Addressing Ergonomic Hazard at the "Language Laboratory" in Universiti Malaysia Perlis (UniMAP) vis-à-vis the Occupational Safety and Health Act 1994

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Abstract- **The Centre of Communication & Entrepreneurship Skill (Pusat Kemahiran, Komunikasi dan Keusahawanan) or a.k.a. PKKK, UniMAP offer various language subjects to students. For effective learning these students have to make use of the language laboratory. In these Language Laboratories are present an array of interactive equipment and resources to enhance language learning and teaching. There are student and lecturer workstations. Conversely, at the Language Laboratory place of work, where the activity of teaching and learning takes place, students and the laboratory staffs etcetera undertaking these work activities are exposed to unsafe act, unsafe conditions and various hazards especially Ergonomic Hazard. Ergonomic hazards refer to workplace conditions that pose the risk of injury to the musculoskeletal system of the worker. Ergonomic hazards too take account of the repetitive and forceful movements, vibration, extremes temperature plus awkward postures that arise from improperly designed workstations, tools, equipment and improper work methods. These ergonomic hazards need to be managing to avoid accidents and occupational diseases at the workplace. A survey using risk analysis matrix will be conducted to ascertain the ergonomic hazards which affect the students and staffs undertaking teaching and learning at the language laboratory. Hence this paper endeavors to propagate to the students and staffs on the importance of understanding of the ergonomic hazard which effect their safety and health and the remedial actions to be taken vis-à-vis the Occupational Safety and Health Act (OSHA) 1994.**

Keywords- safety, **health, hazards, analysis matrix, OSHA 1994**

I. INTRODUCTION

At Universiti Malaysia Perlis (UniMAP) there are essentially 2 categories of courses – core course and university required courses. The core courses are courses directly related to students chosen discipline. On the other hand University required courses are those which are outside the engineering domin. The Centre of Communication & Entrepreneurship Skill (Pusat Kemahiran, Komunikasi dan Keusahawanan) or a.k.a. PKKK offers university required courses.

Languages courses falls under the category of university required courses. Hence PKKK offers various language subjects such as English, Malay, Arabic, Japanese ect. For effective learning of the above mention languages, these students have to make use of the Language Laboratory. The users of the language laboratory usually work in a special design room or confine rooms. Hence users undertaking these work activities are exposed to a variety of hazards. All these hazards must be managed in order to ensure a healthy and safe working environment through implementing of Occupational Safety and Health (OSH) Programmes. One of the programmes that can be undertaken is by "conducting Hazard Identification, Risk Analysis and Control (HIRAC) at the Language Laboratory.

II. OBJECTIVE

The objective of this paper is to:

a. To carry out Hazard Identification, Risk Analysis and Control (HIRAC) in the language lab to establish hazards especially ergonomic hazards.
b. To suggest remedial actions to be taken vis-à-vis the Occupational Safety and Health Act (OSHA) 1994.

III. LAWS AT THE WORKPLACE

In Malaysia, at the moment, the specific act and regulation which deals with the safety at the workplace is the "OSHA 1994". The OSHA 1994 is enforced by Department of Occupational Safety and Health (DOSH), a government department under the Ministry of Human Resources Malaysia. DOSH will ensure that employers, self-employed persons and all employees practice a good working culture and comply with existing legislation, guidelines and codes of practice through its enforcement and promotional activities.

OSHA 1994 applies throughout Malaysia. The Act specify the sectors of the industries which it applies i.e. [1]

a. Manufacturing.
b. Mining and Quarrying.
c. Construction
d. Agriculture, Forestry and Fishing
e. Utilities – Electricity; Gas; Water; and Sanitary Services
f. Transport, Storage and Communications
g. Wholesale and Retail Trade
h. Hotels and Restaurants
i. Finance, Insurance, Real Estate and Business Services
j. Public Services and Statutory Authorities

Under the OSHA, 1994, Section 3 (2) (b) specifies "to protect persons at a place of work other than persons at work against risks to safety and health arising out of the activities of persons at work"[2], and Section 3 (2) (c) to promote an occupational environment for persons at work which is adapted to their physiological and psychological needs[3]". These two sections define the role that ergonomic can play in ensuring the safety, health and welfare or workers.

The act further emphasis on the responsibility of both the employer. Section 15 states the "General duties of employers and self-employed persons to their employees" whereby it is the duty of every employer and every self-employed person to ensure the safety, health and welfare at work of all his employees. Thus the law requires the employer to carry out OSH Programmes at the workplace so as to ensure a favorable working environment.

IV. WORKING ENVIROMENT IN LANGUAGE LABORATORY

The users of the language laboratory usually work in a special design room or confine rooms. The room is design to include furniture's, an array of interactive equipment and resources to enhance language learning and teaching. There are student and lecturer or users computers workstation.

Conversely, at the Language Laboratory place of work, where the activity of teaching and learning takes place, users undertaking these work activities are exposed to hazard such as repetitive movements, unfavorable temperature plus uncomfortable workstations due to an array of reasons. These situations pose the risk of injury to the musculoskeletal system of the worker.

Apart from the aforementioned hazards, there are the unsafe act, unsafe conditions that prevails at the workplace. All these mentioned hazards plus other unforeseen hazards need to be managing to avoid industrial accidents and occupational diseases at the workplace. If these conditions are met, then conducive working situations prevail at the workplace.

V. CONDUCTING RISK MANAGEMENT

A survey is being conducted at the UniMAP Language Laboratory to determine the working conditions that exist in the laboratory and the counter measures to be undertaken to remedy those adverse situations if any. The survey is being conducted by utilizing the "HIRAC (Hazard Identifications, Risk Analysis and Control) techniques.
The manner of how the technique is being carried out will be discussed forthwith. The basis components of OSH Risk Management [4] are:

a. Hazard identification – sport the hazard
b. Risk Assessment – assess the risk by calculating or estimating:
   i. The Likelihood of occurrence, and
   ii. The Severity of hazard;
c. Risk control – decide if risk is acceptable, make the change and apply control measures
d. Monitoring and review.

Hazard Identification

Hazards can be classified into chemical hazards, physical hazards, psychosocial hazard, biological hazard and ergonomic hazard. The aim of hazard identification is to draw attention of those tasks which cause significant risks to the health and safety of the user's of the language laboratory. In this study, the methods employed in Hazard Identifications are discussion and interviews, work place inspections and audits. The result after undertaking the Hazard Identification process is shown at Table 1.

TABLE 1
HAZARD IDENTIICATION AND RISK ASSESSMENT IN LANGUAGE LABORATORY

Activity: Teaching and Learning in the Language Laboratory

Hazard Identification	Risk Assessments
• Electrocution Due To Exposed To/Contact With Electric Current	Death/Bodily Injury
• Stepping On Objects in the Laboratory	Bodily Injury
• Striking Against Stationary Objects in the Laboratory	Bodily Injury
• Striking Against Moving Objects in the Laboratory	Bodily Injury
• Over-Exertion Or Strenuous	Bodily Injury
• Exposure To Cold	Bodily Injury
• Fall From Height in the Lab	Bodily Injury
• Person Falling From The Same Level in the Lab	Bodily Injury
• Fire Due To Incorrect Usage Of Equipment	Bodily Injury
• Over-Exertion Or Strenuous Movements	Bodily Injury
• Over-Exertion In Lifting Object	Bodily Injury
• Over-Exertion In Pushing Or Pulling Objects	Bodily Injury
• Over-Exertion In Handling Or Throwing Objects	Bodily Injury
• Using tools or equipment known to be unsafe	Bodily Injury
• Failure to follow instructions of proper job procedure.	Bodily Injury
• Improper use of hands or body parts.	Bodily Injury
• Taking unsafe position or posture	Bodily Injury
• Horseplay.	Bodily Injury

Risk Assessment

In undertaking risk assessment, the study looks into 3 elements i.e. Determining Risk and Ranking of Risk Factors and Methods of conducting Risk Assessment. The first element is Determining Risk. Risk can be measured using qualitative, semi quantitative and quantitative analysis. Risk is the combination of the likelihood and severity of a specified unsafe event taking place. It correlates to the possibility of injury, damage or loss as a result of a hazard. The main areas to consider in risk assessment are:

a. Likelihood – that injury, illness, damage or loss will occur.
b. Severity – that of potential injury, illness, damage or loss.

Another factor that should be taken into consideration is the "Exposure Factor" that is the number of people who may be exposed to the hazard. Thus, Risk can be measured by the equation: -

$$Risk = Likelihood \times Severity$$

The second element of risk assessment is Ranking of Risk Factors**.** Risk factors can be rank as shown in Table 2.

TABLE 2
RANKING OF RISK FACTORS

Ranking Risk Factors By Likelihood		Ranking Risk Factors By Severity	
Very Likely	Could happen frequently	Fatality	May cause death or loss of a facility
Likely	Could happen occasionally	Major	Severe injury or illness, or major property damage
Unlikely	Could happen but only rarely	Minor	Minor (usually reversible) injury or illness resulting in days off work, minor property damage
Very Unlikely	Could happen, but probably never will	Negligible	Minor injury, possible first aid

Method of Conducting Risk Assessment

Two methods can be use in conducting risk Assessment. A qualitative analysis uses words to describe qualitative or descriptive scale for likelihood and severity of risk factors. Due to 4 level ranking of likelihood and 4 level ranking of severity, hence 3 degree or scale is observed that is " HIGH, MEDIUM and LOW" as show in Diagram 1. This technique needs proficient knowledge and experience to determine likelihood and severity category.

Diagram 1. Qualitative Risk Table

Severity	Likelihood			
	Very Likely 4	Likely 3	Unlikely 2	Highly Unlikely 1
Fatality 4	High	High	High	Medium
Major Injuries 3	High	High	Medium	Medium
Minor Injuries 2	High	Medium	Medium	Low
Negligible Injuries 1	Medium	Medium	Low	Low

In semi-quantitative analysis, qualitative scales such as those described in the Qualitative Risk Table are given values.

Diagram 2. Semi-Quantitative Risk Table

Severity	Likelihood			
	Very Likely 4	Likely 3	Unlikely 2	Highly Unlikely 1
Fatality 4	High	High	High	Medium
Major Injuries 3	High	High	Medium	Medium
Minor Injuries 2	High	Medium	Medium	Low
Negligible Injuries 1	Medium	Medium	Low	Low

Hence, semi-quantitative analysis uses numerical values for both likelihood and severity as shown in Diagram 2. The result of the Quantitative Risk Assessment will be numerical estimate of the risk.

The hazard identified is further evaluated to determine its "Risk" to the workers performing their tasks in Language Laboratory. All the information obtains via Hazard Identification and Risk Assessment of Language Laboratory User through the process as mention above are summarized in Table 1.

The process of Hazard Identification and Risk Assessment has established the hazards and risk faced by user of the Language Laboratory. However to determine the Likelihood and Severity, the details in Table 1 are further analyze into Risk Matrix Worksheet Table. This can be prepared by using the qualitative, semi quantitative or the quantitative analysis. To assess the safety and health of user of the Language Laboratory, this paper will use the format of Risk Matrix Table that has been apply by Occupation Safety and Health Unit, UniMAP to implement Risk Management in the university as shown in Appendix 1.

Risk Control

Where a risk to health and safety has been recognized, controls must be introduced to eliminate or minimize it. The risk control process must follow the control hierarchy as shown in Diagram 1. The most effective risk control measure is elimination. This process eliminates hazards or unsafe work practice at the workplace. This is follow by fairly effective control measure that is Substitution where the unsafe work practice is being substitute with one that is less dangerous. Subsequently, if the unsafe work cannot be substitute, the next control measure should be taken that is Isolate. If however hazards cannot be Eliminate, Substitutes or Isolate, the next control measure is Engineering Control**.** If Engineering Control is not suitable to be implemented, the next control measures that can be considered will be Administrative Control. The measures that can be considered include Training, Job Procedures, Safe equipment inspections etc. The last control measure is the use of Personal Protective Equipment (PPE). Aspects included in this control measures is protection of the head and face, eyes and ears, respiratory, body and skin, hands and legs etc.

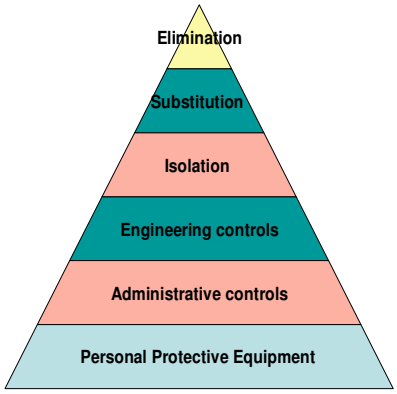

Diagram 1: The hierarchy of Risk Control

Monitoring and Review

The last component in Risk Management is Monitoring and Review. The hazards and control measures are to be reviewed so as to ensure that no new hazards have been found and that the process implemented is working effectively to identify the risks and control the hazard.

HIRAC Worksheet Table

The processes of Hazard Identification and Risk Assessment have facilitated the set up of the Risk Matrix Worksheet Table. However, to have an overall knowledge on the impact and the status of hazards, risk and control measures to be taken the Language Laboratory the HIRAC Worksheet Table to be institute**.** All the results established in the Risk Matrix Worksheet Tables are summarized in **HIRAC Worksheet Table** at **Appendix 2.** This HIRAC Worksheet Table used in this study has been developed by OSH Unit, UniMAP. From the HIRAC Worksheet Table, it is established:

a. Those who use the Language Laboratory face a variety of hazards which are under control.
b. Control Measures to address hazard and risk need to be formulated.

Result of the Study

The survey conducted has identified the hazards that exist in the Language Laboratory. However after conducting "HIRAC" it is established that favorable working environments prevail at the PKKK Language Laboratory.

VI. CONCLUSION

This paper has look at the safety and health issues of user of the Language Laboratory. Risk Management is being carried out to assess the safety and health issues which encompass the processes of Hazard Identification through Discussion and Interviews, Work Place Inspections and Audits, Analyzing Statistics of Accidents at the Workplace, Risk Assessment and Control. All the finding is recorded in the Risk Matrix Table. The HIRAC Worksheet Table is introduce to have an overall knowledge on the impact and the status of hazards, risk and control measures and the priority of action to be taken to address the hazard. All hazards that are categorized as "HIGH" are being addressed immediately.

VII. RECOMMENDATIONS

To effectively implement ergonomic at UniMAP in general and the society in particular, the following recommendations are suggested:

a. Implementation of a OSH-MS in organisations.
b. The government to develop industry or task specific guidelines for a number of industries based on current incidence rate and available information about effective feasible solutions
c. DOSH to conduct inspections for ergonomic hazards and issue
d. DOSH to intensify its Outreach and Assistance to businesses, particularly small businesses, and help them proactively address ergonomic issues in the workplace.

REFERENCES

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Appendix 1

BORANG PENILAIAN RISIKO
UNIT KESELAMATAN DAN KESIHATAN PEKERJAAN
UNIVERSITI MALAYSIA PERLIS

A. Maklumat Umum

i. Bangunan / Makmal :
ii. Butiran aktiviti :
iii. Kumpulan Penilai :

B. Hubungan Risiko dan Tugas, Proses atau Situasi

i. Hazard yang dikenalpasti :
ii. Situasi risiko :
iii. Bilangan pekerja yang mendapat risiko :
iv. Langkah Kawalan Semasa :

C. Penilaian Risiko

AKIBAT	KEMUNGKINAN			
	BESAR KEMUNGKINAN (4)	KEMUNGKINAN (3)	KURANG BEKEMUNGKINAN (2)	SANGAT KURANG KEMUNGKINAN (1)
Maut (4)	TINGGI	TINGGI	TINGGI	SEDERHANA
Kecederaan Besar (3)	TINGGI	TINGGI	SEDERHANA	SEDERHANA
Kecederaan Kecil (2)	TINGGI	SEDERHANA	SEDERHANA	RENDAH
Kecederaan boleh diabaikan (1)	SEDERHANA	SEDERHANA	RENDAH	RENDAH

Sila tandakan pada petak yang sesuai

D. Rumusan Penilaian

i. Butiran Kemungkinan :.
ii. Butiran Akibat :
iii. Penilaian Aras Risiko:
iv. Ukuran kawalan risiko yang dicadangkan : (Pilih yang terbaik)
a. Tindakan kawalan dilakukan segera [ ]
b. Tindakan kawalan dilakukan dalam tempoh tertentu [ ]
c. Risiko disemak semula [ ]

Appendix 2

Aktiviti: Kerja-kerja Dalam Makmal Bahasa

PENGURUSAN RISIKO									
MENGENAL PASTI HAZARD		IMPAK DAN STATUS RISIKO		ANGGARAN RISIKO				PENILAIAN RISIKO	KAWALAN
Aktiviti	Hazard	Kesan	Kawalan Semasa	Kemungkinan	Akibat	Aras risiko	Keutamaan Risiko		