as name were not being exposed. The person in charge (PIC) was asked question related to the study and not touching any sensitive issue. All data obtained from this study is only for academic purposes and remain Private and Confidential.

### **3.13 Research Planning**

The research was done according to the guideline in the Gantt chart that can be found in Appendix E. The research was planned before it was carried out to ensure that the research can be done in due time.

## CHAPTER 4

### RESULTS AND DISCUSSION

#### 4.1 Introduction

The results presented in this chapter were based on the observation and survey done at Vocational College in Perak. The chapter starts with the presentation of results from the checklist and then questionnaires, and lastly the intervention result. It was concluded by interpretation of the results.

#### 4.2 Level of Occupational Safety and Health Management Implementation

OSH management is defined as “the modern way of planning and doing activities, leading to continuous improvement. OSH MS combine occupational safety and health with management and ‘system thinking’” (Zwetsloot & Stepa, 2018). To determine the level of implementation of OSH management in vocational college, this study used checklist adopted from Victorian trade hall council where it is used for working environment in school (Victorian Trades Hall Council, 2018). The places that been observed in the checklist are building and structures, classrooms, computer workstations, electrical equipment, first aid and hygiene, food preparation and handling, machineries, tools, personal occupational safety and health, safe system of work, safety publication and notice, school grounds (in and out of school), storage, student occupational safety and health and lastly, toilet and drinking taps. The example of the checklist was shown in Appendix A.

Based on the result from the checklist, the result will be summarise from one to another category. The level of implementation will be analyse by the implementation scale as shown in Table 4.1. Table 4.1 provides the mean scores for each category in the checklist. The mean score of each category were compared with a scale provided together with the mean score which will indicate the level of occupational safety and health management implementation. The table of implementation was adapted from Maidabino

and Zainab research on collection security management at university libraries: Assessment of its implementation status (Maidabino & Zainab, 2011).

Based on Maidabino and Zainab (2011), the level of implementation of all factors can be determined by totaling the scores of all the items listed under each factor. The minimum and maximum scores for each factor are dependent on the number of items listed under each section. Table 4.2 indicates the measuring scale used for all factors, where, the minimum will be 4 and the maximum is 63. Under each factors the performance level is measured in accordance to the following scale: 1 = Non-implementation, 2 = Planning stage, 3 = Partial implementation, 4 = Close to completion and 5 = Full Implementation.

Table 4.1 Rating Scale Used to Assess the Level of OSH Management Implementation

Factors	Mean Score			Implementation Level				
	Items	Mean	Sum	1	2	3	4	5
1 Building and Structures	7	3.71	26	1 – 7	8 – 14	15 – 21	22 – 28	29 – 35
2 Classrooms	14	3.14	44	1 – 14	15 – 28	29 – 42	43 – 56	57 – 70
3 Computer Workstation	2	3.50	7	1 – 2	3 – 4	5 – 6	7 – 8	9 – 10
4 Electrical Equipment	8	2.75	22	1 – 8	9 – 16	17 – 24	25 – 32	33 – 40
5 First Aid and Hygiene	6	2.50	15	1 – 6	7 – 12	13 – 18	19 – 24	25 – 30
6 Food Preparation and Handling	13	3.31	43	1 – 13	14 – 26	27 – 39	40 – 52	53 – 65
7 Machinery	2	3.00	6	1 – 2	3 – 4	5 – 6	7 – 8	9 – 10
Emergency Stop Button	4	4.00	16	1 – 4	5 – 8	9 – 12	13 – 16	17 – 20
8 Tools	7	3.00	21	1 – 7	8 – 14	15 – 21	22 – 28	29 – 35
Correct Use								
Condition – Hand Tools	6	3.00	18	1 – 6	7 – 12	13 – 18	19 – 24	25 – 30
Condition – Power Tools	11	3.00	33	1 – 11	12 – 22	23 – 33	34 – 44	45 – 55
9 Personal Occupational Safety and Health	9	3.00	27	1 – 9	10 – 18	19 – 27	28 – 36	37 – 45
10 Safety System of Work	12	2.91	35	1 – 12	13 – 24	25 – 36	37 – 48	49 – 60
11 Safety Publication and Notices	4	4.00	16	1 – 4	5 – 8	9 – 12	13 – 16	17 – 20
12 School Grounds (in and close to school)	21	3.00	63	1 – 21	22 – 42	43 – 63	64 – 84	85 – 105
13 Storage	13	2.00	26	1 – 13	14 – 26	27 – 39	40 – 52	53 – 65
14 Students Occupational Safety and Health	2	2.00	4	1 – 2	3 – 4	5 – 6	7 – 8	9 – 10
15 Toilets and Drinking Taps	4	3.50	14	1 – 4	5 – 8	9 – 12	13 – 16	17 – 20

Based on the Table 4.1, there were 15 elements in the checklist, two of the elements were in level 2 or planning stage, nine of the elements were in level 3 or partial implementation and the rest were in level 4 or close to completion. First, the study discussed about elements in level four. There were seven elements: building and structures, classrooms, computer workstations, food preparation and handling, machineries (emergency stop button), safety publication and notices and toilets and drinking taps. The elements that had achieved close to completion level were mostly due to frequent used, high maintenance cost or strong enforcement of law and regulations. As mentioned before, due to frequent used, building and structures, classroom and toilets and drinking taps had high level of implementation. This may be because the element was frequently used causing the school to take extra care and to go extra length to ensure that the students, teachers and other occupants of the vocational college comfortable while carrying their activities. While for food preparation and handling, machineries (emergency stop button) and safety publications and notices elements, the reason of it's close to completion implementation level may be due to strong enforcement of law and regulations. First element was food preparation and handlings was a sensitive element. Lately, there were lots of cases involved food poisoning that lead to fatality causing all food providers to take extra care in handling their food preparation including the vocational college. The enforcement of law and regulations on food preparation and handlings made it more seriously taken by others. Second elements were machineries for emergency stop button. Due to machine that mostly used by the vocational college were heavy machines, it came together with law and regulations to use and maintained it, explaining why it almost to completion level compare to other elements. Third element was safety publications and notices where this element was implemented by NIOSH where every school need to have its own occupational safety and health policy and be displayed to others to ensure that the information can be delivered to others fully.

For third level of implementation or partial implementation level, the elements involved were electrical equipment, first aid and hygiene, machinery, tools (correct use, condition for hand tools and power tools), personal occupational safety and health, safety systems of work, and school grounds (in and close to school). All elements in this level were partially implemented based on the implementation level. This may be due to the elements were needed in the vocational college but there was no reasons or

effort to implement it more, since all elements mentioned were common things found that can be found anywhere. Mostly elements mentioned in this level required knowledge and awareness of students and teachers to be implemented. This show that the level of knowledge and awareness of the students and the teachers were still lacking for a proper implementation the occupational safety and health management. The elements that involved might be personal occupational safety and health and safe system of work. While for other elements, sum score was low because of the implementation of the elements were insufficient. Various test, tools, or equipment was not enough to implement the elements properly.

Lastly, the elements in planning stage level of implementation or level 2 were storage and students' occupational safety and health. For students' occupational safety and health, due to lack of knowledge and awareness on occupational safety and health made the implementation not effective enough.

According Gaceri (2015), there were elements that do give effect to the level of implementation of OSHMS in workplace such as leadership, department (in supermarket), employee participation, training, and the implementation itself. Meaning, the level of implementation of the OSH management in the vocational college can be increase by involving everyone in carrying out OSH management (Gaceri, 2015).

#### **4.2.1 Demographic Analysis**

##### **4.2.1.1 Gender**

The question of gender was included in the questionnaires to establish the gender ratio of participants and also to understand the perspectives regarding students' awareness and knowledge towards OSH management in general from both males and females. The results obtained are presented in Figure 4.1.

Gender  
□ Boy  
▨ Girl

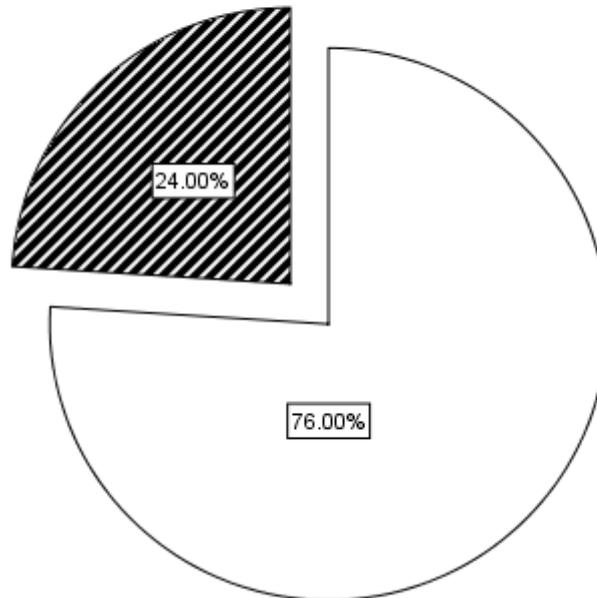


Figure 4.1 Gender

The results from questionnaire indicate that 24% of girls and 76% of boys participated in the study. As been mentioned in journal *The Online Journal of Quality in Higher Education*, the percentage for enrolment by gender in government and government assisted educational institutions in 2012 for college/polytechnics were as before: 53.1% male and 46.9% female (Ismail, 2015). Although the statistics show polytechnic as an example but the tendency can be seen even in vocational college due to hard chores and also lack of reading subjects and more of hand-on subject. Based on the research of William Wooleys (2010), the study of 192 teams showed that teams with more women tended to perform above average score and those with more men below it. Thus, the female students involved might have slightly higher mean scores compare to the male students. While for work related incident rates in workplace, Kelsh and Sahl (1996) stated that even though sex-specified unadjusted injury rates were higher for male workers, however, after readjustment was made, the elevated rate ratios indicated that female workers have higher injury rates. This show that it is important to give attention to both male and female students to ensure that they could work safely in the future or even now.

#### 4.2.1.2 Age

Awareness initiatives should take into account the age factor hence inclusion of age in this questionnaire. This question was included to establish understanding of student awareness and knowledge in different age groups. The result of question had been shown in Figure 4.2.

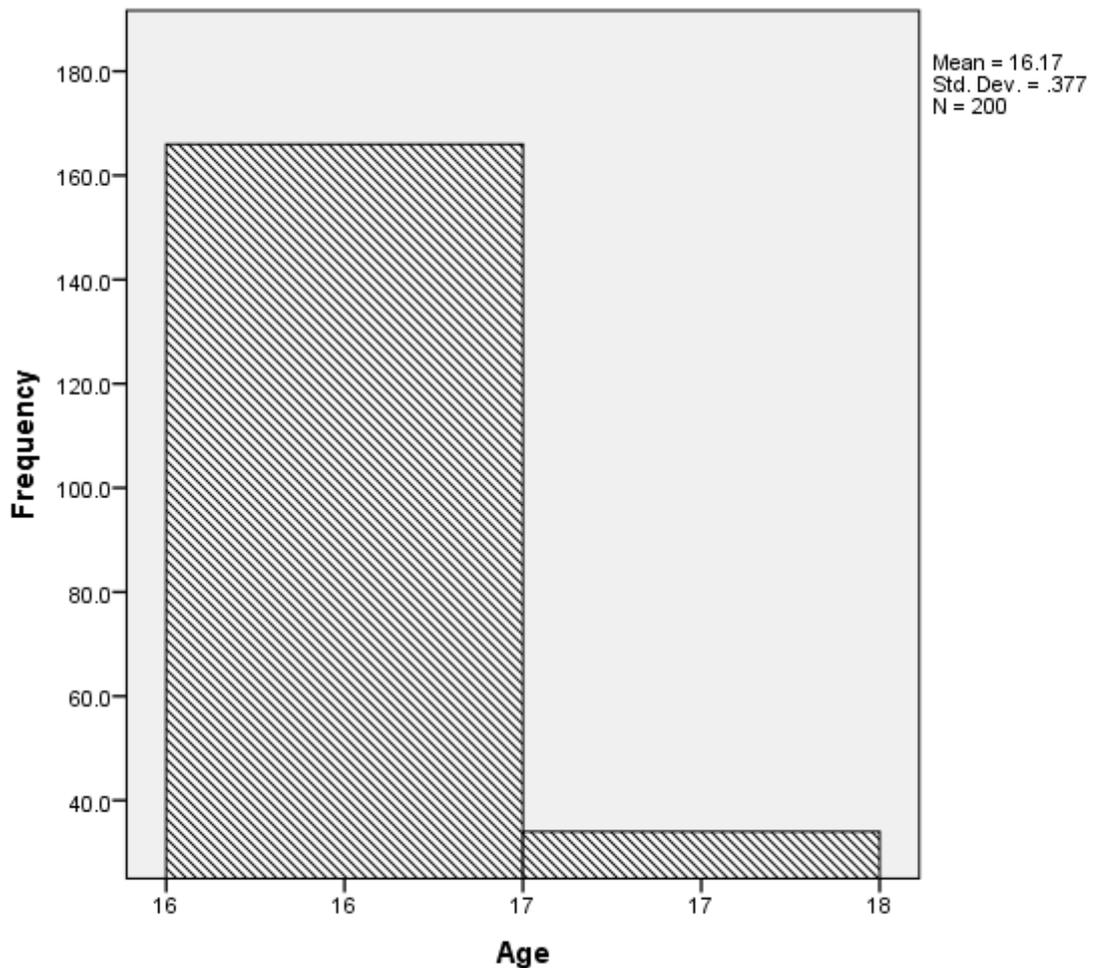


Figure 4.2 Age

The result in Figure 4.2 above show only two group of ages had been recorded, this due to the limitation of time for the upper students to participate in the intervention study. As been mentioned in characteristics of occupational accidents by age by Akiko Takahashi and Takashi Miura, cut and abrasions were experienced by mostly workers in their twenties thus why this study try to gather as much as possible from the students as they all will be a young workers one day (Takahashi & Miura, 2015). As for the

knowledge and awareness, the study tried to gain more from the first years so that we can study what are their knowledge and awareness on OSH management in school.

Based on a research, it suggest that young workers had a 1.44 times higher likelihood of having no access to an occupational physician and were more likely to be unaware of legal OSH frameworks (Dragano, et al., 2018). The study even encouraged OSH management should pay attention to young workers in general. This show that the students might not have that much of knowledge and awareness on occupational safety and health management compared with person who had work for long enough in industry.

#### **4.2.1.3 Course**

The courses of the students take in the vocational college also need to be taken into consideration due to different exposures during the learning process. The students might also have encountered different type of hazards and risks due to their courses. It is important to ensure that all courses were taken into consideration so the result would be unbiased. The result of the question has been shown in Figure 4.3.

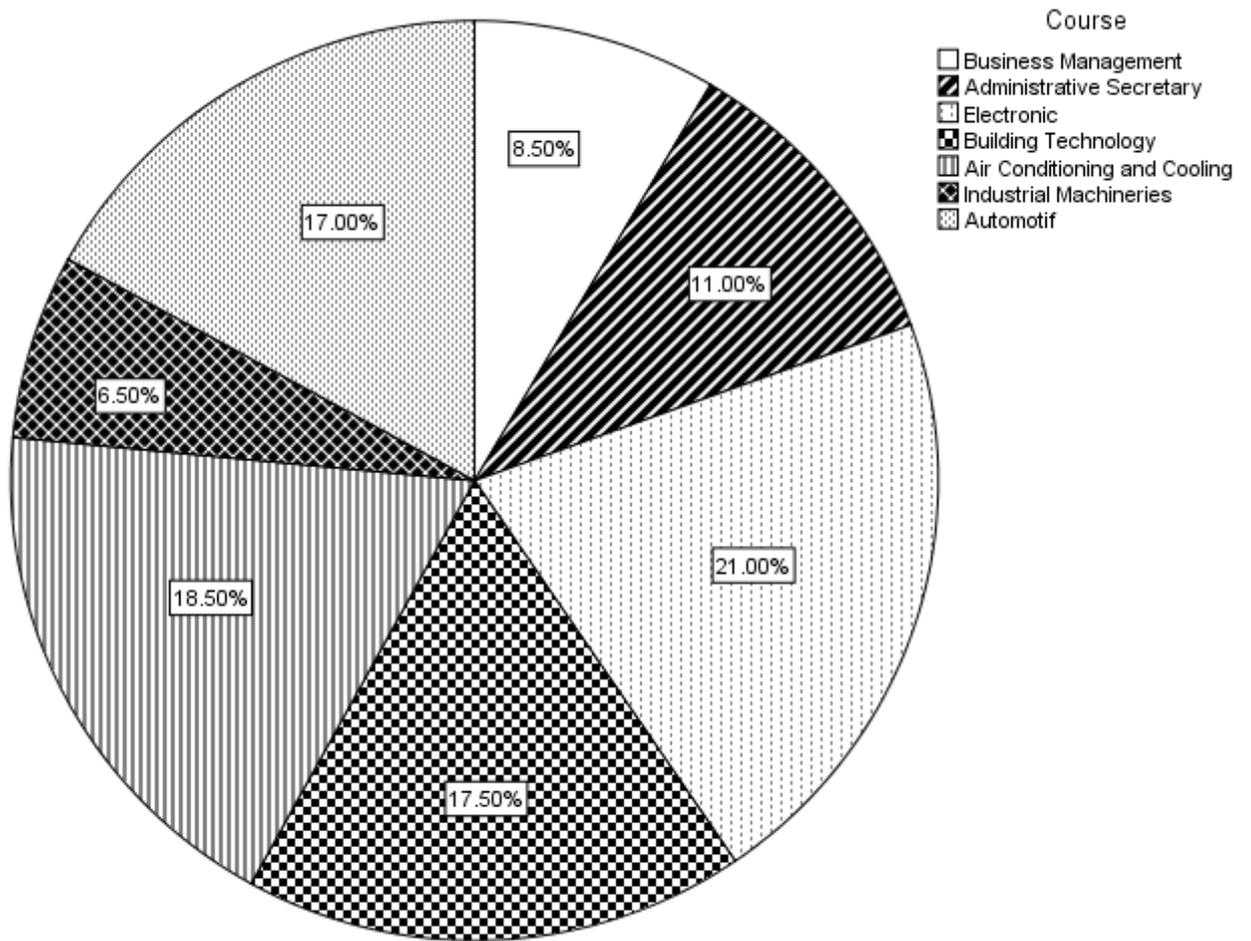


Figure 4.3 Courses

The result shown in the Figure 4.3 above shown there were eight courses available in the vocational college. Most respondents came from Electronic courses with 21%. Second was Air Conditioning and Cooling students with 18.5% followed by Building Technology students with 17.5% and Automotive students with 17%. Next, was Administrative Secretary Students with 11%, Business Management students with 8.5% and lastly, Industrial Machineries students with 6.5%. As shown above, all courses available in the vocational college were present in the pie chart, meaning that this study successfully included every single courses in the vocational college. This was to ensure that the result came out would be greatly unbiased.

Different courses have different level of knowledge and awareness on occupational safety and health management. For example, students from Administrative Secretary courses were given basic exposure on administrative management in secretary sector compared with students from Machineries Industrial Technology that were given

exposure on working with machineries. Both courses had different spectrum of knowledge needed to be learnt showing that there were exposed to different risks and hazards. Thus, why the study included all courses to ensure that the knowledge and awareness level gained would be based on the whole students instead of only one course.

### **4.3 Students' Knowledge on OSH Management**

Knowledge is defined as “the fact or condition of knowing something with a considerable degree of familiarity through experience, association or contact” (Marchi, 1999). The question was included to evaluate the knowledge of students of vocational college on OSH management in vocational college as their learning experience have more hazards and risks compare to common school. The result shown in the Table 4.2 was analysed from pre-intervention data, so that the level of knowledge of the student on OSH management can be measured before intervention happened. The whole results can be found in Appendix C.

Table 4.2 Level of Students' Knowledge Related to OSH Management

Question Keyword	Mean	Interpretation Level
Important person during emergency	4.22	High
Importance of PPE	3.70	High
Knowledge on NIOSH	3.65	High
Knowledge on DOSH	3.63	High
Assembly point and exit	3.60	High
Inspection on machines	3.59	High
Knowledge on FMA 1967	3.48	Moderate
PPE usage (teachers)	3.41	Moderate
Knowledge on PPE	3.25	Moderate
PPE usage (students)	3.20	Moderate
Knowledge on OSH management	2.96	Moderate
Safety management function	2.82	Moderate
Knowledge on OSHA 1994	2.77	Moderate
First aid kit	2.74	Moderate
Proper handling fire extinguisher	2.07	Low

Based on the Table 4.2, there were total of 15 questions in knowledge section and 6 questions ranked high, eight questions ranked moderate and one question ranked low. First, the questions that ranked high were mostly the basic knowledge on occupational safety and health management. Although, the questions ranked high in term of level of knowledge it still showed that the level of knowledge of students still low compare to people who were more experienced or working people. Eight questions ranked moderate can support this, or to put simply, the students did not sure what is the answer to the questions. This also may due to lack of training or explanation given to the students regarding occupational safety and health during learning process that lead to students had low knowledge on occupational safety and health. The mean score for the low ranked question was 2.07 showing that the students really did not know how to use the fire extinguisher properly. For students who working with machines, tools, or equipment, how to use fire extinguisher is must know but for other students who were not involved, they might did not know how to operate the fire extinguisher properly. However, to conclude, the level of knowledge of the students on occupational safety and health management was above the moderate level.

#### 4.4 Students' Awareness on OSH Management

Awareness is the state or condition of having a knowledge of consciousness. The Oxford dictionary defines awareness as “knowledge or perception of a situation or fact.” Based on the questionnaire, this question was aimed to establish how much the students aware of OSH management in their school. This is important since awareness

will stimulate the students to take action in ensuring themselves and others can carry out their daily life in the college safely. Dan Mager (2014) said in order to be successful in and sustain any process of meaningful change; both awareness and action are requisite. Translating conscious awareness into intentional action in recovery from addiction and/or chronic pain is similar to the process of learning and building new skills in any area—be it sports, reading, video gaming, cooking, auto repair, keyboarding, gardening, plumbing, or meditating. In order to get better at anything it is necessary to: 1) learn the techniques that work, and 2) practice what works with consistency and persistence (Mager, 2014). The result for the awareness of the students on OSH management was based on pre intervention data. It was to measure the level of students’ awareness on OSH management before the intervention happened. The whole results can be found in Appendix C.

Table 4.3 Level of Students’ Awareness related to OSH Management

<b>Question</b>	<b>Mean</b>	<b>Interpretation Level</b>
Broken machine usage	4.59	High
Awareness on FMA 1967	4.05	High
Safety briefing before class	3.93	High
Safeness in school	3.78	High
Awareness on OSHA 1994	3.36	Moderate
Safety programme participation	3.28	Moderate
First aid	3.12	Moderate
Safety programme in school	2.75	Moderate
Fire drill in school	2.62	Moderate
Safety committee	2.46	Low

Based on the Table 4.3, there were total of ten questions in awareness section where four questions ranked high, five questions ranked moderate and one question ranked low for the interpretation level. The reasons why the awareness level for the four questions were high might be due to their experience while going through learning process. According to Vaneechoutte (2000), awareness is what experience is for animal. Thus, why the awareness level low or high were due to the students’ experienced. If they encountered lots of risks and hazards during learning process, the level of awareness of the students will be high too. The same if they had less to no encountered to risks and hazards, the level of awareness will be low to. That was why the question with low ranked got low rank was because the students did not know that they did have a safety committee in the college. Lack of exposure to students might be one of the reasons why the students scored low for this question. As mentioned before, if the

students had knowledge or perceptions on each element of occupational safety and health, the level of awareness would become high. To conclude, the level of awareness of students on OSH management was above the average level.

#### **4.5 Effectiveness of the Intervention for Occupational Safety and Health Management on Students**

As mentioned before in Chapter 3, the higher the percentage of the performance measures that show significantly ( $p < 0.05$ ) favourable changes, the more confident we can be in the effect of the interventions (Hale, Guldenmund, Loenhout, & Oh, 2010). The full results of Wilcoxon Rank Sum Test can be found in Appendix C.

Based on the result shown in Appendix C, there were P-value listed as 0.000. According to Simon (2012), whenever SPSS reports a p-value of 0.000, it is unclear whether SPSS truncates or rounds. He strongly suspects that it always rounds. Truncating and rounding will produce a few discrepancies. A p-value like 0.0009 would be truncated to 0.000 but would round to 0.001. The researcher thought that some people place too much stock in the number of zeros in a p-value. People believed that if the result have seven zeroes in front of the p-value (e.g., 0.00000001) that this implies that the finding is immune from any criticism. Simon (2012) stated that it is not true, and some biases and flaws in the research design can indeed produce a p-value that is so extremely small. In a reaction against this tendency to overemphasize the extremely tiny p-values, Simon round any tiny p-value up to 0.001.

Thus in this study, this method had also been applied. Based on the result shown, there were fourteen questions with P value of 0.000. The result of 0.000 had been rounded up to .001 as mention in Simon (2012). Thus, the result showed that there were 15 questions where the p-value was lower than 0.005, while the rest of questions had p value more than 0.005.

Table 4.4 Questions and p-Value

Questions	P-Value	P-Value < 0.005
Awareness on FMA 1967	0.001	Yes
Awareness on OSHA 1994	0.001	Yes
Broken machine usage	0.001	Yes
Fire drill in school	0.001	Yes
Safety programme participation	0.001	Yes
Safety committee	0.010	No
Safeness in school	0.001	Yes
Safety programme in school	0.104	No
First aid training	0.024	No
Safety briefing	0.670	No
Knowledge on FMA 1967	0.001	Yes
Knowledge on OSHA 1994	0.001	Yes
Knowledge on OSH management	0.001	Yes
Fire extinguisher proper handling	0.001	Yes
Important person during emergency	0.001	Yes
Knowledge on NIOSH	0.005	No
Knowledge on DOSH	0.818	No
Assembly points and exits	0.875	No
Safety committee function	0.002	Yes
First aid kit	0.478	No
Knowledge on PPE	0.001	Yes
PPE usage (teachers)	0.057	No
PPE usage (students)	0.001	Yes
Machineries inspection	0.001	Yes
Importance of PPE	0.009	No

Based on the Table 4.4 above, more than half of the questionnaire had p-value more than 0.005. These might prove that the intervention done were effective to increase knowledge and awareness of the students. The intervention done were based on the knowledge and awareness of occupational safety and health management to increase the level of both elements. When p-value was smaller than 0.005, it showed that the difference was due to the change to and in this case, it was due to the intervention. However, there could be changes due to other factors such as the students were exposed to other safety programme organized by the college or the students gained knowledge or awareness through their learning process.

While for the p-value that were bigger than 0.005, maybe it was due to the type of engagement training on occupational safety and health used in the intervention was low. The safety talk given to the students might not be effective enough or the content of the talk was not enough to initiate any improvement in the post-intervention phase. Besides, during the safety talk period, the students were busy due to last weeks at the college and the students were busy with their project files and exams causing them to

cannot focused properly during the talk. Some of them even sleep during the talk due to too tired in preparing to enter the break. These reasons were maybe why there were some questions where there is no difference between pre-intervention and post-intervention.

To conclude, the intervention done on OSH management to the students were effective enough because of there were difference between pre-intervention and post intervention. Although not all questions showed difference, but half of the questions show difference thus show that the intervention done were effective. As mentioned before, although the safety talk and lecture were the least engaging method, however it still achieved 0.63 for the mean overall effects associated with safety and health training interventions (Burke, et al., 2006). Thus, the objective three was achieved.

#### **4.6 Limitation of Study**

There were problems faced throughout the whole research process were done. First problem faced would be the inadequate sample size. Due to the schedule of the vocational college, only first year students and small numbers of second year students can participate in the intervention programme. This caused the sample to lack 69 more samples. Second problem happened after the intervention were conducted. The returned questionnaires were only 153 instead of 200 as in the pre-intervention. These may be because the students thought it was unnecessary to give back the questionnaires as the previous session had also used the same questionnaires. It may also due to miscommunication from researcher causing the students not returning the questionnaire back.

## **CHAPTER 5**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1 Introduction**

This chapter is the final chapter of this thesis. The conclusion part will summarize each objective briefly and its finding and ultimately give the conclusion of whole thesis. Meanwhile, the recommendation part is the part where there would better improvement suggestion for the vocational college involved and others in term of occupational safety and health management.

#### **5.2 Conclusion**

To conclude, for first objectives was to determine the level of implementation of occupational safety and health management. The level of implementation was also above the average but there was still room for improvement needed according to the elements in the college. Second was to measure level of knowledge and awareness of the students on occupational safety and health management. The result were the students had more than average level of knowledge and awareness on occupational safety and health. These might due to little experienced on encountering risks and hazard and less information on occupational safety and health management. Lastly, to measure effectiveness of the intervention on occupational safety and health management in the vocational college. The result showed that more than half of the questionnaires show differences due to intervention. There is difference between pre-intervention and post-intervention thus the intervention done to the students on occupational safety and health management was effective.

### **5.3 Recommendations**

It is important for the students to gain more knowledge and awareness on occupational safety and health management in vocational college to ensure the soon-will-be young workers can really adapt themselves in working life. This were the main purpose of this study; to ensure that the soon young workers can work comfortably knowing their rights while working and also taking care of themselves and others. The earlier the students were exposed to occupational safety and health management, the better, and the more prepared they will be when encountering risks and hazards.

#### **5.3.1 Safety Education Improvement in School**

To ensure students gain more knowledge and awareness on occupational safety and health management, it should start from the basic, the school. First, government or other responsible team should encourage of, or reinforce, a whole school approach, within the wider community to be involved in school safety. By gaining attention from outsiders, either parents or not can actively participate in ensuring the knowledge and awareness can be spread further. The main point in letting others joining the hype was to ensure they know what they need to know. Just because someone had 10 years' experience, he or she cannot really know everything. By doing this school can gain more support in ensuring the occupational safety and health management can be carry out smoothly.

Second, for teachers or educators, they need to try to use active approaches to teaching and learning including interactive and experiential learning. By doing this, students will be more prone to participate in any occupational safety and health management programmes. Besides, in school they can involve young people in real decisions to help them stay safe such as risk assessments for school visits. They will also learn what risks are and how to avoid or lessen it. The schools also need to ensure they do assess children and young people's learning needs so that the educators know what were need to be catered. After that, teaching safety as part of a comprehensive personal social and health curriculum and use realistic and relevant settings and resources when carrying out teaching and learning process. The responsible person also should address known risk and protective factors. An understanding of risk and protective factors can help those designing and delivering safety education resources to

focus on wider aspects of injury prevention and personal safety. The school also should address psychosocial aspects of safety e.g. confidence, resilience, self-esteem, self-sufficiency. Psychosocial risk and protective factors are individual characteristics that may predispose children to injury or to being a victim of bullying, violence or abuse and lastly, adopt positive approaches which model and reward safe behaviour, within a safe, supportive environment (RoSPA, 2012).

### **5.3.2 Effectiveness of Occupational Safety and Health Education and Training**

Based on the research done by the Institute for Work and Health (2010), there is strong evidence shown that the effectiveness of occupational safety and health training on targeted occupational safety and health behaviours of workers. Meaning that to change unsafe behaviours or to implement targeted occupational safety and health behaviours, occupational safety and health training was the most effective way. This method can be implemented in the school by inviting occupational safety and health practitioners from any government agencies to give training to students and also the teachers in the school, by giving out train, students and teachers can benefit from the training and may lessen occupational safety and health incidents in school or even work place in the future.

The research also stated that the effects observed for knowledge and attitudes and beliefs were consistently positive with the evidence on behaviours, though there was insufficient evidence on the effectiveness of training on knowledge and attitudes and beliefs since there were too few studies on the subject. However, board of school should take nay method to ensure their students were safe in the school and while working in the future. By that, the training should be given to the students and even the teachers so that the students can implement their knowledge while working in the future and the teachers can implement the occupational safety and health management more smoothly. Inevitably, students will gain more knowledge and maybe spread it to others too. The school also can adapt buddy system by having a number of students to go through the training and share it back with their other friends at the school.

Lastly, as mentioned before in Chapter 4, there are three types of level engagement training on occupational safety and health, high engagement training, medium engagement training and low engagement training. The research mentioned

that there was insufficient evidence that high engagement training on occupational safety and health is more effective compared to medium or low engagement training on occupational safety and health training. However, school should try giving out all level engagement training on occupational safety and health to all of the students and teachers and measure the results themselves which level of engagement training is suitable for the students and the teachers. By carrying out these activities, the school can manage their own training afterwards based on the performances of the students and teachers.

### **5.3.3 Revised Occupational Safety and Health Management System (OSHMS) in School**

All OSHMS that had been implemented at school should be revised back to ensure that the OSHMS implemented at school was suitable for the school. The OSHMS implemented should be understood and knew by everyone since it was one of the important key in ensuring the OSHMS implementation was effective enough to the school. SWOT Analysis can be used to analyse the implementation of OSHMS. By utilising its strength, defeating its weaknesses, availing its opportunities and opposing or justify its threat, educational institution can take a decision to develop and implement successful OSHMS (Subhani, 2010).

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## APPENDIX A

The checklist below was adopted from Victorian Trades Hall Council (Victorian Trades Hall Council, 2018).



# Working Environments

### Key:

1            2            3            4            5  
 Poor        Satisfactory        Good

### BUILDINGS AND STRUCTURES

	1	2	3	4	5
1. Presence and condition of asbestos					
2. Condition of roofs, ceilings, walls, floors, doors, etc.					
3. Condition of windows and locks					
4. Condition of playground equipment					
5. Condition of fencing, water tanks, football posts, basketball structures					
6. Overhead power lines, e.g. near trees etc.					
7. Water tanks in good condition, e.g. no leaks, blocks					

### CLASSROOMS

	1	2	3	4	5
8. Enough space for staff to carry out their duties					
9. Adequate storage, e.g. cupboards, shelving, in room for class requirements					
10. Floors, walkways, entrances and exits free from obstruction					
11. Electrical leads or cables off the floor and away from walkways					
12. Computer cables/leads secured and not on floors, work area					
13. Carpets, tiles in good repair. No broken tiles or holes					
14. Folders, brief cases, bags off the floor and out of passageway					
15. Lighting levels adequate					
16. Exits and entries free from hazards					
17. Fire extinguishers readily accessible, their location known, and checked regularly					
18. Classroom tables and chairs at appropriate heights					
19. Condition of roofs, ceilings, walls floors, doors, etc.					

- 20. Condition of windows and locks
- 21. Ergonomic principles followed, e.g. seating, bench height, chairs, screen glare etc.


## COMPUTER WORKSTATIONS

- 22. Ergonomic principles, e.g. seating, bench height, chairs, screen glare etc.
- 23. Copying machines, e.g. ventilation, gases, chemicals, as per the WorkSafe Guidelines

1	2	3	4	5

## ELECTRICAL EQUIPMENT

- 24. Serviceability of light fittings
- 25. Serviceability of power outlets and leads
- 26. Adequacy of power outlets (quantity and rating)
- 27. Accessibility of circuit breakers or fuses and main switch
- 28. Labelling of fuses, circuit breakers and main switches
- 29. Periodic maintenance
- 30. Electric shock resuscitation drill, notices and instructions
- 31. Electric leads or cables off the floor and away from walkways

1	2	3	4	5

## FIRST AID AND HYGIENE

- 32. Organised as per the First Aid Code of Practice
- 33. First aid kits fully equipped and available, and their location known to all staff
- 34. First aid training to appropriate workplace level
- 35. Stretchers in position
- 36. Health and Hygiene taught in the school curriculum
- 37. Adequate supply of soap, towels, etc.

1	2	3	4	5

## FOOD PREPARATION AND HANDLING

- 38. Canteen workers aware of guidelines laid down in H&CS, Personal Hygiene for People Working With Food, Hygienic, Food Preparation and Handling, Safe Food Storage and Displaying, Food Poisoning - and How to Prevent It and Food Premises Code
- 39. Hands washed thoroughly
- 40. All cuts or wounds covered with a waterproof bandage (cover hand also with glove)
- 41. Food handling staff, if suffering from diseases which are likely to be transmitted through food must not work

1	2	3	4	5

- 42. Long hair tied back or covered
- 43. Protective clothing worn over normal clothes
- 44. Equipment used washed thoroughly
- 45. All fruit and vegetables washed in clean water and in own sink
- 46. For cooked or ready-to-eat food, utensils such as tongs, spoons, spatulas or disposable gloves used
- 47. Raw foods stored below cooked foods in refrigerator
- 48. Cooked and ready-to-eat foods separate from raw foods
- 49. Fixed temperature measurement devices on refrigerators and freezers
- 50. Food storage containers clean and in good repair


## MACHINERY

- 51. No unguarded nip points
- 52. Guards securely fitted

1	2	3	4	5

### Emergency Stop Button

- 53. Tested
- 54. Identified
- 55. Red mushroom type
- 56. Easily accessible to operate

1	2	3	4	5

## TOOLS

### Correct Use

- 57. Used for purpose for which they are designed
- 58. Not extended or used beyond design capability
- 59. Sharp tools used away from the body
- 60. Job always held securely
- 61. Used according to acceptable practice
- 62. Stored in suitable area
- 63. Locked away when not in use

1	2	3	4	5

### Condition - Hand Tools

- 64. Handles free from cracks, breakage, etc.
- 65. Handles secure
- 66. Impact point in good condition free from chips, burrs, etc.
- 67. Blades sharp/square
- 68. Regularly cleaned/maintained
- 69. Insulation in good condition

1	2	3	4	5







## TOILETS AND DRINKING TAPS

- 142. Clean and in good working order, e.g. no leaks, no litter
- 143. Adequate numbers to meet school requirements
- 158 Broken or damaged amenities replaced
- 159. Regular inspections carried out

1	2	3	4	5

### COMMENTS

### PRIORITIES

Use welding workshop.	
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**APPENDIX B**



**No. Respondent**

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**FAKULTI TEKNOLOGI KEJURUTERAAN  
RESEARCH QUESTIONS**

**AN INTERVENTION STUDY ON OSH MANAGEMENT IN  
VOCATIONAL COLLEGE IN PERAK**

**2018/2019**

AGE: \_\_\_\_\_ GENDER: \_\_\_\_\_ COURSE: \_\_\_\_\_

Part A

<b>Q1</b>					
Have you ever heard of FMA 1967?	<b>Not probable</b>	<b>Somewhat improbable</b>	<b>Neutral</b>	<b>Somewhat probable</b>	<b>Very probable</b>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>Q2</b>					
Have you heard of OSHA 1994?	<b>Not probable</b>	<b>Somewhat improbable</b>	<b>Neutral</b>	<b>Somewhat probable</b>	<b>Very probable</b>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>Q3</b>					
Will you use any kind of machine even if the machine can be deem broken?	<b>Not probable</b>	<b>Somewhat improbable</b>	<b>Neutral</b>	<b>Somewhat probable</b>	<b>Very probable</b>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>Q4</b>					
Is there any fire drill carried out throughout this year?	<b>Not probable</b>	<b>Somewhat improbable</b>	<b>Neutral</b>	<b>Somewhat probable</b>	<b>Very probable</b>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>Q5</b>					
Have you involved in any safety programs done by school?	<b>Not probable</b>	<b>Somewhat improbable</b>	<b>Neutral</b>	<b>Somewhat probable</b>	<b>Very probable</b>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q6**

Is there any safety committee in your school?

Not probable

Somewhat improbable

Neutral

Somewhat probable

Very probable

**Q7**

Do you feel safe studying in this school?

Not probable

Somewhat improbable

Neutral

Somewhat probable

Very probable

**Q8**

Are there any safety programs done in your school?

Not probable

Somewhat improbable

Neutral

Somewhat probable

Very probable

**Q9**

Have ever been exposed to first aid training?

Not probable

Somewhat improbable

Neutral

Somewhat probable

Very probable

**Q10**

Is there any safety briefing before carrying out any work?

Not probable

Somewhat improbable

Neutral

Somewhat probable

Very probable

**Part B**

<b>Q11</b>					
How much do you know about FMA 1967?	<b>Definitely</b>	<b>Very Probably</b>	<b>Probably</b>	<b>Probably Not</b>	<b>Definitely Not</b>
	<input type="radio"/>				

<b>Q12</b>					
How much do you know about OSHA 1994?	<b>Definitely</b>	<b>Very Probably</b>	<b>Probably</b>	<b>Probably Not</b>	<b>Definitely Not</b>
	<input type="radio"/>				

<b>Q13</b>					
Do you know what OSH management is?	<b>Definitely</b>	<b>Very Probably</b>	<b>Probably</b>	<b>Probably Not</b>	<b>Definitely Not</b>
	<input type="radio"/>				

<b>Q14</b>					
Do you know how to use the fire extinguisher?	<b>Definitely</b>	<b>Very Probably</b>	<b>Probably</b>	<b>Probably Not</b>	<b>Definitely Not</b>
	<input type="radio"/>				

<b>Q15</b>					
Do you know whom to inform during emergency situation?	<b>Definitely</b>	<b>Very Probably</b>	<b>Probably</b>	<b>Probably Not</b>	<b>Definitely Not</b>
	<input type="radio"/>				

**Q16**

**Do you know  
NIOSH?**

**Definitely**

**Very  
Probably**

**Probably**

**Probably  
Not**

**Definitely  
Not**

**Q17**

**Do you know DOSH?**

**Definitely**

**Very  
Probably**

**Probably**

**Probably  
Not**

**Definitely  
Not**

**Q18**

**Do you know where  
the assembly point  
and the escape route  
are?**

**Definitely**

**Very  
Probably**

**Probably**

**Probably  
Not**

**Definitely  
Not**

**Q19**

**Do you know the  
function of the safety  
committee in your  
school?**

**Definitely**

**Very  
Probably**

**Probably**

**Probably  
Not**

**Definitely  
Not**

**Q20**

**Do you know how to  
use first aid kit?**

**Definitely**

**Very  
Probably**

**Probably**

**Probably  
Not**

**Definitely  
Not**

**Q21**

**Do you know about PPE?**

**Definitely**

**Very Probably**

**Probably**

**Probably Not**

**Definitely Not**

**Q22**

**Does your teacher use PPE when using hardware tools?**

**Every time**

**Almost every time**

**Occasionally**

**Almost never**

**Never**

**Q23**

**Do you use PPE when using hardware tools?**

**Every time**

**Almost every time**

**Occasionally**

**Almost never**

**Never**

**Q24**

**Are there any inspections done to the machine?**

**Every time**

**Almost every time**

**Occasionally**

**Almost never**

**Never**

**Q25**

**Did your teacher explain the importance of PPE?**

**A great deal**

**A moderate**

**Occasionally**

**Rarely**

**Never**

## APPENDIX C

### STATISTICAL PACKAGE SOCIAL SCIENCE (SPSS) OUTPUT FOR QUESTIONNAIRE

	Age	Gender	Course	Q1	Q2	Q3
N Valid	200	200	200	200	200	200
Missing	0	0	0	0	0	0
Mean	16.16	1.24	4.41	4.05	3.36	4.59
Median	16.00	1.00	4.00	4.00	3.00	5.00
Mode	16	1	3	5	3	5
Std. Deviation	.402	.428	2.203	1.050	1.156	.804
Variance	.162	.183	4.855	1.103	1.337	.646
Minimum	14	1	1	1	1	1
Maximum	17	2	8	5	5	5
Sum	3231	248	881	810	672	917

		Q4	Q5	Q6	Q7	Q8	Q9	Q10
N Valid		200	200	200	200	200	200	200
Missing		0	0	0	0	0	0	0
Mean		2.62	3.28	2.46	3.78	2.75	3.12	3.93
Median		2.00	3.00	2.00	4.00	3.00	3.00	4.00
Mode		1	3	1	3	3	3	5
Std. Deviation		1.476	1.273	1.295	1.034	1.181	1.233	1.091
Variance		2.178	1.620	1.676	1.070	1.394	1.519	1.191
Minimum		1	1	1	1	1	1	1
Maximum		5	5	5	5	5	5	5
Sum		523	656	491	755	550	623	786

		Q11	Q12	Q13	Q14	Q15	Q16	Q17
N Valid		200	200	200	200	200	200	200
Missing		0	0	0	0	0	0	0
Mean		3.48	2.77	2.96	2.07	4.22	3.65	3.63
Median		3.00	2.00	4.00	1.00	5.00	3.00	3.00
Mode		3	2	4	1	5	3	3
Std. Deviation		.929	1.251	1.346	1.332	1.178	1.056	1.044
Variance		.864	1.565	1.812	1.774	1.389	1.115	1.090
Minimum		1	1	1	1	1	1	1
Maximum		5	5	5	5	5	5	5
Sum		695	554	591	414	844	729	725

	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25
N	200	200	200	200	200	200	200	200
	0	0	0	0	0	0	0	0
Mean	3.60	2.82	2.74	3.25	3.41	3.20	3.59	3.70
Median	4.00	3.00	2.00	3.00	4.00	3.00	4.00	4.00
Mode	5	4	4	2	4	3	3	5
Std. Deviation	1.404	1.397	1.458	1.366	1.182	1.169	.953	1.156
Variance	1.971	1.951	2.125	1.867	1.398	1.367	.907	1.337
Minimum	1	1	1	1	1	1	1	1
Maximum	5	5	5	5	5	5	5	5
Sum	719	563	547	650	681	640	717	740

### WILCOXON RANK-SUM TEST

#### NPar Tests

#### Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
PreQ1	269	4.06	1.046	1	5
PreQ2	269	3.38	1.132	1	5
PreQ3	269	4.61	.767	1	5
PreQ4	269	2.77	1.503	1	5
PreQ5	269	3.22	1.278	1	5
PreQ6	269	2.42	1.298	1	5
PreQ7	269	3.80	1.028	1	5
PreQ8	269	2.63	1.205	1	5
PreQ9	269	3.05	1.242	1	5
PreQ10	269	3.92	1.064	1	5
PreQ11	269	3.50	.904	1	5
PreQ12	269	2.77	1.249	1	5
PreQ13	269	2.91	1.364	1	5
PreQ14	269	2.06	1.334	1	5
PreQ15	269	4.25	1.159	1	5
PreQ16	269	3.68	1.049	1	5
PreQ17	269	3.62	1.046	1	5
PreQ18	269	3.64	1.422	1	5
PreQ19	269	2.81	1.382	1	5
PreQ20	269	2.73	1.465	1	5
PreQ21	269	3.25	1.380	1	5
PreQ22	269	3.44	1.143	1	5

PreQ23	269	3.25	1.127	1	5
PreQ24	269	3.59	.975	1	5
PreQ25	269	3.69	1.146	1	5
POSTQ1	269	2.50	.751	1	5
POSTQ2	269	3.97	.889	3	5
POSTQ3	269	4.81	.432	3	5
POSTQ4	269	2.29	1.086	1	4
POSTQ5	269	2.56	.877	1	4
POSTQ6	269	2.73	1.260	1	5
POSTQ7	269	4.15	.890	3	5
POSTQ8	269	2.47	.500	2	3
POSTQ9	269	3.29	1.039	1	5
POSTQ10	269	3.85	1.461	1	5
POSTQ11	269	3.12	1.235	1	5
POSTQ12	269	3.78	1.330	1	5
POSTQ13	269	2.16	1.055	1	4
POSTQ14	269	1.67	1.120	1	4
POSTQ15	269	4.76	.429	4	5
POSTQ16	269	3.42	1.025	1	4
POSTQ17	269	3.62	.785	2	4
POSTQ18	269	3.62	1.498	2	5
POSTQ19	269	2.48	1.154	1	4
POSTQ20	269	2.84	1.231	1	5
POSTQ21	269	4.58	.494	4	5
POSTQ22	269	3.62	1.218	1	5
POSTQ23	269	3.63	1.372	1	5
POSTQ24	269	4.14	.981	2	5
POSTQ25	269	3.97	1.359	1	5

### Wilcoxon Signed Rank Test

		Ranks		
		N	Mean Rank	Sum of Ranks
POSTQ1 - PreQ1	Negative Ranks	207 <sup>a</sup>	119.65	24767.50
	Positive Ranks	21 <sup>b</sup>	63.74	1338.50
	Ties	41 <sup>c</sup>		
	Total	269		
POSTQ2 - PreQ2	Negative Ranks	58 <sup>d</sup>	88.29	5121.00
	Positive Ranks	139 <sup>e</sup>	103.47	14382.00
	Ties	72 <sup>f</sup>		
	Total	269		

POSTQ3 - PreQ3	Negative Ranks	41 <sup>g</sup>	44.18	1811.50
	Positive Ranks	64 <sup>h</sup>	58.65	3753.50
	Ties	164 <sup>i</sup>		
	Total	269		
POSTQ4 - PreQ4	Negative Ranks	126 <sup>j</sup>	117.98	14865.50
	Positive Ranks	86 <sup>k</sup>	89.68	7712.50
	Ties	57 <sup>l</sup>		
	Total	269		
POSTQ5 - PreQ5	Negative Ranks	147 <sup>m</sup>	111.06	16325.50
	Positive Ranks	61 <sup>n</sup>	88.70	5410.50
	Ties	61 <sup>o</sup>		
	Total	269		
POSTQ6 - PreQ6	Negative Ranks	91 <sup>p</sup>	102.33	9312.00
	Positive Ranks	124 <sup>q</sup>	112.16	13908.00
	Ties	54 <sup>r</sup>		
	Total	269		
POSTQ7 - PreQ7	Negative Ranks	71 <sup>s</sup>	79.89	5672.50
	Positive Ranks	113 <sup>t</sup>	100.42	11347.50
	Ties	85 <sup>u</sup>		
	Total	269		
POSTQ8 - PreQ8	Negative Ranks	108 <sup>v</sup>	100.90	10897.00
	Positive Ranks	88 <sup>w</sup>	95.56	8409.00
	Ties	73 <sup>x</sup>		
	Total	269		
POSTQ9 - PreQ9	Negative Ranks	88 <sup>y</sup>	101.72	8951.50
	Positive Ranks	120 <sup>z</sup>	106.54	12784.50
	Ties	61 <sup>aa</sup>		
	Total	269		
POSTQ10 - PreQ10	Negative Ranks	87 <sup>ab</sup>	109.07	9489.00
	Positive Ranks	104 <sup>ac</sup>	85.07	8847.00
	Ties	78 <sup>ad</sup>		
	Total	269		
POSTQ11 - PreQ11	Negative Ranks	120 <sup>ae</sup>	135.60	16272.50
	Positive Ranks	105 <sup>af</sup>	87.17	9152.50
	Ties	44 <sup>ag</sup>		
	Total	269		
POSTQ12 - PreQ12	Negative Ranks	49 <sup>ah</sup>	84.15	4123.50
	Positive Ranks	158 <sup>ai</sup>	110.16	17404.50
	Ties	62 <sup>aj</sup>		
	Total	269		
POSTQ13 - PreQ13	Negative Ranks	141 <sup>ak</sup>	108.01	15229.00

	Positive Ranks	59 <sup>al</sup>	82.56	4871.00
	Ties	69 <sup>am</sup>		
	Total	269		
POSTQ14 - PreQ14	Negative Ranks	103 <sup>an</sup>	76.08	7836.00
	Positive Ranks	50 <sup>ao</sup>	78.90	3945.00
	Ties	116 <sup>ap</sup>		
	Total	269		
POSTQ15 - PreQ15	Negative Ranks	47 <sup>aq</sup>	51.00	2397.00
	Positive Ranks	99 <sup>ar</sup>	84.18	8334.00
	Ties	123 <sup>as</sup>		
	Total	269		
POSTQ16 - PreQ16	Negative Ranks	136 <sup>at</sup>	130.93	17806.00
	Positive Ranks	108 <sup>au</sup>	111.89	12084.00
	Ties	25 <sup>av</sup>		
	Total	269		
POSTQ17 - PreQ17	Negative Ranks	111 <sup>aw</sup>	118.75	13181.50
	Positive Ranks	120 <sup>ax</sup>	113.45	13614.50
	Ties	38 <sup>ay</sup>		
	Total	269		
POSTQ18 - PreQ18	Negative Ranks	83 <sup>az</sup>	96.16	7981.00
	Positive Ranks	94 <sup>ba</sup>	82.68	7772.00
	Ties	92 <sup>bb</sup>		
	Total	269		
POSTQ19 - PreQ19	Negative Ranks	116 <sup>bc</sup>	100.19	11622.00
	Positive Ranks	76 <sup>bd</sup>	90.87	6906.00
	Ties	77 <sup>be</sup>		
	Total	269		
POSTQ20 - PreQ20	Negative Ranks	89 <sup>bf</sup>	96.98	8631.50
	Positive Ranks	102 <sup>bg</sup>	95.14	9704.50
	Ties	78 <sup>bh</sup>		
	Total	269		
POSTQ21 - PreQ21	Negative Ranks	25 <sup>bi</sup>	34.00	850.00
	Positive Ranks	170 <sup>bj</sup>	107.41	18260.00
	Ties	74 <sup>bk</sup>		
	Total	269		
POSTQ22 - PreQ22	Negative Ranks	84 <sup>bl</sup>	96.29	8088.50
	Positive Ranks	111 <sup>bm</sup>	99.29	11021.50
	Ties	74 <sup>bn</sup>		
	Total	269		
POSTQ23 - PreQ23	Negative Ranks	78 <sup>bo</sup>	99.17	7735.50
	Positive Ranks	131 <sup>bp</sup>	108.47	14209.50

	Ties	60 <sup>bq</sup>		
	Total	269		
POSTQ24 - PreQ24	Negative Ranks	57 <sup>br</sup>	91.25	5201.50
	Positive Ranks	141 <sup>bs</sup>	102.83	14499.50
	Ties	71 <sup>bt</sup>		
	Total	269		
POSTQ25 - PreQ25	Negative Ranks	74 <sup>bu</sup>	108.56	8033.50
	Positive Ranks	127 <sup>bv</sup>	96.59	12267.50
	Ties	68 <sup>bw</sup>		
	Total	269		

a. POSTQ1 < PreQ1

b. POSTQ1 > PreQ1

c. POSTQ1 = PreQ1

d. POSTQ2 < PreQ2

e. POSTQ2 > PreQ2

f. POSTQ2 = PreQ2

g. POSTQ3 < PreQ3

h. POSTQ3 > PreQ3

i. POSTQ3 = PreQ3

j. POSTQ4 < PreQ4

k. POSTQ4 > PreQ4

l. POSTQ4 = PreQ4

m. POSTQ5 < PreQ5

n. POSTQ5 > PreQ5

o. POSTQ5 = PreQ5

p. POSTQ6 < PreQ6

q. POSTQ6 > PreQ6

r. POSTQ6 = PreQ6

s. POSTQ7 < PreQ7

t. POSTQ7 > PreQ7

u. POSTQ7 = PreQ7

v. POSTQ8 < PreQ8

w. POSTQ8 > PreQ8

x. POSTQ8 = PreQ8

y. POSTQ9 < PreQ9

z. POSTQ9 > PreQ9

aa. POSTQ9 = PreQ9

ab. POSTQ10 < PreQ10

ac. POSTQ10 > PreQ10

ad. POSTQ10 = PreQ10

ae. POSTQ11 < PreQ11

af. POSTQ11 > PreQ11

ag.  $\text{POSTQ11} = \text{PreQ11}$   
ah.  $\text{POSTQ12} < \text{PreQ12}$   
ai.  $\text{POSTQ12} > \text{PreQ12}$   
aj.  $\text{POSTQ12} = \text{PreQ12}$   
ak.  $\text{POSTQ13} < \text{PreQ13}$   
al.  $\text{POSTQ13} > \text{PreQ13}$   
am.  $\text{POSTQ13} = \text{PreQ13}$   
an.  $\text{POSTQ14} < \text{PreQ14}$   
ao.  $\text{POSTQ14} > \text{PreQ14}$   
ap.  $\text{POSTQ14} = \text{PreQ14}$   
aq.  $\text{POSTQ15} < \text{PreQ15}$   
ar.  $\text{POSTQ15} > \text{PreQ15}$   
as.  $\text{POSTQ15} = \text{PreQ15}$   
at.  $\text{POSTQ16} < \text{PreQ16}$   
au.  $\text{POSTQ16} > \text{PreQ16}$   
av.  $\text{POSTQ16} = \text{PreQ16}$   
aw.  $\text{POSTQ17} < \text{PreQ17}$   
ax.  $\text{POSTQ17} > \text{PreQ17}$   
ay.  $\text{POSTQ17} = \text{PreQ17}$   
az.  $\text{POSTQ18} < \text{PreQ18}$   
ba.  $\text{POSTQ18} > \text{PreQ18}$   
bb.  $\text{POSTQ18} = \text{PreQ18}$   
bc.  $\text{POSTQ19} < \text{PreQ19}$   
bd.  $\text{POSTQ19} > \text{PreQ19}$   
be.  $\text{POSTQ19} = \text{PreQ19}$   
bf.  $\text{POSTQ20} < \text{PreQ20}$   
bg.  $\text{POSTQ20} > \text{PreQ20}$   
bh.  $\text{POSTQ20} = \text{PreQ20}$   
bi.  $\text{POSTQ21} < \text{PreQ21}$   
bj.  $\text{POSTQ21} > \text{PreQ21}$   
bk.  $\text{POSTQ21} = \text{PreQ21}$   
bl.  $\text{POSTQ22} < \text{PreQ22}$   
bm.  $\text{POSTQ22} > \text{PreQ22}$   
bn.  $\text{POSTQ22} = \text{PreQ22}$   
bo.  $\text{POSTQ23} < \text{PreQ23}$   
bp.  $\text{POSTQ23} > \text{PreQ23}$   
bq.  $\text{POSTQ23} = \text{PreQ23}$   
br.  $\text{POSTQ24} < \text{PreQ24}$   
bs.  $\text{POSTQ24} > \text{PreQ24}$   
bt.  $\text{POSTQ24} = \text{PreQ24}$   
bu.  $\text{POSTQ25} < \text{PreQ25}$   
bv.  $\text{POSTQ25} > \text{PreQ25}$   
bw.  $\text{POSTQ25} = \text{PreQ25}$

**Test**

**Statistics<sup>a</sup>**

	POSTQ1 - PreQ1	POSTQ2 - PreQ2	POSTQ3 - PreQ3	POSTQ4 - PreQ4	POSTQ5 - PreQ5	POSTQ6 - PreQ6	POSTQ7 - PreQ7	POSTQ8 - PreQ8	POSTQ9 - PreQ9	POSTQ10 - PreQ10	POSTQ11 - PreQ11	POSTQ12 - PreQ12	POSTQ13 - PreQ13
Z	-11.911 <sup>b</sup>	-5.921 <sup>c</sup>	-3.276 <sup>c</sup>	-4.061 <sup>b</sup>	-6.400 <sup>b</sup>	-2.561 <sup>c</sup>	-4.020 <sup>c</sup>	-1.624 <sup>b</sup>	-2.252 <sup>c</sup>	-.426 <sup>b</sup>	-3.791 <sup>b</sup>	-7.779 <sup>c</sup>	-6.412 <sup>b</sup>
Asymp. Sig. (2-tailed)	.000	.000	.001	.000	.000	.010	.000	.104	.024	.670	.000	.000	.000
	POSTQ14 - PreQ14	POSTQ15 - PreQ15	POSTQ16 - PreQ16	POSTQ17 - PreQ17	POSTQ18 - PreQ18	POSTQ19 - PreQ19	POSTQ20 - PreQ20	POSTQ21 - PreQ21	POSTQ22 - PreQ22	POSTQ23 - PreQ23	POSTQ24 - PreQ24	POSTQ25 - PreQ25	
Z	-3.599 <sup>b</sup>	-6.057 <sup>c</sup>	-2.778 <sup>b</sup>	-.231 <sup>c</sup>	-.157 <sup>b</sup>	-3.104 <sup>b</sup>	-.710 <sup>c</sup>	-11.168 <sup>c</sup>	-1.907 <sup>c</sup>	-3.778 <sup>c</sup>	-5.902 <sup>c</sup>	-2.603 <sup>c</sup>	
Asymp. Sig. (2-tailed)	.000	.000	.005	.818	.875	.002	.478	.000	.057	.000	.000	.009	

a. Wilcoxon  
Signed Ranks

Test

b. Based on  
positive  
ranks.

c. Based on  
negative  
ranks.

## APPENDIX D

### CRONBACH'S ALPHA TEST

#### Case Processing Summary

		N	%
Cases	Valid	15	100.0
	Excluded <sup>a</sup>	0	.0
	Total	15	100.0

a. Listwise deletion based on all variables in the procedure.

#### Reliability Statistic

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.702	.662	25

#### Item – Total Statistic

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Pernahkan anda mendengar tentang FMA 1967?	90.87	40.124	.518	.	.665
Pernahkan anda mendengar tentang OSHA 1994?	90.40	43.400	.422	.	.681

Adakah anda akan terus menggunakan mesin yang kelihatan rosak?	90.60	44.829	.186	.	.699
Sepanjang tahun ini, adakah latihan kebakaran pernah dijalankan di sekolah anda?	91.20	44.600	.328	.	.688
Pernahkah anda terlibat dengan mana – mana program keselamatan yang dijalankan di sekolah anda?	91.40	49.257	-.172	.	.739
Adakah sekolah anda mempunyai jawatankuasa keselamatan?	90.07	43.638	.451	.	.680
Adakah anda berasa selamat belajar di sekolah ini?	91.40	49.114	-.182	.	.723
Pernahkan program keselamatan dijalankan di sekolah anda?	91.40	44.829	.264	.	.692
Pernahkah anda didedahkan dengan latihan pertolongan cemas?	89.87	47.981	-.063	.	.711
Adakah taklimat keselamatan diberikan sebelum melakukan apa – apa kerja di bengkel?	91.47	41.410	.345	.	.684
Sejauh manakah anda tahu mengenai FMA 1967?	90.47	42.981	.493	.	.676
Sejauh manakah anda tahu mengenai OSHA 1994?	91.33	45.667	.289	.	.693
Adakah anda tahu apa itu pengurusan Keselamatan dan Kesihatan Pekerjaan?	89.93	48.924	-.207	.	.715
Adakah anda tahu cara untuk menggunakan pemadam api?	91.33	46.238	.081	.	.707

Adakah anda tahu kepada siapa anda perlu maklumkan jika berlaku kecemasan?	90.67	42.095	.524	.	.671
Adakah anda tahu apa itu NIOSH?	91.60	45.686	.171	.	.699
Adakah anda tahu apa itu DOSH?	90.60	45.829	.156	.	.700
Adakah anda tahu di mana tempat berkumpul dan jalan keluar sekiranya berlaku kecemasan?	91.73	42.924	.354	.	.683
Adakah anda tahu fungsi jawatankuasa keselamatan di sekolah anda?	89.73	49.067	-.366	.	.713
Adakah anda tahu cara menggunakan kit pertolongan cemas?	91.27	39.924	.468	.	.669
Adakah anda tahu apa itu kelengkapan perlindungan diri (PPE)?	90.73	41.352	.499	.	.670
Adakah guru anda menggunakan PPE ketika menggunakan alat perkakasan (hardware tools)?	91.67	40.524	.545	.	.664
Adakah anda menggunakan PPE ketika menggunakan alat perkakasan (hardware tools)?	91.13	47.267	.039	.	.705
Adakah sebarang pemeriksaan dilakukan ke atas mesin- mesin di bengkel?	90.13	44.124	.498	.	.681
Adakah guru anda menerangkan kepentingan kelengkapan perlindungan diri (PPE)?	91.00	43.429	.214	.	.699

## Frequency Table

### Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	14	1	.5	.5	.5
	16	166	83.0	83.0	83.5
	17	33	16.5	16.5	100.0
	Total	200	100.0	100.0	

### Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Boy	152	76.0	76.0	76.0
	Girl	48	24.0	24.0	100.0
	Total	200	100.0	100.0	

### Course

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 SUM BPP	17	8.5	8.5	8.5
	1 SUM BKP	22	11.0	11.0	19.5
	1 SVM ETN	42	21.0	21.0	40.5
	Teknologi Pembinaan	35	17.5	17.5	58.0
	1 SVM MPP	31	15.5	15.5	73.5
	1 SVM PPU	6	3.0	3.0	76.5
	1 SVM MPI	13	6.5	6.5	83.0
	2 SVM MTA	34	17.0	17.0	100.0
	Total	200	100.0	100.0	

### Pernahkah anda mendengar tentang FMA 1967?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sangat mungkin	4	2.0	2.0	2.0

	Sememangnya mungkin	11	5.5	5.5	7.5
	Biasa	48	24.0	24.0	31.5
	Sememangnya mungkin	45	22.5	22.5	54.0
	Tidak mungkin	92	46.0	46.0	100.0
	Total	200	100.0	100.0	

**Pernahkan anda mendengar tentang OSHA 1994?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tidak mungkin	20	10.0	10.0	10.0
	Agak mustahil	15	7.5	7.5	17.5
	Biasa	73	36.5	36.5	54.0
	Sememangnya mungkin	57	28.5	28.5	82.5
	Sangat mungkin	35	17.5	17.5	100.0
	Total	200	100.0	100.0	

**Adakah anda akan terus menggunakan mesin yang kelihatan rosak?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sangat mungkin	1	.5	.5	.5
	Sememangnya mungkin	7	3.5	3.5	4.0
	Biasa	13	6.5	6.5	10.5
	Sememangnya mungkin	32	16.0	16.0	26.5
	Tidak mungkin	147	73.5	73.5	100.0
	Total	200	100.0	100.0	

**Sepanjang tahun ini, adakah latihan kebakaran pernah dijalankan di sekolah anda?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tidak mungkin	70	35.0	35.0	35.0
	Agak mustahil	31	15.5	15.5	50.5
	Biasa	34	17.0	17.0	67.5
	Sememangnya mungkin	36	18.0	18.0	85.5
	Sangat mungkin	29	14.5	14.5	100.0
	Total	200	100.0	100.0	

**Pernakah anda terlibat dengan mana – mana program keselamatan yang dijalankan di sekolah anda?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sangat mungkin	19	9.5	9.5	9.5
	Sememangnya mungkin	36	18.0	18.0	27.5
	Biasa	63	31.5	31.5	59.0
	Sememangnya mungkin	34	17.0	17.0	76.0
	Tidak mungkin	48	24.0	24.0	100.0
	Total	200	100.0	100.0	

**Adakah sekolah anda mempunyai jawatankuasa keselamatan?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sangat mungkin	61	30.5	30.5	30.5
	Sememangnya mungkin	49	24.5	24.5	55.0
	Biasa	47	23.5	23.5	78.5
	Sememangnya mungkin	24	12.0	12.0	90.5
	Tidak mungkin	19	9.5	9.5	100.0
	Total	200	100.0	100.0	

**Adakah anda berasa selamat belajar di sekolah ini?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tidak mungkin	4	2.0	2.0	2.0
	Agak mustahil	15	7.5	7.5	9.5
	Biasa	65	32.5	32.5	42.0
	Sememangnya mungkin	54	27.0	27.0	69.0
	Sangat mungkin	62	31.0	31.0	100.0
	Total	200	100.0	100.0	

**Pernahkan program keselamatan dijalankan di sekolah anda?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sangat mungkin	34	17.0	17.0	17.0

Sememangnya mungkin	45	22.5	22.5	39.5
Biasa	81	40.5	40.5	80.0
Sememangnya mungkin	17	8.5	8.5	88.5
Tidak mungkin	23	11.5	11.5	100.0
Total	200	100.0	100.0	

**Pernakah anda didedahkan dengan latihan pertolongan cemas?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Sangat mungkin	27	13.5	13.5	13.5
Sememangnya mungkin	29	14.5	14.5	28.0
Biasa	69	34.5	34.5	62.5
Sememangnya mungkin	44	22.0	22.0	84.5
Tidak mungkin	31	15.5	15.5	100.0
Total	200	100.0	100.0	

**Adakah taklimat keselamatan diberikan sebelum melakukan apa – apa kerja di bengkel?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Tidak mungkin	5	2.5	2.5	2.5
Agak mustahil	13	6.5	6.5	9.0
Biasa	57	28.5	28.5	37.5
Sememangnya mungkin	41	20.5	20.5	58.0
Sangat mungkin	84	42.0	42.0	100.0
Total	200	100.0	100.0	

**Sejauh manakah anda tahu mengenai FMA 1967?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Pasti	5	2.5	2.5	2.5
Sangat mungkin	9	4.5	4.5	7.0
Tidak pasti	109	54.5	54.5	61.5
Mungkin	40	20.0	20.0	81.5
Mungkin tidak	37	18.5	18.5	100.0
Total	200	100.0	100.0	

**Sejauh manakah anda tahu mengenai OSHA 1994?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mungkin tidak	28	14.0	14.0	14.0
	Mungkin	77	38.5	38.5	52.5
	Tidak pasti	31	15.5	15.5	68.0
	Sangat mungkin	41	20.5	20.5	88.5
	Pasti	23	11.5	11.5	100.0
	Total	200	100.0	100.0	

**Adakah anda tahu apa itu pengurusan Keselamatan dan Kesihatan Pekerjaan?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pasti	44	22.0	22.0	22.0
	Sangat mungkin	40	20.0	20.0	42.0
	Tidak pasti	10	5.0	5.0	47.0
	Mungkin	93	46.5	46.5	93.5
	Mungkin tidak	13	6.5	6.5	100.0
	Total	200	100.0	100.0	

**Adakah anda tahu cara untuk menggunakan pemadam api?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pasti	101	50.5	50.5	50.5
	Sangat mungkin	43	21.5	21.5	72.0
	Tidak pasti	7	3.5	3.5	75.5
	Mungkin	39	19.5	19.5	95.0
	Mungkin tidak	10	5.0	5.0	100.0
	Total	200	100.0	100.0	

**Adakah anda tahu kepada siapa anda perlu maklumkan jika berlaku kecemasan?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mungkin tidak	7	3.5	3.5	3.5
	Mungkin	25	12.5	12.5	16.0

Tidak pasti	4	2.0	2.0	18.0
Sangat mungkin	45	22.5	22.5	40.5
Pasti	119	59.5	59.5	100.0
Total	200	100.0	100.0	

**Adakah anda tahu apa itu NIOSH?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Pasti	6	3.0	3.0	3.0
Sangat mungkin	6	3.0	3.0	6.0
Tidak pasti	105	52.5	52.5	58.5
Mungkin	19	9.5	9.5	68.0
Mungkin tidak	64	32.0	32.0	100.0
Total	200	100.0	100.0	

**Adakah anda tahu apa itu DOSH?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Pasti	6	3.0	3.0	3.0
Sangat mungkin	9	4.5	4.5	7.5
Tidak pasti	97	48.5	48.5	56.0
Mungkin	30	15.0	15.0	71.0
Mungkin tidak	58	29.0	29.0	100.0
Total	200	100.0	100.0	

**Adakah anda tahu di mana tempat berkumpul dan jalan keluar sekiranya berlaku kecemasan?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Mungkin tidak	9	4.5	4.5	4.5
Mungkin	64	32.0	32.0	36.5
Tidak pasti	7	3.5	3.5	40.0
Sangat mungkin	39	19.5	19.5	59.5
Pasti	81	40.5	40.5	100.0
Total	200	100.0	100.0	

**Adakah anda tahu fungsi jawatankuasa keselamatan di sekolah anda?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Pasti	50	25.0	25.0	25.0
Sangat mungkin	48	24.0	24.0	49.0
Tidak pasti	9	4.5	4.5	53.5
Mungkin	75	37.5	37.5	91.0
Mungkin tidak	18	9.0	9.0	100.0
Total	200	100.0	100.0	

**Adakah anda tahu cara menggunakan kit pertolongan cemas?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Pasti	57	28.5	28.5	28.5
Sangat mungkin	49	24.5	24.5	53.0
Tidak pasti	9	4.5	4.5	57.5
Mungkin	60	30.0	30.0	87.5
Mungkin tidak	25	12.5	12.5	100.0
Total	200	100.0	100.0	

**Adakah anda tahu apa itu kelengkapan perlindungan diri (PPE)?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Mungkin tidak	16	8.0	8.0	8.0
Mungkin	67	33.5	33.5	41.5
Tidak pasti	20	10.0	10.0	51.5
Sangat mungkin	45	22.5	22.5	74.0
Pasti	52	26.0	26.0	100.0
Total	200	100.0	100.0	

**Adakah guru anda menggunakan PPE ketika menggunakan alat perkakasan (hardware tools)?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Tidak pernah	22	11.0	11.0	11.0

Hampir tidak pernah	13	6.5	6.5	17.5
Kadang - kadang	63	31.5	31.5	49.0
Hampir setiap masa	66	33.0	33.0	82.0
Setiap masa	36	18.0	18.0	100.0
Total	200	100.0	100.0	

**Adakah sebarang pemeriksaan dilakukan ke atas mesin- mesin di bengkel?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Tidak pernah	6	3.0	3.0	3.0
Hampir tidak pernah	12	6.0	6.0	9.0
Kadang - kadang	77	38.5	38.5	47.5
Hampir setiap masa	69	34.5	34.5	82.0
Setiap masa	36	18.0	18.0	100.0
Total	200	100.0	100.0	

## APPENDIX E

PROJECT TASK	SEMESTER 1											SEMESTER 2																
	WEEK																											
Purpose of title	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
Understand a scope of study and propose a problem statement, research objective and research question																												
Literature Review																												
Develop methodology																												
Submission of proposal																												
Slide preparation for presentation																												
Data collections																												
Data analysis																												
Final report writing																												
Submission of final report																												