UTP Health, Safety & Environment (HSE) Web Based System

By

Nur Zatul Iffah Binti Zolkana

A project dissertation submitted to the
Information Communication Technology Programme
Universiti Teknologi PETRONAS
in partial fulfillment of the requirement for the
BACHELOR OF TECHNOLOGY (Hons)
(INFORMATION COMMUNICATION TECHNOLOGY)

JULY 2007

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CERTIFICATION OF APPROVAL

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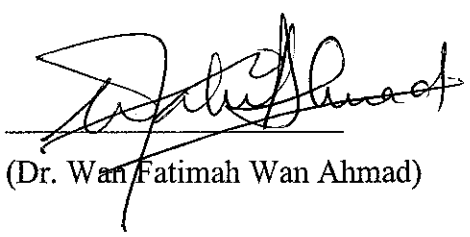
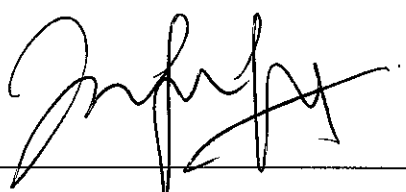


(Dr. Wan Fatimah Wan Ahmad)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
July 2007

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



NUR ZATUL IFFAH BINTI ZOLKANA

ABSTRACT

Health, Safety & Environment (HSE) is a cross-disciplinary area concerned with protecting the safety, health and welfare of people engaged in work or employment. It may involve interaction among many cognate disciplines, including occupational medicine, industrial hygiene, public health, safety engineering, health physics, ergonomics, toxicology, epidemiology, industrial relations, public policy, sociology, and psychology. The objective of this project is to develop a web based system for UTP HSE department. In order to identify and assess health concerns in all HSE critical activities or business, and also to recommend to line management via various means or ways to prevent, control and mitigate such concerns to ensure healthy and safety working environment in UTP. Currently, Universiti Teknologi PETRONAS (UTP) has no systematic HSE web based system to store information about UTP HSE activities. The information about HSE is recorded manually by HSE administrator but does not share among UTP staff and student. All records regarding Chemical Register, CHRA and Incident/Accident reporting was kept in cabinet without sort out according to cluster. Data recording was done manually using paper based method. The scope of study is to computerize the process of storing and sharing information about UTP HSE department to all UTP staff and student. Besides, it is also to computerized all functions in the current system. This system provides features to view all information and records, sharing information, make the process of editing, updating and retrieving data become easier for HSE administrator. In developing this web based system, the waterfall model is implemented. This system is developed using Macromedia DreamWeaver and EasyPHP that offers the dynamic language PHP and efficient use of database under Windows. The package used includes Apache 1.3.27, PHP 4.3.3, PHP MyAdmin 2.5.3 and also MySQL 4.0.15. Besides, it has undergone functional, integration and user acceptance testing. As the result, UTP HSE system is developed in two modules, HSE administrator and staff from various department and also student. All features in the system have solved the problems stated. As a conclusion, this system has achieved the objective stated and has eliminate the inefficiency of data management using paper based method.

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ABBREVIATIONS AND NOMENCLATURES

HSE	Health Safety & Environment
UBC	University British Columbia
FYP	Final Year Project
HCI	Human Computer Interaction
ICT	Information and Communication Technology
UT	University Toronto
DOSH	Department of Occupational Safety & Health
UTP	Universiti Teknologi PETRONAS
WWW	World Wide Web
CHRA	Chemical Health Risk Assessment
ERT	Emergency Response Team
EPSC	Emergency Planning Steering Committee
UHSC	University Health Safety Committee
HSEMS	Health Safety Environment Management System
WISB	Workplace Safety Insurance Board
RAD	Rapid Application Development
MSDS	Material Data Sheet List
SDLC	System Development Life Cycle
OHS	Occupational Health Safety
FAQ	Frequently Asked Question
GUI	Graphical User Interface
PHP	Personal Home Page
HTML	Hyper Text Markup Language
CSDS	Chemical Safety Data Sheet
DOE	Department Of Environment
HSC	Health Safety Committee

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CHAPTER 1
INTRODUCTION

1.1 Background of Study

In this new evolution, web site is becoming one of the main medium for people to interact, communicated and worked. The World Wide Web (WWW) is a transformative medium, as important as electricity [Brown (2000)]. The web also has been a new medium to people nowadays, and has been placed where user / people gain knowledge [Schnell (2000)]. A web based system has advantages of supports interlinking of all kind content, easy for end-user to access and supports easy content creation using widely-available tools [Manola (2000)]. Based on these advantages, this system is developed as a web based system.

Health, Safety & Environment (HSE) is a body of an organization that responsible for the regulation of risks to health and safety. It is also a cross-disciplinary area concerned with protecting the safety, health and welfare of people engaged in work or employment. In Malaysia, the Department of Occupational Safety and Health (DOSH) under the Ministry of Human Resource is responsible to ensure that the safety, health and welfare of workers in both the public and private sector are upheld. DOSH is responsible to enforce the Factory and Machinery Act 1969 and the Occupational Safety and Health Act 1994. Occupational safety and health may involve interaction among many cognate disciplines, including occupational medicine, occupational (or industrial) hygiene, public health, safety engineering, health physics, ergonomics, toxicology, epidemiology, industrial relations, public policy, sociology, and psychology [Joseph (2000)].

HSE Department is an important department for Universiti Teknologi PETRONAS (UTP) as one of the requirement for providing guidance and direction in all phases of all safety program including occupational safety & health, environmental control system,

fire safety, safety-oriented training programs, and building and equipment design criteria affecting safety codes of standards. So, it is important to have a systematic system that can be able to identify and assess health concerns in all HSE critical activities or business, and also to recommend to line managements via various means or way to prevent, control and mitigate such concerns to ensure healthy and safety working environment. Besides, it is also to promote the health and productivity of employees by prevention and management of occupational injuries, illness, and disabilities.

UTP HSE department provides general guidelines outlining the HSE responsibilities of each level of the organization in this campus and develops a clear understanding of how these responsibilities are integrated. In order to strive for excellence in all its activities including health, safety and environment matters, UTP is committed to give priority to HSE department to take every reasonable and practicable step to prevent and eliminate the risk of injuries, health hazards and damage to properties. Besides, it also takes proactive steps towards the conservation and preservation environment by having a systematic HSE web based system.

Currently, there is no HSE web based system to store information about UTP HSE department. All information about HSE department is recorded by HSE administrator but does not share among UTP staff and student. Every semester, UTP HSE administrator also will do all their jobs manually. They will keep the reports such as the report of Chemical Register and Accident/Incident Notification manually without sorting them accordingly. All the information and records are kept in the file. The reports are kept there for a long time, before being transferred to a store when they do not need them anymore. Meaning, it is a time consuming for UTP HSE administrator to look at every single records or information by open all files only to find some particular information.

Most of the systems today are developed by presenting data in a table. The disadvantage of presenting data in table is data are displayed as general especially in a case of long data. So, some of this system is developed using taxonomy data representation. Taxonomy is the study of classification [Taxonomy (2007)]. According to Human

Computer Interaction (HCI) principle, one key way information access interfaces can help with memory load is to provide mechanisms for keeping track of choices made during the search process, allowing users to return to temporarily abandoned strategies, jump from one strategy to the next, and retain information and context across search sessions [Hearts (2000)]. Presenting data in taxonomy provides feature where data are displayed as specific as possible. Data at parent node can be specified into several child nodes where users may view data specifically. Thus, users will not get lost when viewing a long data.

1.2 Problem Statement

Information about UTP HSE is important to staff and also student. The process of giving the information will prevent or reduce the risk posed by the chemicals that might be hazardous to the health of them especially at the labs (process/location). If there were no reference for them, it will become ineffective because there is no information sharing about the guidelines or HSE policies among UTP staff and student. As there were important to identify chemicals that might be hazardous to the health and the need to give information and control any health risk associated with the work activities involving the use of chemicals, there is a need to develop a web based system for UTP HSE department to store and share information among UTP staff and student.

Besides, UTP HSE department still using the paper based method for recording all of their information about chemicals, incident & accident reporting and also for CHRA by manually. So, the purpose is to define the perceived problems, opportunities and the objectives of triggering this project. After conducting preliminary investigation and problem analysis about information record keeping of UTP HSE department, a full understanding of the existing manual process of information / data records was obtained. A comprehensive definition of problems faced was defined and the points for improving the current system were determined. Some effects by recording the information manually and do all the works using paper based method will make the data editing and updates is limited. So, it will cause the inefficiency of data management.

Besides, there were so many files because they record the information manually in the book or files by using the paper based method. Since all the UTP HSE information is manually written in the book or file, it is difficult for HSE administrator to monitor all the records for every chemical register report, incident/accident investigation report and also when conducting the Chemical Health Risk Assessment (CHRA) system. Currently, there is no shared information of UTP HSE among the staff and student. Meaning, all of them have no information about the information or records regarding the HSE department. The problem is there will be some information or records that do not noticed or misplaced because of inefficiency of data management using the paper based method.

Data editing and updates is limited because UTP HSE administrator must find and take a look every files to find the information so that this will caused inefficiency whereby there were also repetition and redundancy in some tasks handled. UTP HSE administrator might not notice that the records or information that they want to let people know about their activities or some guidelines were not spread out among UTP staff and student. Basically, by having UTP HSE web based system, all the information or records will be stored after performing assessment or all the reports about chemical register and incident/accident notification will be stored after obtaining the data.

The data stored then evaluated and appropriate control measure and actions are recommended in order to prevent or reduce risks. So, the report generated from this UTP HSE web system will be used as guidelines to all UTP staff and student for their safety and health because they will know and updates every news or events conducted by UTP HSE department by viewing the UTP HSE web based system from the UTP main website *(www.utp.edu.my)*.

1.2.1 Problem Identification

Here is the list of problems caused by no system to store and share information about UTP HSE department:

- **UTP HSE Administrator**

It is time consuming for administrator to check every single report or information in the files for references because the reports are not sorted out accordingly and all of them being done manually. It is difficult for HSE administrator to monitor the records of chemical register, CHRA and also incident/accident investigation reported by staff since the record is manually written and will be put in the files and cannot be easily to update the data. For example, it is also hard to identify the chemical because there is no database system for chemical register in order to characterize the chemical hazards and act as an online chemical register for UTP HSE system. Moreover, all the incident / accident reporting was done manually and there were no proper record of them and also the CHRA data was done using paper based method and make the HSE administrator unable to retrieve database and edit or update the database because the data updating and editing is limited.

- **UTP Staff (Lecturer, Management Staff, Technician, Lab Assistant etc.) and student**

There are problems of misplaced, redundant or reuse of information regarding HSE information especially regarding the incident/accident notification because it is using the paper based method and there is no shared information of HSE department news among them. Staffs also need to do the investigation report for incident / accident notification manually and hard to do the data retrieval and updates. There are problems when there is no on the spot information sharing about HSE in order to prevent the risks. There is no guidance or brief description about HSE department to view. It is also hard to know the organization chart, work area or job description

about HSE administration and not easily can refer to some sources for the health effects of each chemical when they need that information. There were also no details of information about HSE guidelines or policies that need to guide the students during their lab sessions, when handling the hazardous chemicals or when to use appropriate control measure in order to reduce or prevent the risks.

1.2.2 Significant of the Project

This system provides features to solve all problems stated. All the UTP staff and also student can view information about UTP HSE information including the details about the list register of chemical hazardous to health, incident / accident notification report summary and CHRA system. Besides, all the information and news regarding UTP HSE department will be published and can be viewed. So, the student also can get some knowledge in order to guide them in the labs (process / location) in order to prevent or reduce the risks posed by the chemicals that might be hazardous to their health.

From this, it will be able to conclude on the significance of the health risk posed by the hazardous chemicals to health. So, all the UTP staff and student can know the further action to recommend appropriate control measure to prevent the risk or injury in the labs. Based on the information that will be put in the HSE web based system, this system will provide information sharing among UTP staff and student. All of them can view the information about UTP HSE department and the information will be shared among them. UTP HSE administrator can use this system to record, edit or retrieve all the information of database for chemical register or chemical inventory, CHRA system, incident / accident investigation report summary and all the information about UTP HSE department.

They can decrease time that required to finds the data or information they want because it systematically stored in the system because of the efficiency of data management by not using the paper based method anymore. All the chemicals and incident/accident report

will be updated easily and do not cause the data redundancy anymore because the manually task will be eliminate.

1.3 Objectives & Scope of Study

1.3.1 The Relevancy of Project

This project is develop to solve all problem stated. The objective of this project is to develop a web based system for UTP HSE department.

As the scope of study, the UTP HSE web based system is developed to:

- computerize the process of storing and sharing information about UTP HSE department to all UTP staff and student
- computerized the process of recording and updating the register of chemical hazardous to health, incident/accident notification report summary, industrial hygiene record, ERP record, CHRA record, training record and HSEMS record.
- display only some of the data in taxonomy at the searching and viewing information about UTP HSE department

1.3.2 Feasibility of the Project within the Scope and Time Frame

The duration of time is estimated for two semesters which is consisting of about twelve months. The first part of the project (five months) is allocated for research of the project (research about UTP HSE, gathering data and some technical research). Technical research is focused on how the ideas could be implemented. It includes the research on how to develop the system, learning on programming language that feasible to implement the system and complete the system prototype. This first part covers the paperwork writing as well. The analysis of the ideas is also implemented in this part. The second phase is the implementation phase. Four months are allocated for development process.

The system is anticipated to be completed within this duration. The remaining three months is for testing purposes and deployment.

1.3.3 Expected Output / Product

From this project, it is targeted that by the end of the development period, the working system of UTP HSE web based system can make the HSE administrator feel easy in handling their tasks and works. They can stored all data and records by retrieving, updating and deleting data because it is act as an online system. All UTP staff and student can view and update the information about HSE department that will be link from UTP website. This web system have interactive, simple and clear interface so that all the administrators feel the easiness when they want to view, edit or update the chemicals and information in the database. Besides, all the UTP staff and student will keep track on the safety policies and guidelines in order to ensure a safe environment in UTP. The project is also targeted to follow the schedule and always on time frame track.

CHAPTER 2
LITERATURE REVIEW AND/OR THEORY

The proposed solution for this research project is to develop a web based system to store information about UTP HSE department. Nowadays, the web based system has become more important and have several advantages over paper based method system.

2.1 Web-Based Application

Definition of the web is a universe of networking-accessible information, and breaks the "full potential" into two by looking at it first as a means of human-to-human communication, and then as a space in which software agents can, though access to vast amount of everything which is society, science and its problem, become tools to work with human [Goble & Horrocks (2000)]. The web is a very general concept – one universal space of information. The concept it requires such as identifiers and information resources (documents) are as general and abstract as possible. However, there have been some designs decisions made which define some interfaces, and effectively define modules or agents which are independent. These agents are independent in many ways [Lee (2000)].

In this new evolution web site is becoming one of the main medium for people to interact, communicated and worked. Web is known as World Wide Web (WWW), and it was a transformative medium, as important as electricity [Lenert (2004)]. The web also has been a new medium to people nowadays, and has been a placed where user/people gain knowledge. As web helps to establish a culture that honors the fluid boundaries between production and consumption of knowledge, it recognizes that knowledge can be produced wherever serious problems are being attacked and followed to their root. Furthermore, with the Web it is easier for various experts to interact casually-in the academy or in the firm-and to mentor or advice students of any age [Brown (2000)].

Organizations perceive a number of advantages in using the Web in enterprise computing, a particular advantage being that it provides an information representation which [Manola (2000)]:

- supports interlinking of all kinds of content
- it is easy for end-users to access
- supports easy content creation using widely-available tools

Web resources provide advantages over paper resources. The Web makes possible interactive resources encouraging student involvement, a fundamental requirement of the currently popular constructivist theory of learning. According to Sheard, Postema & Markham (2000), the web enables immediate changes to information; resources may be accessed by students on or off campus and at any time. There is a significant correlation between the student's opinion of the quality of the web resources and usefulness of each web resource indicating that the quality of resources influences student opinions of their usefulness [Sheard, Postema & Markham (2000)]. One of the important key in developing a web based system is to fulfill Human Computer Interaction (HCI) challenges in order to maximize user satisfaction.

2.2 Human Computer Interaction (HCI) Challenges

Information access is an iterative process, the goals of which shift and change as information is encountered. One key way information access interfaces can help with memory load is to provide mechanisms for keeping track of choices made during the search process, allowing users to return to temporarily abandoned strategies, jump from one strategy to the next, and retain information and context across search sessions. Another memory-aiding device is to provide browsable information that is relevant to the current stage of the information access process [Hearst (2000)].

No autonomy can exist in the absence of control, and control cannot be exerted in the absence of sufficient information. Status mechanisms are vital to supplying the

information necessary for users to respond appropriately to changing conditions [Toganazzini (2000)]. Most users cannot and will not build elaborate mental maps and will become lost or tired if expected to do so. Once users reach our applications, a web based developer must take care to reduce navigation to a minimum and make that navigation that is left clear and natural. Present the illusion that users are always in the same place, with the work brought to them. This not only eliminates the need for maps and other navigational aids, it offers users a greater sense of mastery and autonomy. As with the inherent statelessness of the web, a web based developer job is not to accept blindly what the architects have given them, but to add the layers of capability and protection that users want and need. That the web's navigation is inherently invisible is a challenge, not an inevitable [Berghel, Berleant, Foy & McGuire (2000)].

Taxonomy organized data into system of classification. Thus, user can keep track of a long data they viewed as it has been classified in taxonomy. Taxonomy is the science of identifying and naming species and organizing them into systems of classification [Lawrence (2006)]. Taxonomy also provides autonomy or mastery of data where users can select data they want to view by clicked at any node in taxonomy. It will reduced users memory load of a long data. So, by presenting data in taxonomy has advantage over in table.

2.3 Example other university's HSE web based system

The function of HSE is much broader than that which is commonly used in the university. It is also a central organization responsible for health, safety, environment, and security; providing corporate-level leadership and strategic vision to coordinate and integrate these vital programs. Besides, it is also responsible for policy development and technical assistance; safety analysis; corporate safety and security programs; education and training; complex-wide independent oversight; and enforcement. Besides, it is also to serves as corporate advocate for Department health, safety, environment, and security programs and initiatives, including Integrated Safety Management, Integrated Safeguards and Security Management, Environmental Management Systems, Voluntary Protection

Program, and Federal Technical Capabilities Program. In addition, it also develops health, safety, environmental, and security rules, policies and implementation guidance and also manages the operations in the pursuit of continuous improvement in the health, safety and security posture of DOE [Johnson (2007)].

But, currently in Malaysia's university or colleges there were no HSE web based system. Based on the research done, management of university or colleges in Malaysia does not take HSE matters as one of their main priorities in identifying and assess health concerns in all HSE critical activities for their staff or student. So, I have selected two of international university that has a web based system for their HSE department as my benchmark in developing this project.

2.3.1 University Of British Columbia HSE web system

University of British Columbia holds an international reputation for excellence in advanced research and learning. This university boasts some of the city's best attractions & recreation facilities, including the Museum of Anthropology, the Chan Centre for the Performing Arts, the UBC Botanical Garden and Centre for Plant Research, and endless opportunities to explore forested trails in the adjoining 763-hectare Pacific Spirit Regional Park. UBC has many innovative academic programs, combined with an international reputation for teaching and research; provide students with the knowledge, flexibility, and skills needed for the 21st century [UBC, Department of HSE (2007)]. Besides, this university also have pay more attention to the HSE aspects by having own web system to store the information monitoring by their Department of Health Safety and Environment. The mission of UBC HSE department is to integrate a safe, healthy and environmentally responsible culture into the working and learning experience at this university. Figure 2.1 below shows the main page of HSE web based system in University of British Columbia.

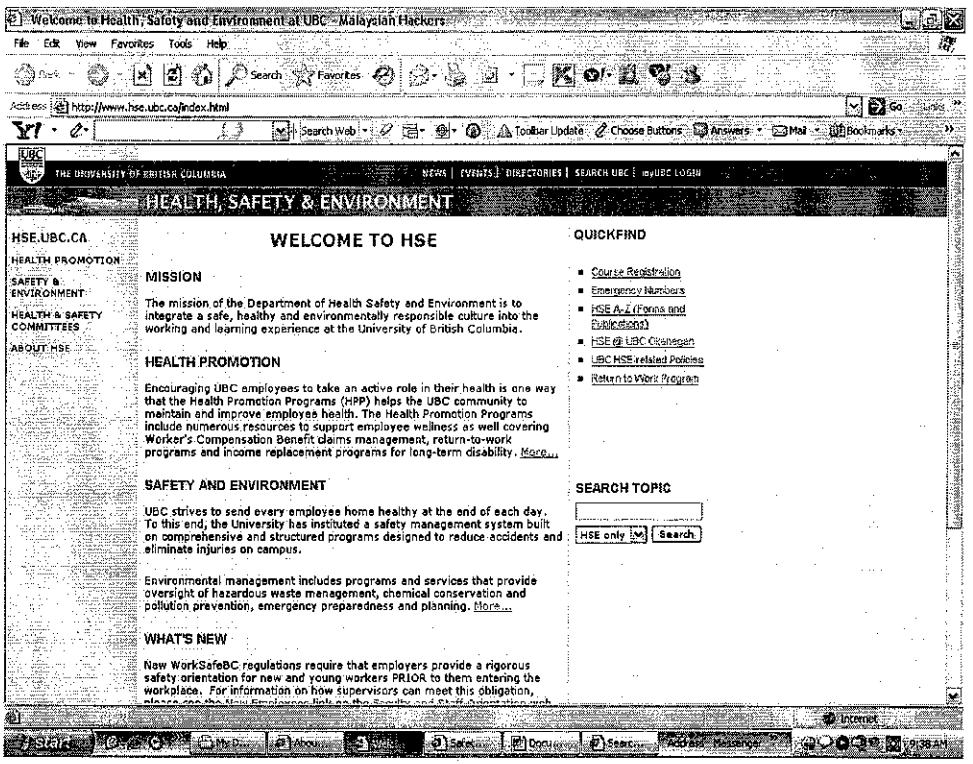

Figure 2.1: Main page University of British Columbia HSE department website

In order to achieve the mission of the Department of Health, Safety and Environment (HSE) University of British Columbia has respect the privacy of all and be sensitive to the diversity of culture and ability in the selection, design, implementation, maintenance and evaluation of HSE programs. Furthermore, UBC HSE also demonstrate a fundamental commitment towards providing and maintaining a safer, healthier and more environmentally responsible workplace based on potential impacts to individuals, departments and the campus community as a whole. By viewing challenges as opportunities for creativity and innovation by seeking input, accepting feedback and applying new learning in the establishment or betterment of cost effective programs, they can improve their quality of HSE department.

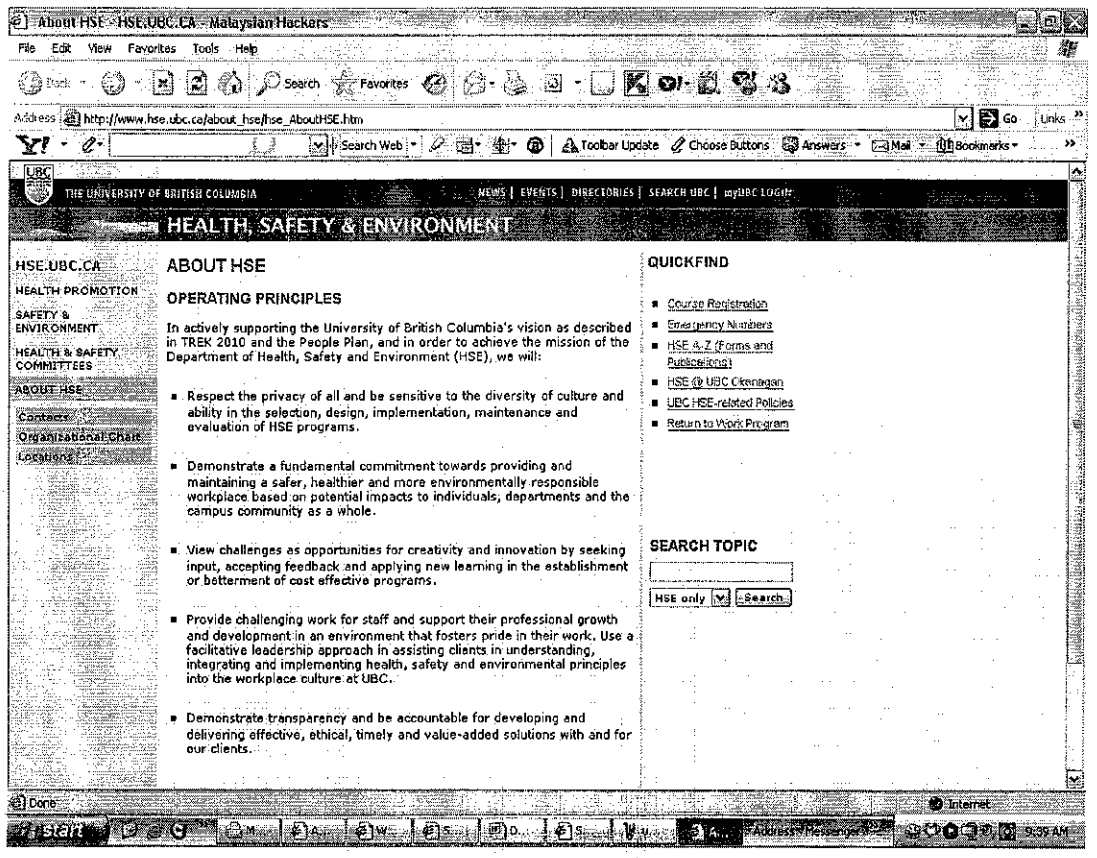

Figure 2.2: About HSE-Operating principles page

Besides, UBC HSE also provides challenging work for staff and support their professional growth and development in an environment that fosters pride in handling the job given. As shown in Figure 2.2, this university's HSE department also using a facilitative leadership approach in assisting clients in understanding, integrating and implementing health, safety and environmental principles into the workplace culture at UBC and also has demonstrate transparency and be accountable for developing and delivering effective, ethical, timely and value-added solutions with and for their clients UBC strives to send every employee home healthy at the end of each day. To this end, UBC HSE has instituted a safety management system built on comprehensive and structured programs designed to reduce accidents and eliminate injuries on campus. Based on the research, the environmental management includes programs and services that provide oversight of hazardous waste management, chemical conservation and pollution prevention, emergency preparedness and planning has been provided by UBC HSE. [UBC, Department of HSE (2007)].

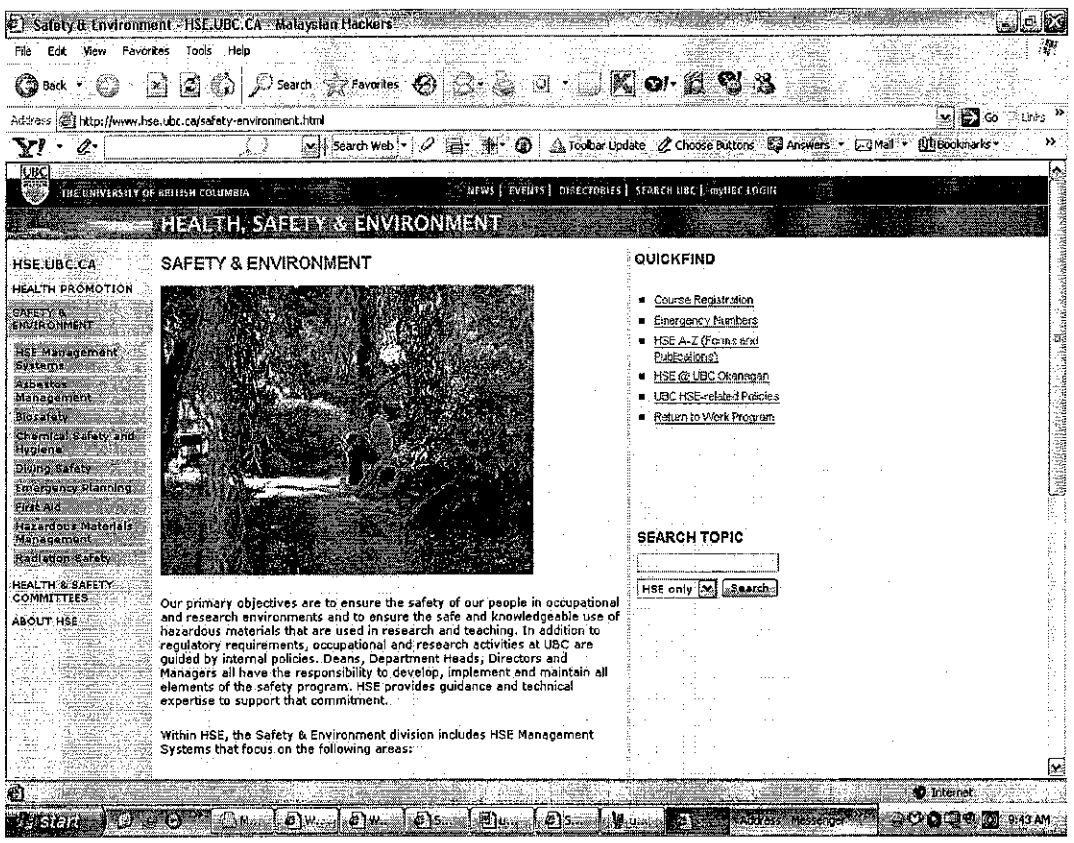

Figure 2.3: Safety & Environment page

Furthermore, UBC HSE department primary objectives are to ensure the safety of our people in occupational and research environments and to ensure the safe and knowledgeable use of hazardous materials that are used in research and teaching as shown in Figure 2.3. In addition to regulatory requirements, occupational and research activities at UBC are guided by internal policies. Deans, Department Heads, Directors and Managers all have the responsibility to develop, implement and maintain all elements of the safety program. HSE provides guidance and technical expertise to support that commitment. Within HSE, the Safety & Environment division in UBC also includes HSEMS focus on the following areas below:

- Management of the University Health, Safety and Environmental Program
- Local and unit health, safety and environmental Programs
- Emergency Planning
- First Aid Service

The UBC Safety and Environment division have supports:

- Biological safety
- Chemical safety
- Diving safety
- Hazardous materials management
- Radiation safety

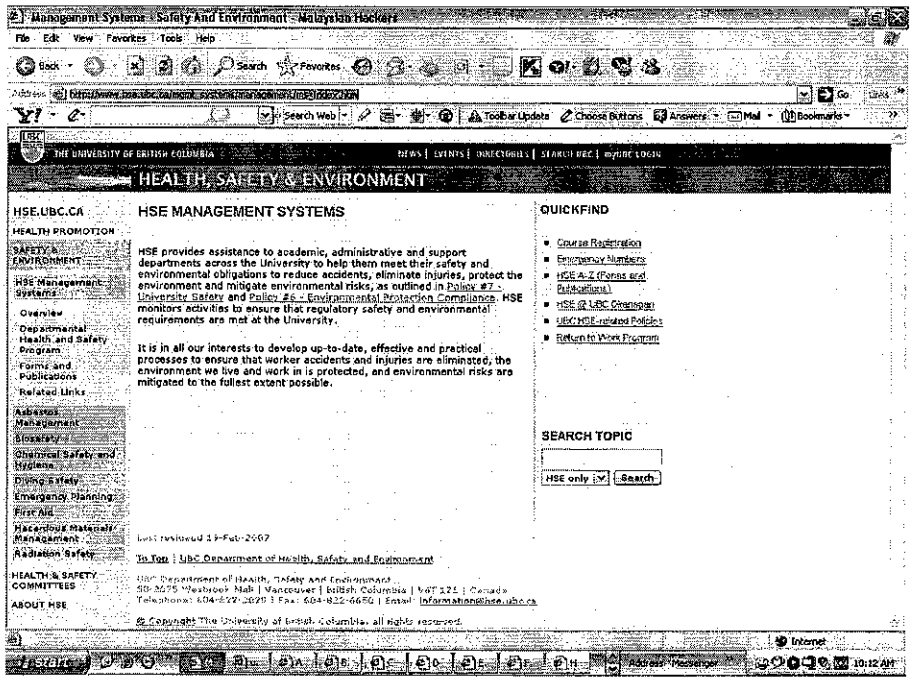

Figure 2.4: HSE Management System page

Figure 2.4 shows the page for HSEMS of UBC. The UBC's HSEMS group works with departments in order to develop a systematic approach of managing HSE programs to improve UBC's HSE performance. UBC are using a collaborative and interactive process to produce effective and practical solutions to HSE problems. These solutions will reduce the quantity and severity of accidents, reduce physical risks, and demonstrate UBC's commitment to HSE excellence [UBC, Department of HSE (2007)]. The research has found that the approach will follow management systems concepts that have gained international acceptance, embracing the concepts of "Plan-Do-Check-Act," as illustrated in the Figure 2.5 below:

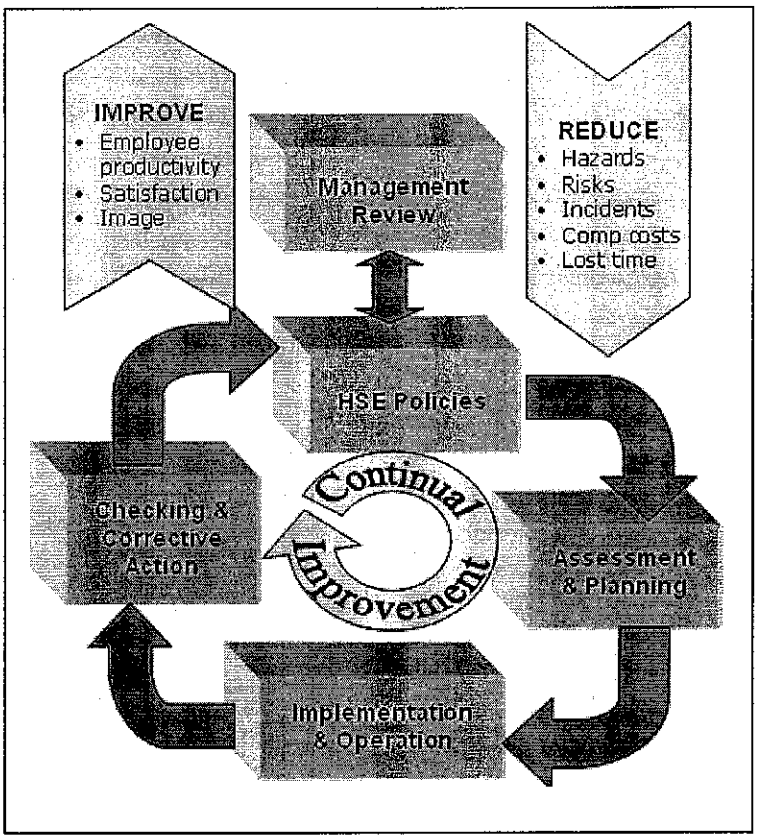

Figure 2.5: "Plan-Do-Check-Act"

UBC HSE provides assistance to academic, administrative and support departments across the University to help all UBC staffs and students meet their safety and environmental obligations to reduce accidents, eliminate injuries, protect the environment and mitigate environmental risks. Implementing and maintaining effective HSE programs requires ongoing and active management at all levels of the organization. Under UBC HSE Management System initiative, departments will be expected to assess their risks, develop activity plans for all levels of the organization, and monitor the progress in meeting the plan objectives. Typical UBC HSE activities include developing and delivering training courses for specific safety concerns, safety orientations for new staff, or conducting workplace inspections. Setting achievable objectives and then providing recognition to those who meet these objectives is a proven approach to manage UBC HSE performance in order to ensure the continuous improvement.

It also has found that all the departments at UBC are responsible for maintaining a Health and Safety Program and managing the various elements within that program. A

comprehensive *Health and Safety Program Manual*, and related materials has being developed and maintained. Under the *BC Occupational Health and Safety Regulation*, a Health and Safety Program have the following eight basic elements which are:

- Safety Policy and Responsibilities
- Management Meetings
- Orientations, Training and Supervision of Workers
- Safe Work Rules and Procedures
- Hazard Assessments and Work Site Inspections
- Accident/Incident Investigations
- First Aid and Emergency Services
- Records, Documents and Statistics

Some other elements that should be included have been figured out in order to ensure a comprehensive health and safety program are:

- Local Health and Safety Committee
- Return to Work
- Personal Security and Public Safety
- Hazardous Materials
- Environmental Protection
- Contractor Safety
- Program Review

As shown in Figure 2.6, UBC HSE department also have The Chemical Safety Program that promotes the recognition, evaluation and control of workplace environmental health hazards such as chemical or noise exposures that may cause illness, impaired health or significant discomfort to UBC faculty, staff and students. This program also promotes the safe handling and storage of laboratory, industrial and agricultural chemicals at this university. Information, advice and guidance on regulations and recognized safe handling procedures and practices for hazardous materials are provided to the UBC's community [UBC, Department of HSE (2007)].

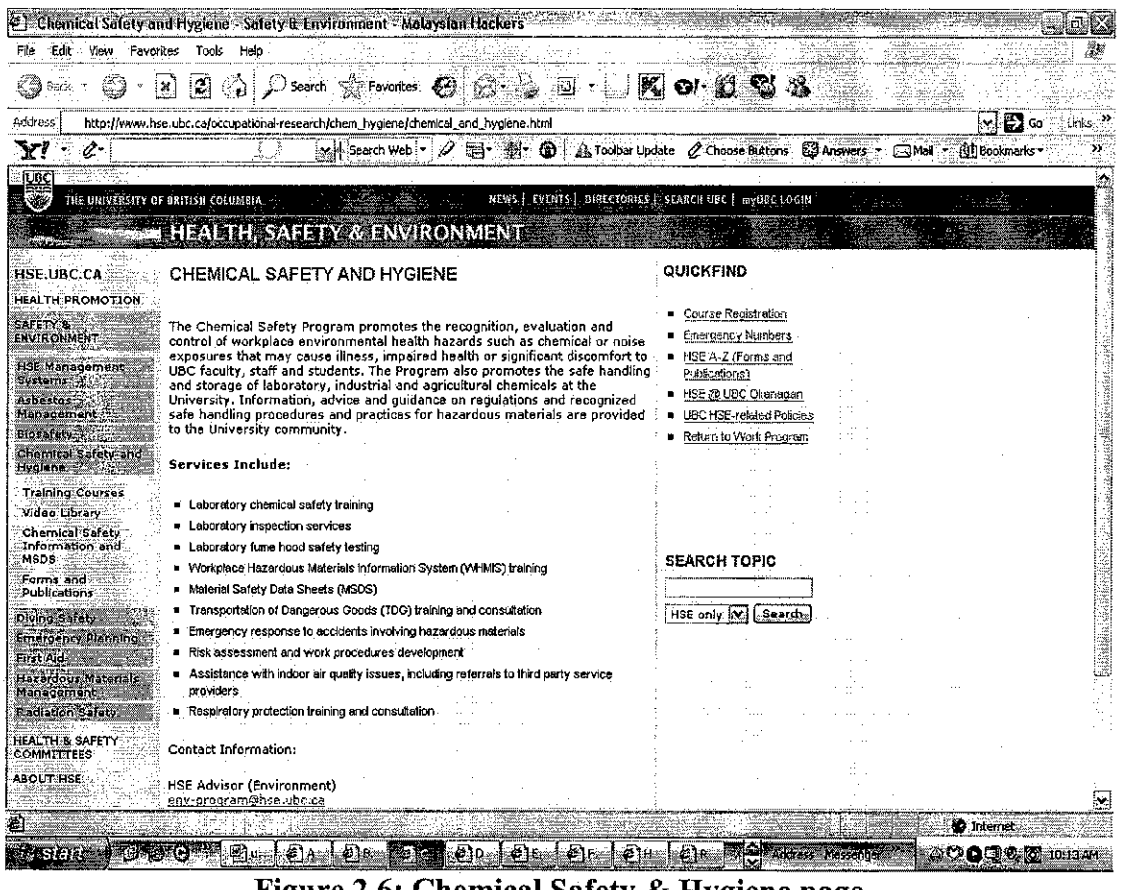

Figure 2.6: Chemical Safety & Hygiene page

From the research, UBC HSE department also conducted the Asbestos Management Program that managed on behalf of UBC by Land and Building Services and its mandate is to control the hazards of exposure to airborne asbestos fibers by the identification and elimination, or the containment of asbestos-containing materials. UBC has many buildings constructed during decades when asbestos was a common addition to building materials [UBC, Department of HSE (2007)]. In addition, UBC HSE also create a Biosafety Program that evaluates and oversees the potential risks in research projects involving biohazardous materials through training, facility and equipment certification and research protocol review. All research projects must be reviewed and approved by the Biosafety Office and the University Biosafety Committee prior to release of funding. The Biosafety Office also acts as a resource on issues of biosafety, including laboratory design and equipment selection [UBC, Department of HSE (2007)].

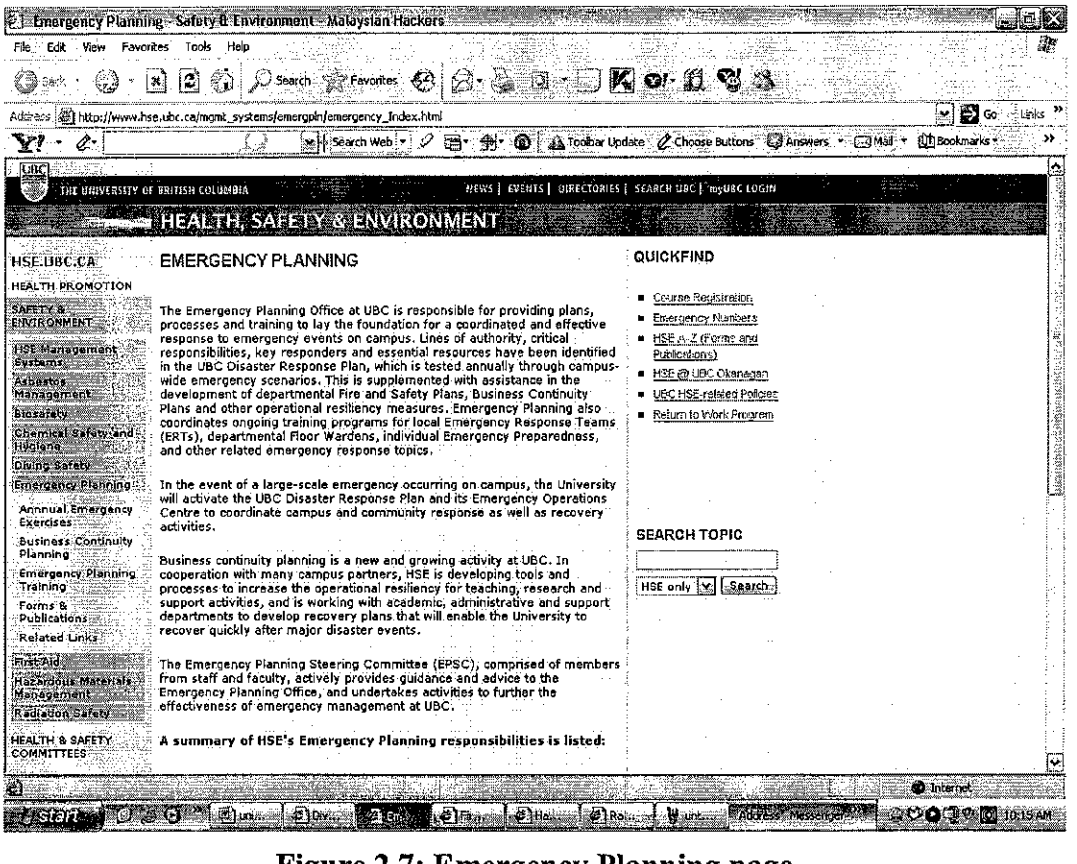

Figure 2.7: Emergency Planning page

Figure 2.7 above shows that the UBC HSE also has their Emergency Planning that responsible for providing plans, processes and training to lay the foundation for a coordinated and effective response to emergency events on campus. Lines of authority, critical responsibilities, key responders and essential resources have been identified in the UBC Disaster Response Plan, which is tested annually through campus-wide emergency scenarios. This is supplemented with assistance in the development of departmental Fire and Safety Plans, Business Continuity Plans and other operational resiliency measures. Emergency Planning also coordinates ongoing training programs for local Emergency Response Teams (ERTs), departmental Floor Wardens, individual Emergency Preparedness, and other related emergency response topics [UBC, Department of HSE (2007)].

UBC HSE department also has their Emergency Planning Steering Committee (EPSC) which comprised of members from staff and faculty, actively provides guidance and also

giving some advice to the Emergency Planning Office, and undertakes activities to further the effectiveness of emergency management at UBC. In the event of a large-scale emergency occurring on campus, the University will activate the UBC Disaster Response Plan and its Emergency Operations Centre to coordinate campus and community response as well as recovery activities. In cooperation with many campus partners, UBC HSE is developing tools and processes to increase the operational resiliency for teaching, research and support activities, and is working with academic, administrative and support departments to develop recovery plans that will enable the University to recover quickly after major disaster events.

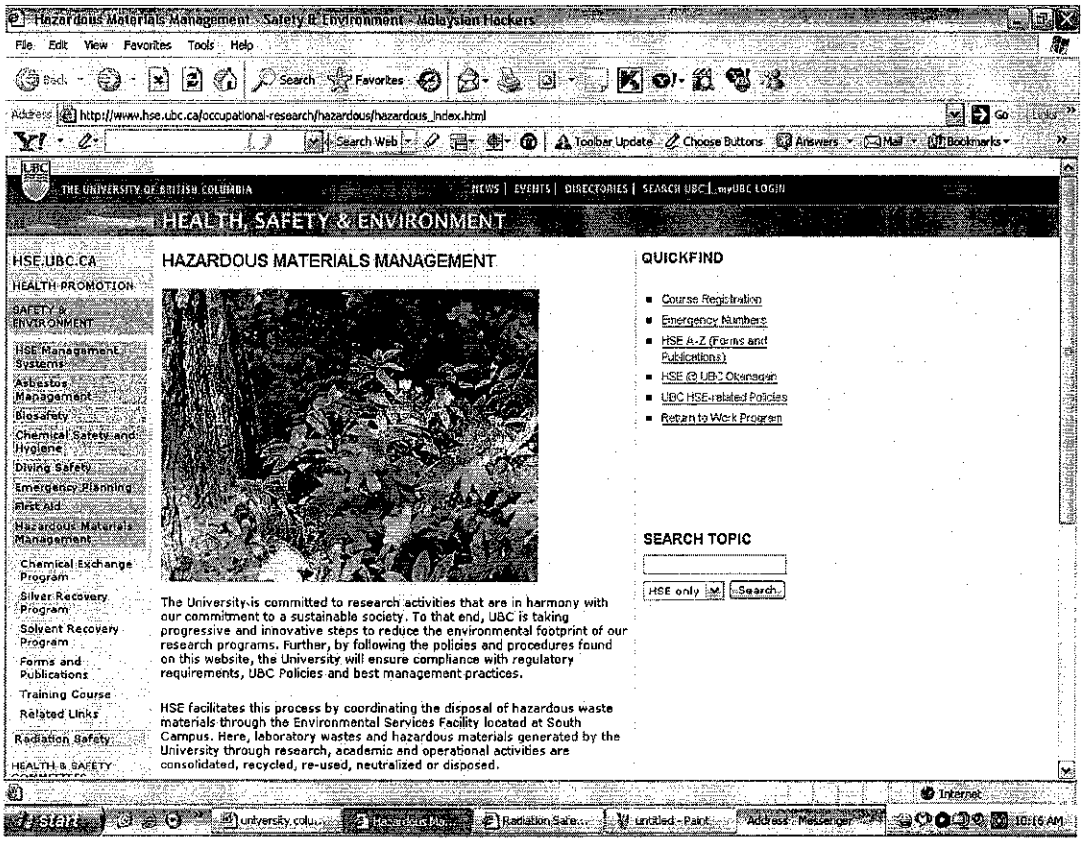

Figure 2.8: Hazardous Materials Management page

Besides, this university HSE department also committed to do some research activities that are in harmony with our commitment to a sustainable society. To that end, UBC HSE is taking progressive and innovative steps to reduce the environmental footprint of our research programs. Further, by following the policies and procedures found on this website, the University will ensure compliance with regulatory requirements, UBC

Policies and best management practices. UBC HSE department has facilitates this process by coordinating the disposal of hazardous waste materials through the Environmental Services Facility located at South Campus. Here, laboratory wastes and hazardous materials generated by the University through research, academic and operational activities are consolidated, recycled, re-used, neutralized or disposed [UBC, Department of HSE (2007)]. Figure 2.8 above shows that the hazardous material management page that also consist of information regarding waste reduction. UBC HSE record is achieved through chemical conservation programs, consisting of:

- Chemical Exchange Program
- Silver Recovery Program
- Solvent Recovery Program
- Pollution Prevention Initiatives

Based on the research, not only UTP HSE but UBC HSE also has their organizational structure as shown in Figure 2.9 in order to advise, assist and make recommendations on policy and procedures which will improve the health, safety and personal security of faculty, staff, students, and the general public while at the University. But, there are two levels of Safety Committees at UBC HSE department. The University Health and Safety Committee (UHSC) have comprised of approximately twenty members representing management and various employee groups on campus.

In addition, a number of other university community members serve as technical resources to the UHSC. All departments at UBC are required to have a functioning local Health and Safety Committee (HSC). A local HSC is a joint committee made up of worker and university representatives working together to identify and resolve health and safety problems in their area. The committee coordinates and promotes health and safety activities and monitors the status of the department's health and safety program. [UBC, Department of HSE (2007)].

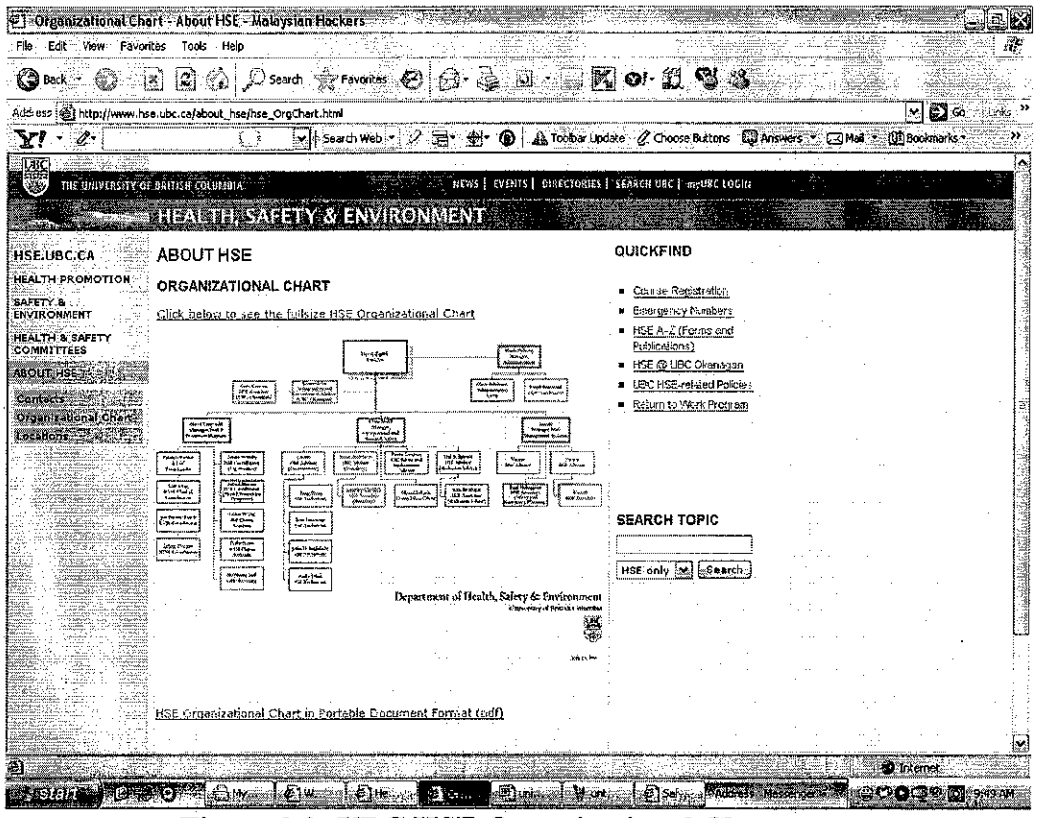

Figure 2.9: UBC HSE Organizational Chart page

Like UTP, UBC also aims to provide a safe, healthy and secure environment in which to carry on the University's affairs. All possible preventive measures are taken to eliminate accidental injuries, occupational diseases and risks to personal security. So, the hazard assessment or task health and safety analysis is recommended prior to the start of any new project, task or job. Its purpose is to anticipate, as much as is reasonable, any hazards that are inherent or could arise out of a new project, task or job. Once the hazards have been identified, the controls for eliminating or minimizing these hazards can then be determined and implemented. UBC HSE should also undertake the hazard assessment concept when major modifications are made to a project, task or job.

"UBC will act responsibly and demonstrate accountable management of the property and affairs of UBC in protecting the environment. All individuals in the University community share the responsibility for protecting the environment. Administrative heads of unit are responsible for ensuring compliance with

legislation and UBC procedures both on and off campus." [UBC, Department of HSE (2007)].

UBC HSE department also conducting the incident / accident investigation and it must take place as soon as possible after an incident's occurrence. The purpose of accident reporting and investigating is to identify deficiencies in the management of health and safety, take steps to correct these deficiencies, and prevent similar incidents from occurring in the future.

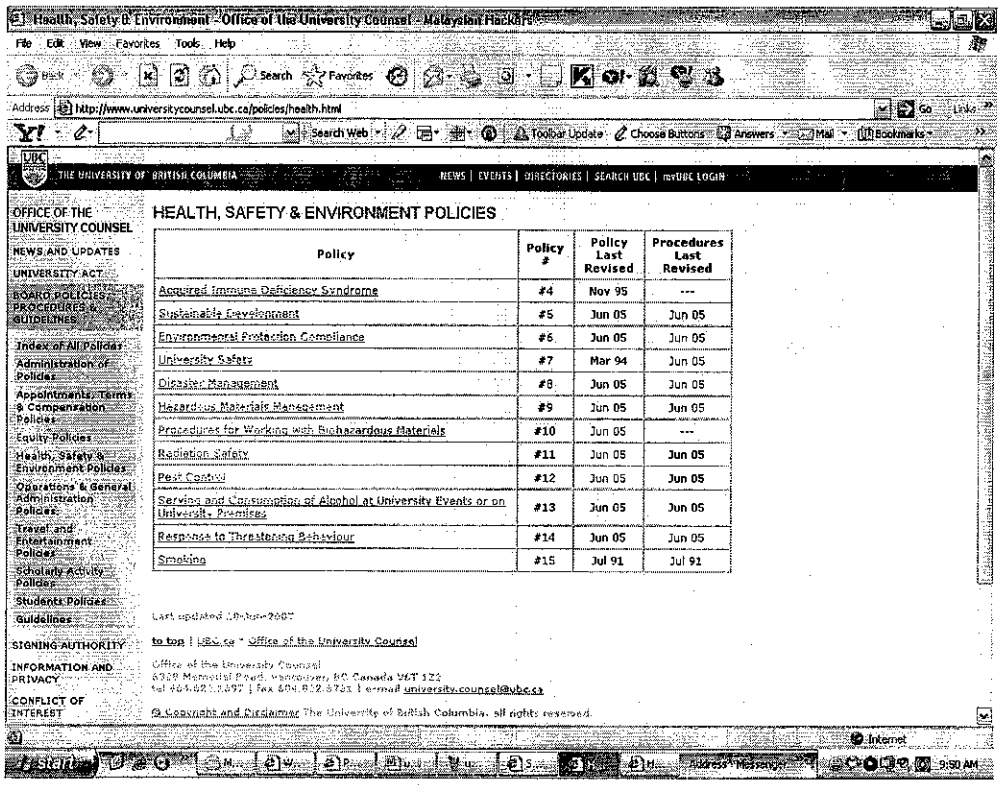

Figure 2.10: UBC HSE policies page

As shown in Figure 2.10 above, UBS HSE policies and procedures may be amended by University President and it also provided the new procedures conform to the approved policies. UBS HSE has stated that the responsibility of University will acting through administrative heads of unit in order to provide a safe, healthy and secure working environment. Besides, it also will ensure regular inspection, health, safety & personal security consideration form an integral part of the design, provide first aid facilities,

support supervisors and safety committees in the implementation of an effective health, safety and security program and to establish department / building safety committees and also to ensure adequate resources are available to implement appropriate procedures.

2.3.2 University Of Toronto HSE web system

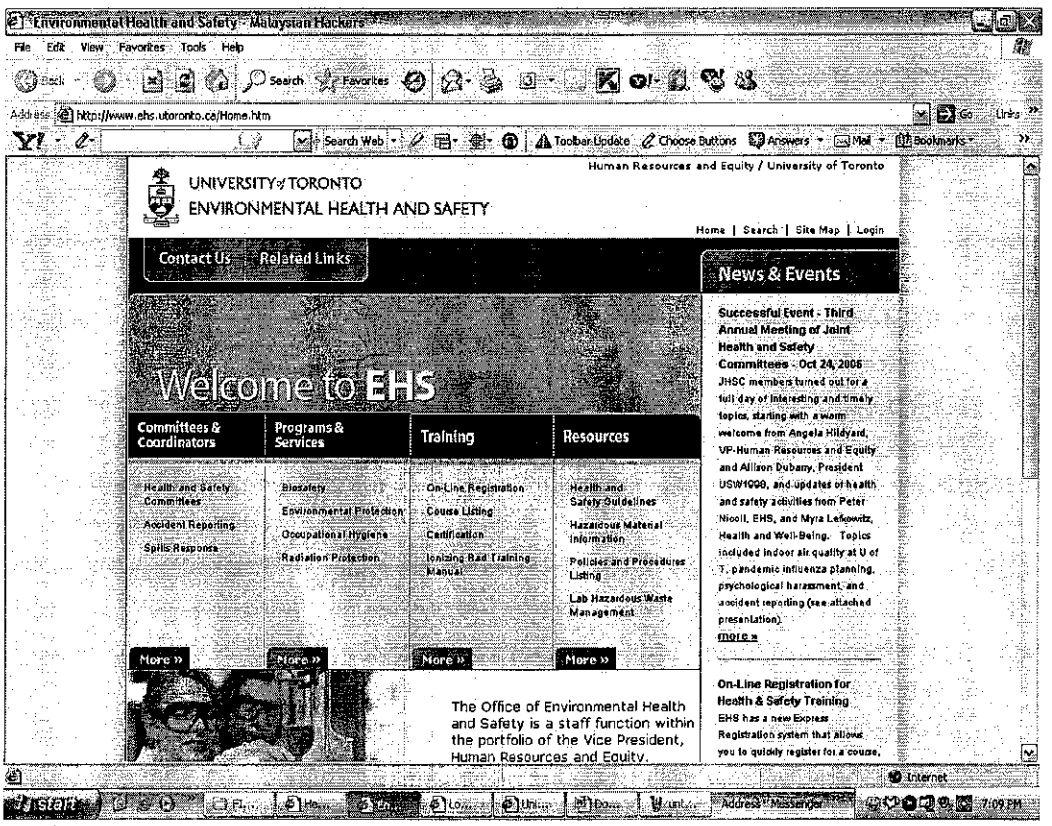

Figure 2.11: Main page University of Toronto HSE website

The University of Toronto was founded as King's College in 1827 and has evolved into a large and complex institution. The University is Canada's most important research institution and has gained an international reputation for its research. It enrols more students, employs more faculties, and offers a greater range of courses than any other Canadian university [University Toronto Web Services (2005)]. Figure 2.11 above shows the main page for UT HSE web based system.

The education of students for the professions has always been an important part of the University's role, and the University accordingly maintains a wide range of professional faculties and also the University's insistence on the importance of HSE aspects. The University of Toronto as an employer is responsible under the Ontario Occupational Health and Safety Act for establishing and maintaining joint health and safety committees in the workplace.

Below is the University Of Toronto Environmental, Health & Safety department mission:

"The mission of the EH&S Department is to ensure that an environmentally responsible, safe and healthy work, research and study environment exists at the University of Toronto.

We do this by being proactive in identifying risks and emerging issues and by developing and implementing innovative, practical and sustainable processes to manage them, including training and awareness, teaching, provision of expert advice, emergency response and assurance.

Through close collaboration with all members of the University community we establish and maintain health and safety systems that are widely acknowledged to be of excellent quality and that, while not limiting or impeding academic freedom and freedom of research; maintain a high level of safety."[Human Resource and Equity, University Toronto (2005)]

The UT HSE committees, consisting of representatives of workers and management, serve to provide consultation and meaningful input from employees in matters relating to health and safety. Because the University is a large, decentralized organization which is widely dispersed geographically, a number of health and safety committees have been established based on academic faculties and departments or employee unions. The Figure 2.12 below shows the Divisions/Departments are encouraged to establish the UT HSE local committees to deal with the risks in their workplaces. The Office of Environmental Health and Safety and the Central Health and Safety Committee monitor the operations

of these local committees [Environmental, Health & Safety Department, Human Resource & Equity University of Toronto (2005)].

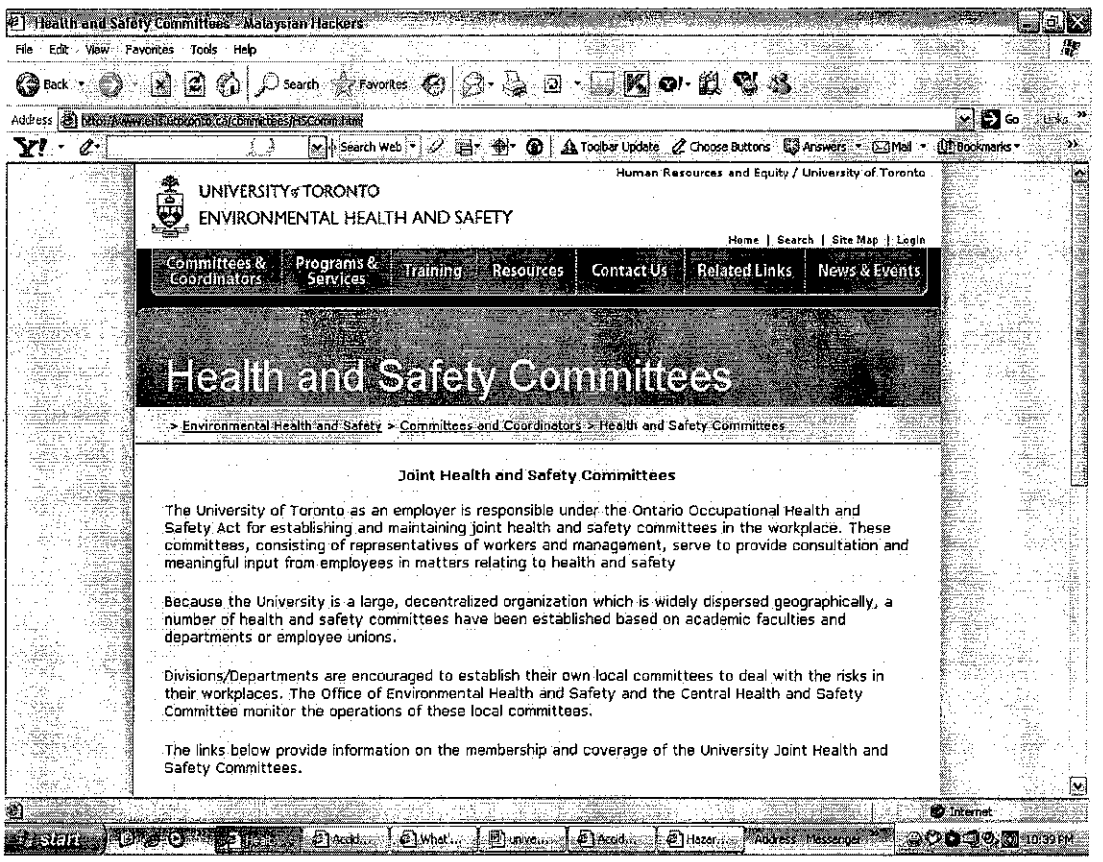

Figure 2.12: UT HSE Committees page

The information on the membership and coverage of the University Joint Health and Safety Committees has being divided into two (2) categories which are Committees Based on Employee Union and Committees Based on Building or Location. UT HSE is committed to the promotion of the health, safety and wellbeing of all their members of the University community, to the provision of a safe and healthy work and study environment, and to the prevention of occupational injuries and illnesses.

In UT's Governing Council, the President and all levels of management will work in consultation and cooperation with University employees, joint health and safety committees, students, contractors and visitors to ensure that the requirements of the

Occupational Health and Safety Act and its regulations, other applicable legislation, and the University's Occupational Health and Safety Management System are fully implemented and integrated into all University work and study activities.

Managers and supervisors, whether academic or administrative, will take responsibility and accountability for the health and safety of those individuals under UT HSE direction and those workplaces under their charge. The administrator of UT HSE will advise their employees of the existence of potential or actual workplace hazards, and will ensure that they work safely and in accordance with the Occupational Health and Safety Act and its regulations, and all applicable University policies and procedures. UT HSE will take every precaution reasonable in the circumstances for the protection of their employees. Besides, the contractors, tenants and visitors at the University will comply with all relevant legislation, policies and procedures as shown in the Figure 2.13 below:

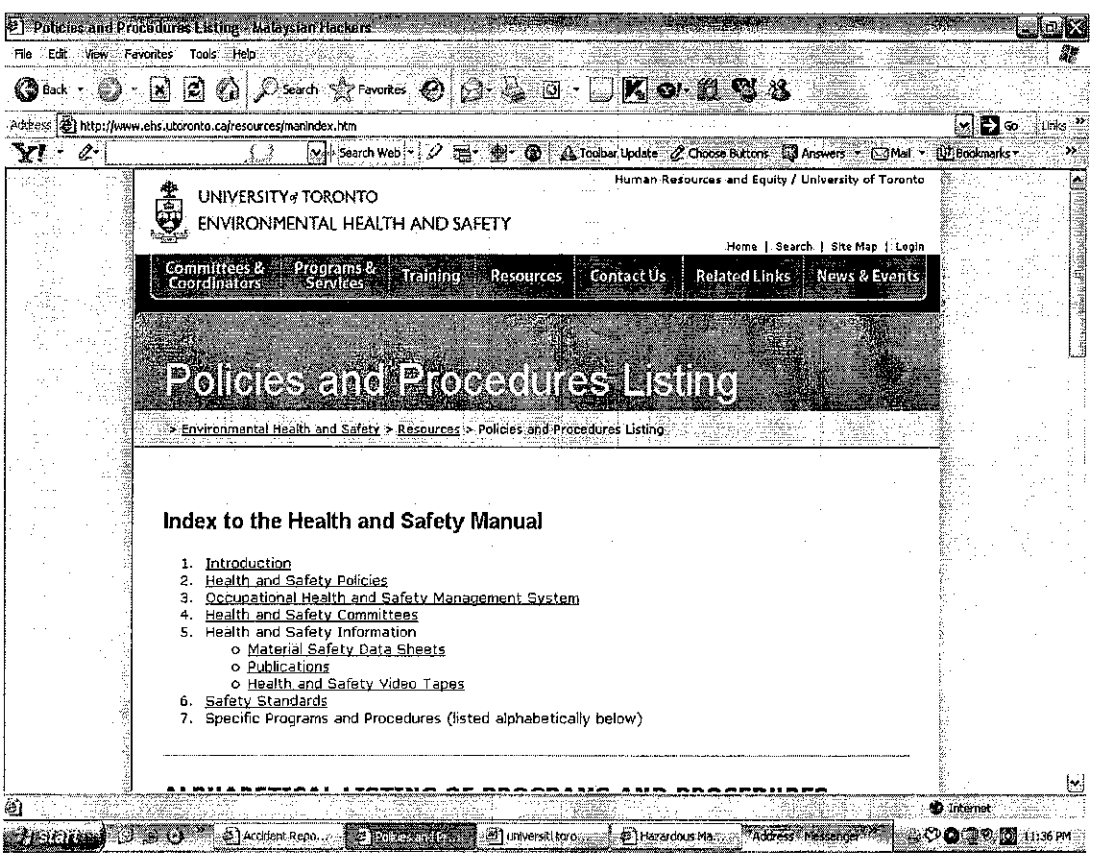

Figure 2.13: UT HSE policies and procedures listing page

All University employees, including faculty, librarians, and non-unionized and unionized employees, have some responsibility for ensuring health and safety in the workplace. Employees will work safely and in compliance with the Occupational Health and Safety Act and its regulations, and University policies and procedures. Employees will report all unsafe and unhealthy conditions and practices in the workplace to their immediate supervisors so that they may be promptly remedied. Where reasonable, the HSE of University Toronto will strive to exceed the legislated requirements by adopting the best practices available to protect the University community and to promote a positive health and safety culture. The University will work towards continuous improvement in its health and safety program.

While students are not covered by the Occupational Health and Safety Act, the University is also committed to ensuring that health and safety is considered in all aspects of student life. Students are responsible for conducting themselves in a safe manner, and are required to comply with all relevant legislation, University policies and procedures. The University's Policy for Safety in Field Research addresses health and safety responsibilities for faculty, staff and students engaged in field research beyond the geographical boundaries of the University. Individuals who fail to meet their obligations concerning health and safety may, depending on the circumstances, face appropriate disciplinary action, up to and including discharge. All members of the University community are expected to demonstrate their commitment towards a safe and healthy work and study environment by acting in compliance with this Policy [Environmental, Health & Safety Department, Human Resources and Equity / University Of Toronto (2005)].

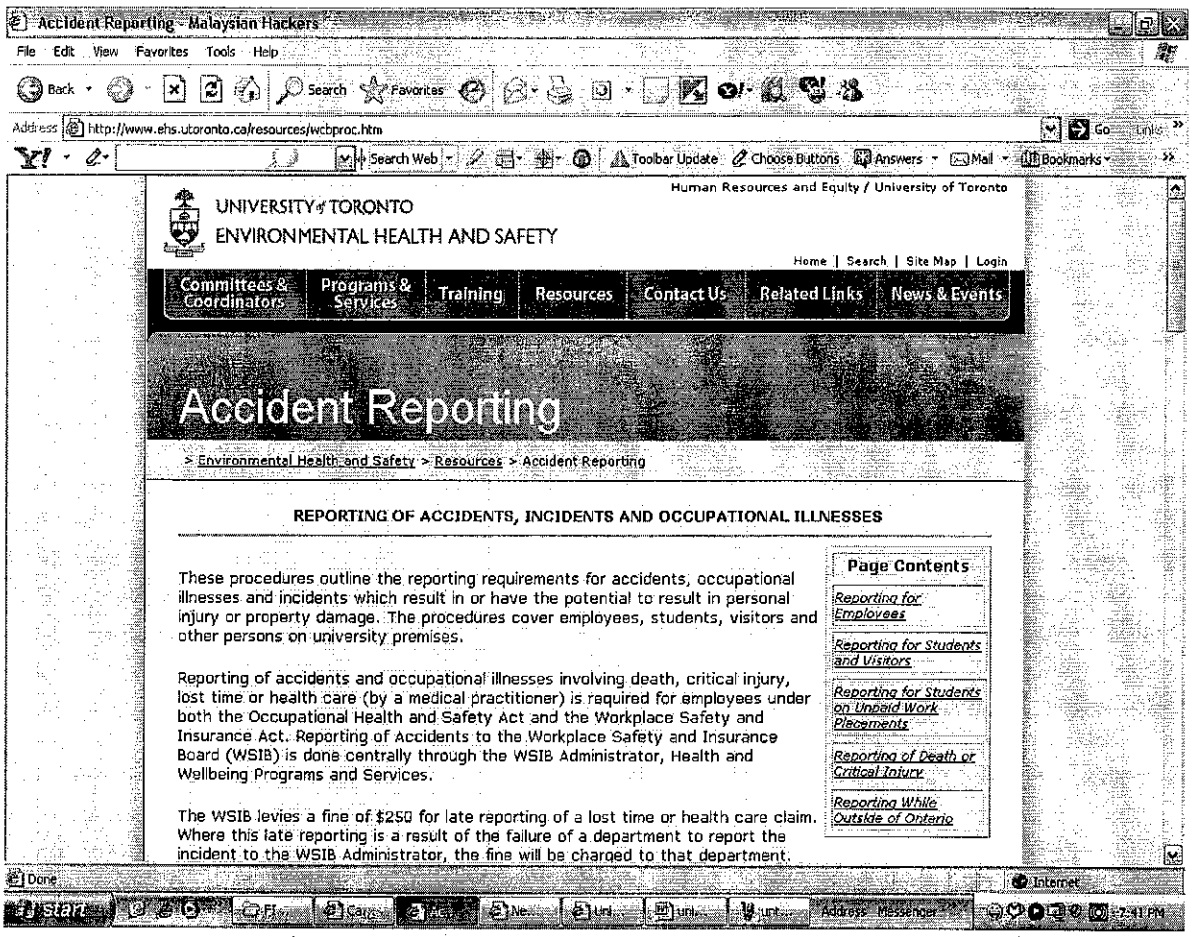

Figure 2.14: UT HSE accident reporting page

Based on Figure 2.14 above shows the UT HSE regulation, reporting of accidents and occupational illnesses involving death, critical injury, lost time or health care (by a medical practitioner) is required for employees under both the Occupational Health and Safety Act and the Workplace Safety and Insurance Act. Reporting of Accidents to the Workplace Safety and Insurance Board (WSIB) is done centrally through the WSIB Administrator, Health and Wellbeing Programs and Services [Environmental, Health & Safety Department, Human Resources and Equity / University Of Toronto (2005)].

For UT HSE department system, the reporting of accidents, incidents and occupational illness are divided into five (5) main sections which is Reporting of Accidents/Incidents Involving Employees. The employees include all full-time, part-time, session, casual employees and graduate teaching assistants when they are performing their duties as teaching assistants. Next is the Reporting of Accidents / Incidents Involving Students and

Visitors. The UT students and visitors include all non-employees present or working in University workplaces. These include undergraduate students, graduate students, visitors and members of the general public. All of the accidents involving students or visitors are to be reported on the "University of Toronto Risk Management and Insurance Report."

The third section of accidents, incidents and occupational illness reporting is Reporting of Accidents Involving Students on Unpaid Work Placements. The UT students who are required to participate in unpaid work placements with an external employer as a part of a requirement for their degree are eligible for coverage through the Workplace Safety and Insurance Board should they suffer a work-related accident or illness. The exception to this is students who are performing unpaid research at the University. Reporting of Death or Critical Injury is the fourth section of accidents, incidents and occupational illness. A critical injury is defined as an injury of a serious nature that:

- places life in jeopardy
- produced unconsciousness (or an altered state of consciousness)
- results in substantial loss of blood
- involves the fracture of a leg or arm, but not a finger or toe
- involves the amputation of a leg, arm, hand or foot, but not a finger or toe
- consists of burns to a major portion of the body, or
- causes the loss of sight in an eye.

The last section is the Reporting of Injuries While Outside of Ontario. These procedures outline the reporting requirements for accidents, occupational illnesses and incidents which result in or have the potential to result in personal injury or property damage. The procedures cover employees, students, visitors and other persons on university premises. Accidents to staff or students occurring outside of Ontario must be immediately reported to the home department within 24 hours [Environmental, Health & Safety Department, Human Resources and Equity / University Of Toronto (2005)].

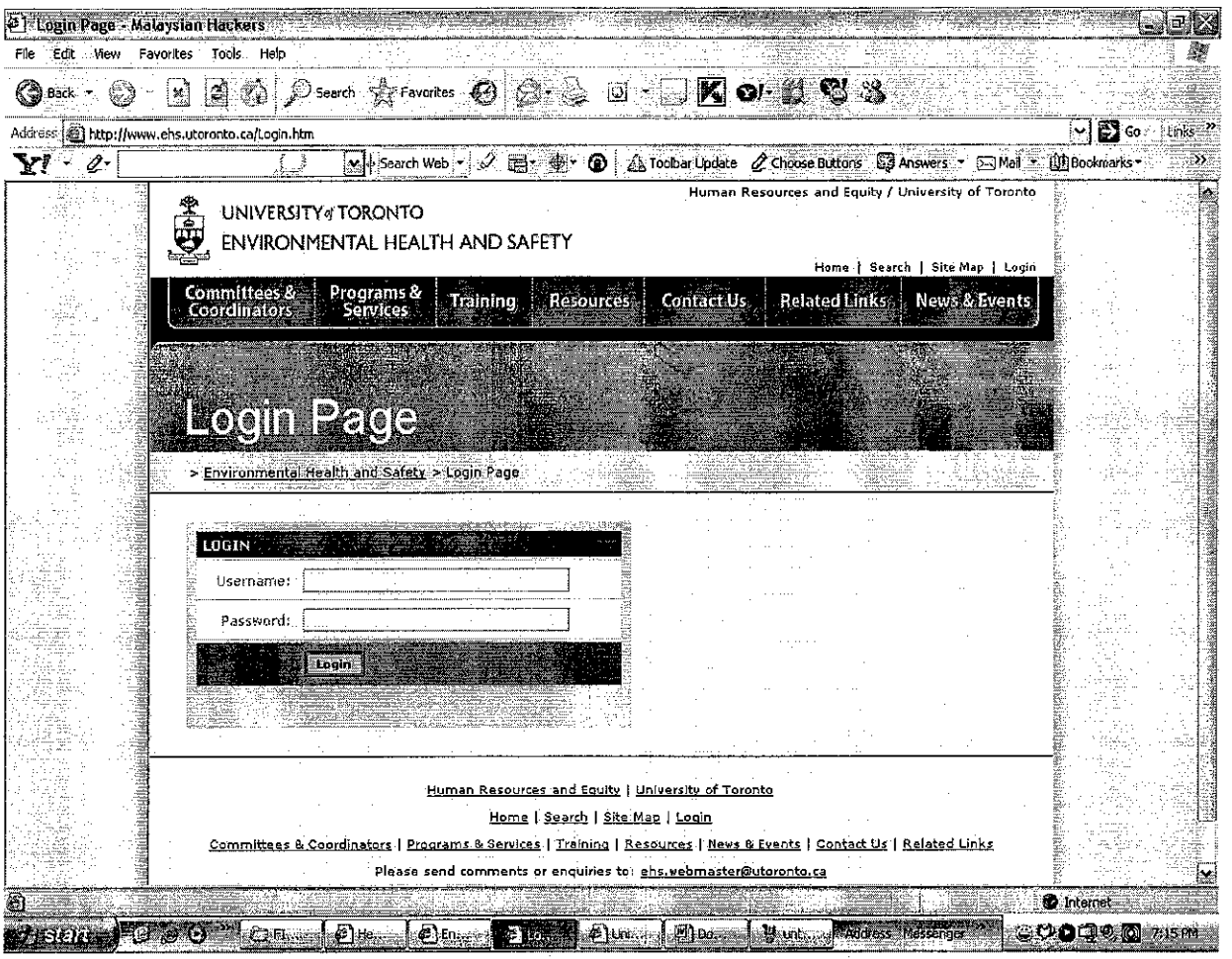

Figure 2.15: Administrator UT HSE login page

UT HSE administrator will address issues of workplace health, injury, illness and accommodation. The web system of UT HSE department was monitor by their administrator and this unit functions also as a centralized resource for all employees, lecturers and students of the University of Toronto in getting the information on workplace injury, long term disability, workplace accommodation and related issues. All UT HSE administrators will have to login first in order for them to update, edit or retrieve the information or data at the login page as shown in Figure 2.15 above. For the hazardous materials information page as shown in Figure 2.16 below, UT HSE has provide some useful information regarding MSDS of safety chemicals.

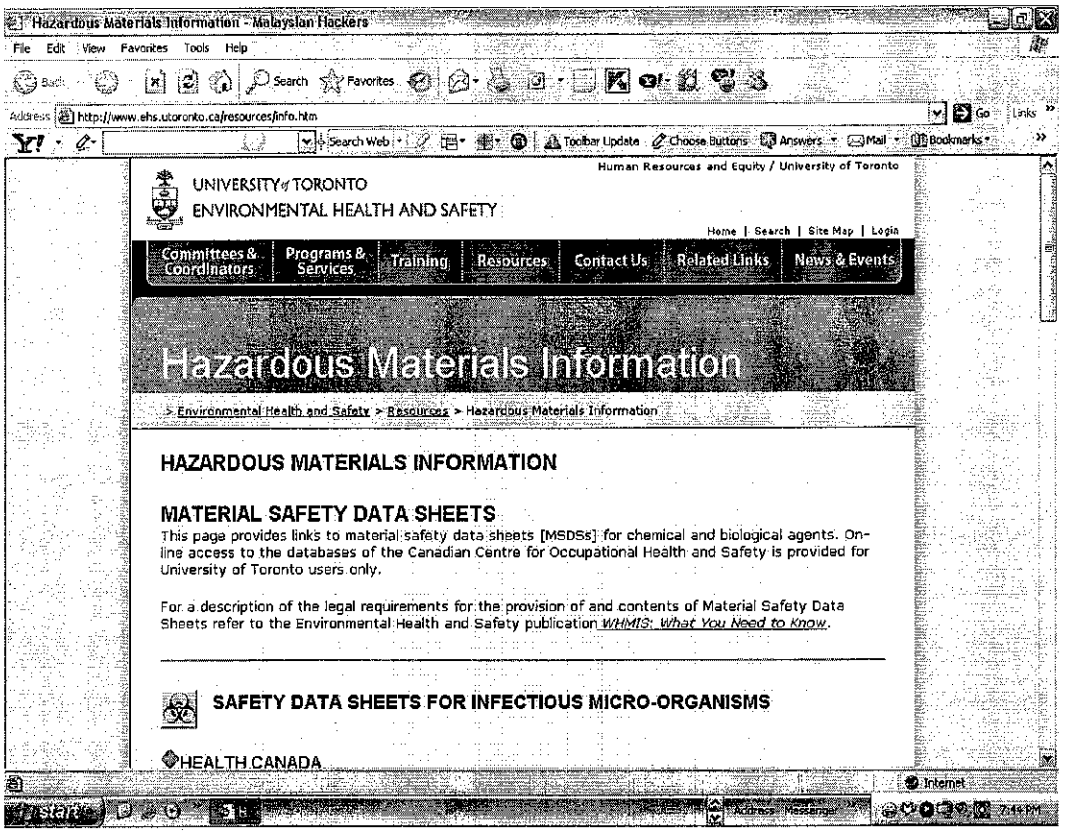

Figure 2.16: Hazardous materials information page

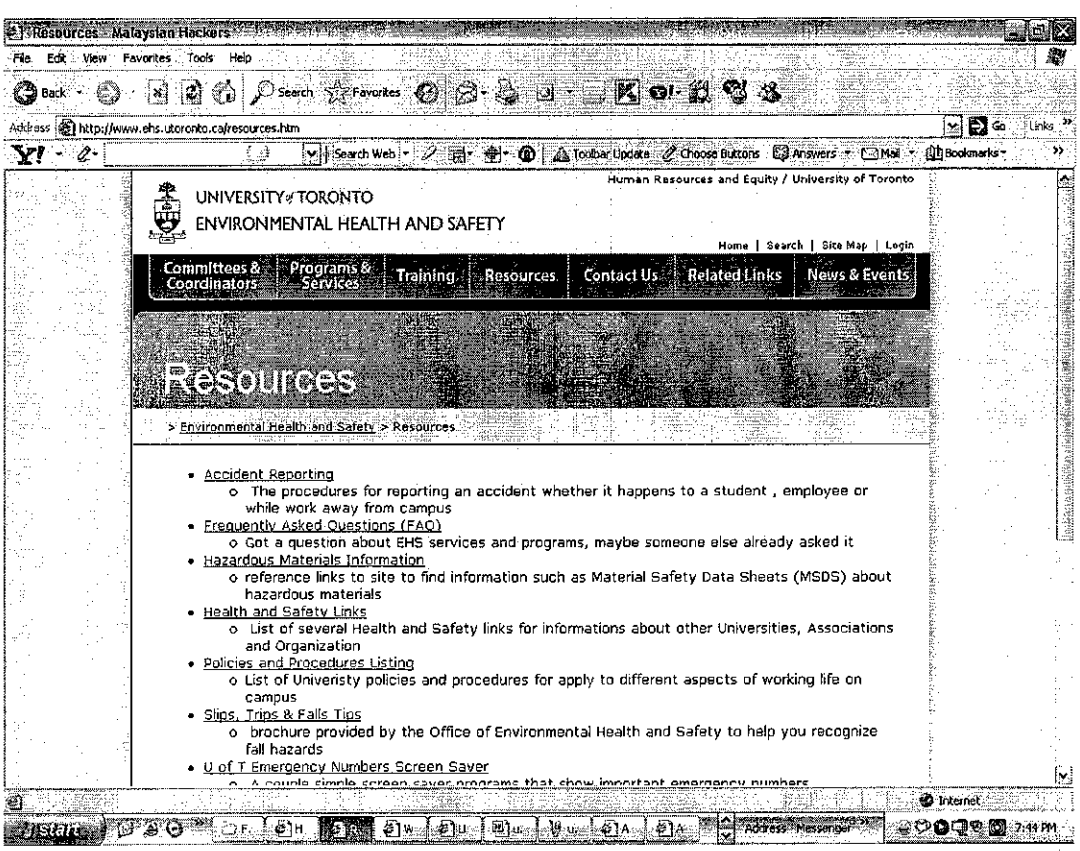

Figure 2.17: Hazardous materials information page

Figure 2.17 above shows that UT HSE department has gathered all their resources which can be divided into eleven (11) main parts which are Accident Reporting, FAQ, Hazardous Materials Information, Health and Safety Links, Policies and Procedures Listing, Slips, Trips & Falls Tips, U of T Emergency Numbers Screen Saver, U of T Lab Hazardous Waste Management, University Health and Safety Guidelines, and Videotape Library [Environmental, Health & Safety Department, Human Resources and Equity / University Of Toronto (2005)]. All of this information is important because it contains all the procedures for reporting an accident whether it happens to a student, employee or while work away from campus and also reference links to site to find information such as MSDS about hazardous materials

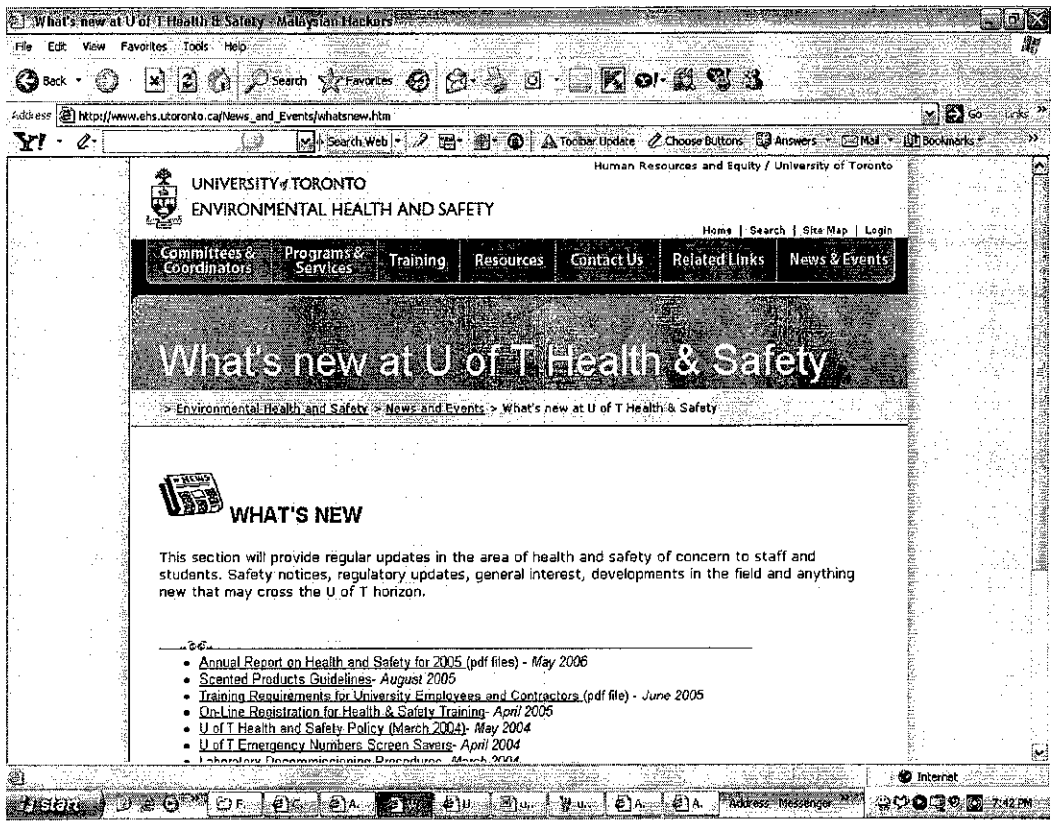

Figure 2.18: UT HSE News & Events page

UT HSE Web Based System, it also has the calendar of current and up and coming events involving the Office of Environmental Health and Safety can be viewed at News & Events page as shows in Figure 2.18 above. All UT employee and student can check out what is new or updated from the Office of Environmental Health and Safety from here.

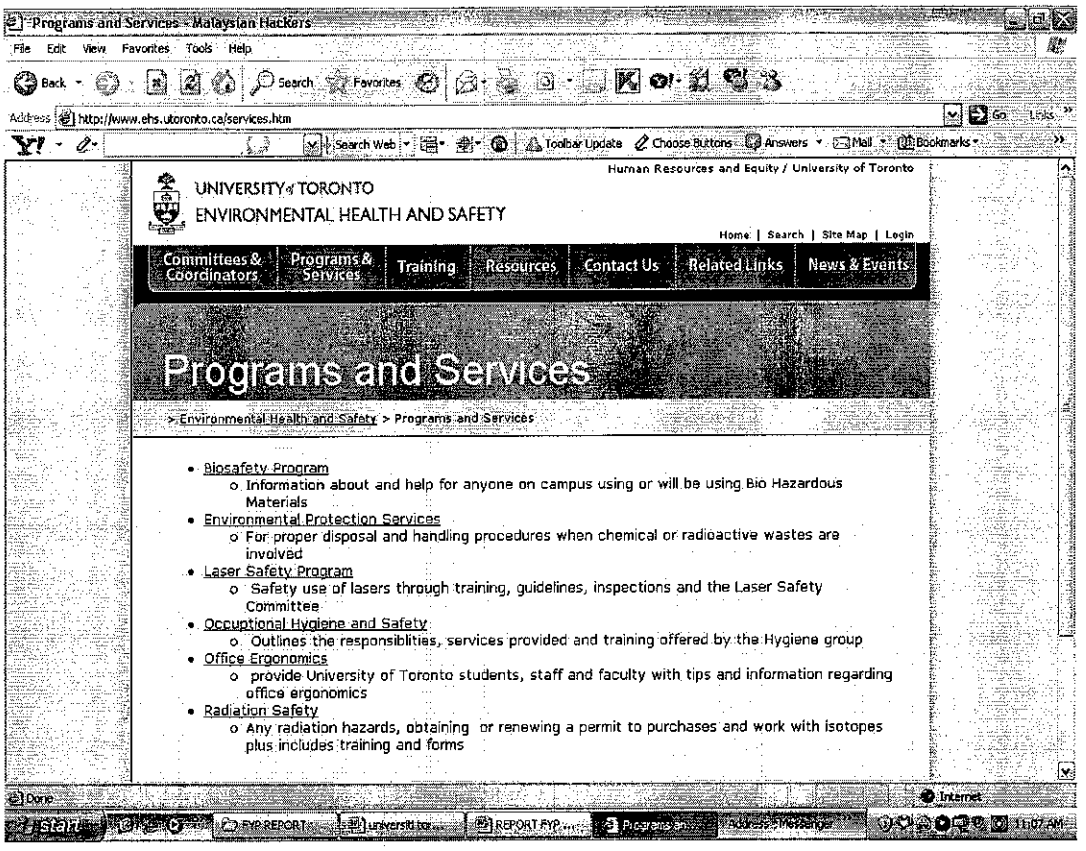

Figure 2.19: Programs and Services page

The purpose of this site in UT HSE Web Based System is to provide University of Toronto student, staff and faculty assistant with tips and information regarding office ergonomics [Environmental, Health & Safety Department, Human Resources and Equity / University Of Toronto (2005)]. This information will answer many common questions and assist in solving some of the most common computer-related ergonomic problems. UT HSE department provides a lot of program and services in order to ensure safe environment and provide the guidelines developed by the Office of Environmental Health and Safety.

Figure 2.19 shows the page for programs and services interface that provide useful information regarding safety program in order to ensure healthy and safety working environment in UT. For example, the hazard information can be obtained and the useful information such as the hazards description can be evaluated and the information being shared by all. These programs and services obtained the data about any radiation

hazards, obtaining or renewing a permit to purchases or work with isotopes plus include training and forms. Besides, the information about and help for anyone on campus using or will be using Bio Hazardous Materials will make all UT employees and students alert through the training, guideline and inspections conducted by UT HSE department.

CHAPTER 3
METHODOLOGY AND PROJECT WORK

Project research involves the processes of studying the problem statements by conducting survey and interview sessions, analyzing the data obtained from survey and interviews, proposing a solution, defining system requirements and system flow, designing system interfaces and installing the hardware and software required.

3.1 Studying the Problem Statements

3.1.1 UTP HSE administrator

A predevelopment survey was conducted to gather HSE administrators' opinions towards matter related to project being research. Survey is used because there is a large number of information and opinions are needed. The objective of this questionnaire is to gather information, opinion and feedback for the research work on behalf of students.

The questionnaire consisted of eleven (11) questions related to the problems of all the UTP staffs and students also including the HSE administrators with the current system which is done manually. These questions also mine the preferable type of presenting data and recording the information. The questionnaire has being distributed randomly to 50 students from the different intake (batch) and also to UTP staff from various departments or academic programme.

Also conducted the interview sessions with the UTP HSE administrator:

- Mr. Wan Tarmizi B Wan Ismail (Manager UTP HSE department)
- Mr. Mohd Fuadriza B Mustafa (Staff UTP HSE department)

The objective of this interview sessions are to gather information, opinion and feedback for the research work on the information and data records for UTP HSE department. The

questions during interview sessions related to the problems of the administrator during conducting chemical register, incident/accident reporting and supervising CHRA with the current system. This interview is also intended to get permission from UTP HSE administrator to use actual data about UTP HSE department.

3.2 Analyzing the Data Obtained

Based on the surveys and interviews conducted, the results were gathered and being analyzed. The results of survey are converted into pie chart while the results of interview sessions are analyzed in feasibility study that will be included in Chapter 4 which is Result and Discussion part.

3.3 Proposing a Solution

After reviewing the current problems, several objectives to be achieved have being identified. These objectives are to identify the proper solution to be made. A plan to develop a system for UTP HSE department named as UTP HSE Web Based System has been asked for supervisor approval first. Several similar web based system has been reviewed that related to UTP HSE web based system via the Net for other university to make as a benchmark in developing this system.

Similar HSE web based system especially from international university regarding their HSE web based system has being found. There are many opportunities to increase the efficiency of the available system in the market especially in data representation because based on the research have been done, currently local university does not have their own HSE web system. They also do not take HSE matters as one of the important factors in their life or jobs. In fact, most of the local university does not have their HSE website compared to international university who got their own HSE web based system.

3.4 Defining System Requirements and System Flow

System requirement and the system flow for UTP HSE administrator, students and also UTP staffs have been defined. Different modules have different requirements and different flow. Then, the discussion was conducted with UTP HSE administrator about the system requirements and the system flow defined for an agreement.

3.5 Designing System Interfaces

It is understood that this phase decides how the system would operate, in term of hardware, software, user interface, and database. Based on the information collected earlier, the logical flow of the system has been designed first. The system interfaces design was according to HCI principle which is also based on the discussion with UTP HSE administrator about the system interfaces designed for an agreement.

3.6 Installing the Hardware and Software Required

The installed software for developing this UTP HSE web system are; Adobe Photoshop CS2, Macromedia Dreamweaver MX and EasyPHP. Personal Home Page (PHP) technology and also the Linux/Unix as a platform has been chooses because the language that being used were HTML and PHP only in order to synchronize with the UTP website since this HSE web based system will be link from there. In order to setup the web interface, EasyPHP is installed to run the project as a web server so that the user may access the system by connecting to the server. EasyPHP is a complete software package that offers the dynamic language PHP and efficient use of database under Windows. The package used includes Apache 1.3.27, PHP 4.3.3, PHP MyAdmin 2.5.3 and also MySQL 4.0.15.

3.7 System Development Life Cycle (SDLC)

For this project, the System Development Life Cycle (SDLC) being chosen is both incremental and prototyping life cycle model. Both two models which are examples of a predictive life cycle are being selected because the system scope is clearly defined from the early stages. Much time will be needed in order to fully clarify and understand the requirement of the entire system, producing necessary requirement analysis design and the theory of the system before starting with the code writing.

Waterfall model in Figure 3.1 is implemented in this system which applies the linear sequential model process instead of Rapid Application Development (RAD). RAD is an incremental software development process model that emphasizes an extremely short development cycle. Since the period of this Final Year Project is about two (2) semesters, Waterfall Model is very appropriate to be implemented. It is referred as waterfall model because of the series of stages, one after another and each stage is related to each other. The most demanding phases are courseware specification and instructional design that largely determines whether the prototype produces achieve the objective stated.

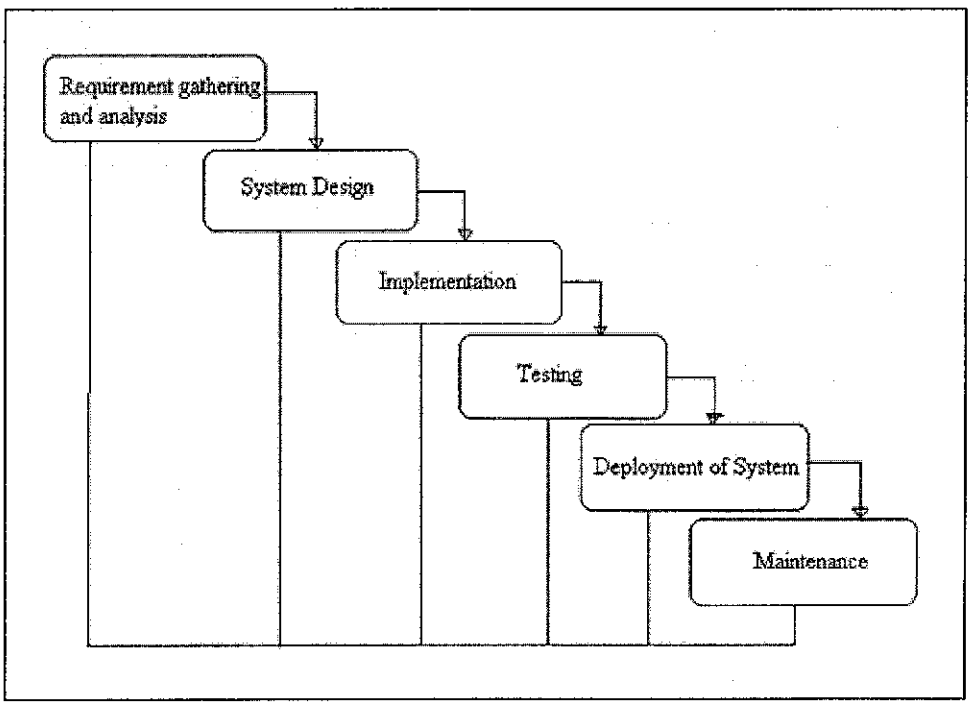

Figure 3.1: Waterfall Model

3.7.1 Phase 1: Requirement gathering and analysis

In this stage, the problem statement need to be understood and analyzed carefully in order to have better understanding of the problem stated. In this project, most of the system requirements are gathered from various information about UTP HSE department and also some information that have been collected from the World Wide Web in the internet.

This phase will lead to achieve the project objective that has been stated before. The study for the first part of this semester is about the courseware design on the web, instructional design, contents needed, interaction styles and software and hardware to be used. In this also, all the requirement and problem might involved are studied and analyzed. Besides, project development task is designed to list all the phase that involve in the development of this system.

The methodology that was being used and also the hypothesis that been analyzed as a guideline in starting to develop this web system. This stage is important in defining the interface design and functionality of the system that will be developed which are closely related to each other. It is because, if the interfaces are poor, the functionality is obscured but if the web system is well designed it will allow the system functionality support all the user's tasks.

The journals and articles also being collected for the system requirement purpose mostly are regarding the importance of analysis in HSE system. The analysis deals with the study of HSE web system from other university; this has been done through the Literature Review in this report. The main goal of this project is to develop a web system for UTP HSE department and to make all the records done not by using the paper based method anymore.

3.7.2 Phase 2: System Design

During the design stage, it is purposely to outline activities that will relate to the accomplishment of the system's objective and achieve the target. System design provides a process and framework for systematic planning, developing and adapting instruction based on the user needs and contents requirements. System design is a phase where all the functions, features, interfaces and contents are sketched and drafted before the real development is done. The required functions are decomposed into modules and their interfaces. User interface is designed and data structured of each task are specified. Graphical User Interfaces (GUI) that has been designed is such as determining interaction types, navigational design, flowchart and storyboard.

At this stage, the system is to be completed phase by phase and for the system architecture for this project, bottom up approach development model is chosen. This method is chosen due to its flexible allowances choice of system development methodology. Traditional approach of system development methodology that needs to get the development model mostly correct in the early stage is impossible as this project involves more than just one area of studies. Various issues need to be considered that is unforeseen at the beginning. Thus different conditions and techniques would be evolved during project development phase from time to time. Below are the descriptions of the task that have been designed:

3.7.2.1 Navigational Design

The navigational design applied in this system is linear navigational design which represents the contents in hierarchical manner with several menus or topics that will assist user to navigate and explore the system. There are ten (10) main menus that have designed to be explored by the user in the first main interface which is Home, About Us, Announcement, Information, Chemical Inventory, Accident / Incident Reporting, CHRA, Industrial Hygiene, HSEMS, Training and also ERP.

3.7.2.2 Module of UTP HSE Web System

The module of the system is representing through a chart which will give clear and brief description about the whole system. The chart is designed based on the user navigation and also considering the menus provided by this system. This prototype system is focus only on the information about UTP HSE department and some storing or recording information related to Chemical Inventory, CHRA, Incident / Accident Reporting, HSEMS, ERP and also Industrial Hygiene records. There are currently two (2) main modules that fully developed in the system which are student or staff module and HSE administrator module in this UTP HSE web based system.

For the home page, it presents a brief description of about UTP HSE department and the policies that need to follow by all UTP staff, student and also the contractor. The Login Page section will display the brief description about HSE system and the user need to login by entering their password. All UTP HSE administrators will use the login function part. For the Organizational Structure and Charts page, it will display the list of all organizational structure charts which is according to the academic buildings. All of these charts will show the safety and evacuation organization structure for all the academic buildings in UTP.

Next is the Chemical Inventory part which displayed all the list of hazardous and non-hazardous chemicals stored in UTP. The list of chemicals registered or unregistered will be stored according to its process/location. There are nine (32) process/location that chemicals will be stored which some of them are Common Engineering (Fluid Mechanic Lab), Organic Chemistry Lab, Materials Processing Lab, Manufacturing / Fabrication Lab, Physical Chemistry Lab, Unit Operation Laboratory, Instrumentation Laboratory Teaching Lab), Fluid Characterization Lab and also Lab at the Building 14.

For the CHRA section, this page will then divided into a brief description about CHRA, the UTP HSE CHRA procedures and the report of CHRA done for UTP HSE

department. The summary regarding chemical assessment also can be viewed according to the work area or department with the recommendations after done the CHRA. Incident/Accident Reporting module will cover all the incident/accident notification that need to be completed by originator within twenty-four (24) hours. The initial report form also must stated two (2) witnesses.

This incident reporting can be fully viewed as a report summary page that consist of date of accident, time of accident was discovered, location, nature of accident, particulars of the deceased/injured, two (2) witnesses with details of their particular, methodology, objectives, finding facts, opinion of investigation team members, conclusion, recommendation, prepared and concluded. It also will covered the incident investigation checklist descriptions which can be divided into four (4) main sections which are events leading up to the incident, facts of the incident itself, relevant facts of what occurred immediately after the incident and also the interviewing witness.

For the HSEMS section, there are seven (7) main sections which are Policy & Strategic Objectives, Organization, Responsibilities Resources and Documentation, HSE Risk Management, Planning & Procedures, Implementation & Monitoring, Audits and Management Review. The Policy & Strategic Objectives consists of policy content, policy discrimination and strategy objectives. For the second section which is Organization, Responsibilities Resources and Documentation, it has divided into seven (7) parts which are organization & responsibilities, resources, competence & training, contractor management, communication, legal requirements and documentation & document.

For the HSE Risk Management section that consist of hazard identification, assessing the risks, analyze risk controls, decision making, implementation of controls and maintenances of controls. The HSE plan, procedures & work instructions, management of change and emergency planning are under the Planning and Procedures section. For the Implementation & Monitoring section, it will consist of

performance monitoring, asset integrity, non-compliance & corrective action and also incident reporting & follow up. In Audits section, only consists of two (2) parts which are audit plan and audit competency. The last section is Management Review that consists of HSE main review.

3.7.2.3 Storyboard

Firstly, before starting to design the interface of UTP HSE web based system, the design of the screen layout and sketched has been done first after considered all the multimedia elements and interactions that need to be included in the system. In this stage, the interface background, buttons to be used, screen size, alignment of the fonts and the standard font and color is determined to make the process of designing the graphical user interface will run smoothly. The location, drop down or bottom up menus is sketched to give a real interface that will be developed.

3.7.3 Phase 3: Implementation

In this stage, all the design and sketch that have been planned on the previous stages is developed to produce a system that will follow the requirements and achieved the target objectives as illustrated in Figure 3.2 below. The web development tools such as web server are installed in the computer to start the development and as well as authoring tools that will be used for content development especially for interactive multimedia components. Below are some steps in development stage:

3.7.3.1 Graphical User Interface (GUI)

- **Web Interface**

A web based interface will contain all the information needed and will be functioning as a main platform to deliver the contents of the UTP HSE department to all UTP staff and student. Besides, it also will stored and record all

the information about chemical register, CHRA, HSEMS, Industrial Hygiene Database, HSEMS, Training and Incident/Accident Reporting system that will be update, edit, retrieve or delete by UTP HSE administrator.

To setup the web interface, EasyPHP is installed to run the project as a web server so that the user may access the system by connecting to the server. EasyPHP is a complete software package that offers the dynamic language PHP and efficient use of database under Windows. The package used includes Apache 1.3.27, PHP 4.3.3, PHP MyAdmin 2.5.3 and also MySQL 4.0.15. By using the Macromedia DreamWeaver MX 2004, the interface is designed and there are currently about twenty (20) user interfaces created to allocate all the functions/menus.

Besides, the flash button also will be included to make the interface become more interesting and attractive from the corporate point of view. In order to synchronize with the UTP main website, Linux/Unix has been selected as a platform.

- **Screen design/color**

The screen design and color that have been used in considering the users environment and background. The screen is developed using the appropriate fonts, font colors, background colors, images and many more. There are two (2) frames created which divides the menus and the welcome page. Basically, selection of the color and fonts is very important to ensure the balance and as an image of the corporate or professional web system.

- **Graphics**

In this system, graphics such as a lot of images are not really necessary because the main concepts of this web system is to store and record the data about UTP HSE department information besides sharing the information to all UTP staff and

student in a corporate or professional views. However, the interfaces created highlight the use of the graphics in a professional ways.

- **Navigations**

The navigation is designed based on the linear navigational model to provide simplicity and structured the system for user to navigate and explore easily. Users are able to return to the main menu and to the previous interface using the buttons and this will also help the UTP HSE administrator accessing and retrieving the information easily.

Figure 3.2: Implementation

Functions	Main Task	Sub-code	STATUS
System performs action requested by user	1. System main interface (Completed during System Design Phase)		DONE
	2. Database for each interface	Perform the page to be link to another page	DONE
		Database connection to all interface in system	DONE
	3. Functioning of web system with database link for every interface	Find the correct data to view after insert the key word to search (testing stage)	IN PROGRESS
		Analyze and identify the page if got an error	IN PROGRESS
	4. Control the level of accessing / viewing data / updating & editing data <u>Use Password Level:</u> Administrator – No limit to access or viewing the data Staff/ Student – Limited access for some private or confidential data		DONE

3.7.4 Phase 4: System Testing

The new web system needs to be tested by user in order to evaluate whether it is user friendly or not. The usability test is conducted for user to evaluate the new prototype to see any parts that need some improvements. In this stage, all the interactive multimedia components and elements will be integrated with the functions as well as the navigations in order to produce a complete functional system after finished the development process. System testing involves functional, integration and user acceptance testing. Below are the phases of project work during the system testing:

3.7.4.1 Functional Testing

Each module is tested once developed. This is to detect and debug any flaws before it is made as a whole system. It is also to ensure each subsystem is well-functioning. All modules are tested by using functional testing. A successful functional testing is when expected result or output achieved from the respective input.

3.7.4.2 Integration Testing

Integration testing is conducted when each module completely developed in the system as a whole. It is to ensure there is no flaw or error each time integration of subsystems is performed. In case of error found, debugging will be carried out. Under this testing, the system linkages are also being tested. It is to ensure each link or successfulness of connection between the system and other system components, including database.

3.7.4.3 Users Acceptance Testing

Even though the system has been put to a rigorous testing in both functional and integration earlier, the author feels that it is also important for the user acceptance test to be also conducted. This is in line with the objective of system development is to develop

the system that meets the true needs of the user, not just the system specifications. Another objective of the test is to actually test on the business process flow of the system.

3.7.5 Phase 5: Deployment of system

After all development process is finished and product is completed, this system needs to be evaluated by the user. The details about the testing and evaluation will be discussed in Chapter 4 which is Result and Discussion chapter.

Upon the completion of system development, the installation of the system would takes place. System would be installed in department of UTP HSE. This would require user support as well such as training. New users would require training. At the closing stage, activities involved finalizing the system, presenting the system and preparing final documentation and lesson learnt.

3.7.6 Phase 6: Maintenance

The sub component in this phase has been specified:

- System Construction (Development)
- System Installation and Closing

The objective of implementing system construction is to build the system to ensure it performs as designed. Application code, databases development, and interfaces design are constructed during system construction. At this phase, it will usually get the most attention because for most systems it is the longest and most expensive single part of the development process.

In addition, it also will make sure to get completed all system design and support documentation. Based on those documents, the first thing that would proceed first is the task with the system development. The database architecture for this system has being

prepared and apart from that the design of the system will include relation database, file database and user information database. The system use MySQL as the database architecture because of the availability of the software and use the PHP Triad with the Linux/Unix platform. This is the most suitable database tool to be integrated and synchronize with the UTP main website since this HSE web system will be link from there.

CHAPTER 4
RESULTS AND DISCUSSION

4.1 Survey / Questionnaires Analysis

On week five (5), pre-test questionnaires have been distributed to the students and also various departments of UTP staff. The main objective of this questionnaire is to help in getting information towards the acceptance of UTP HSE Web Based System to store and also to share information regarding the HSE department activities.

There were eleven (11) questions in the questionnaires being distributed in order to determine the level of acceptance among UTP student and staff. After all the questions answered, the data have been analyzed to make an analysis about the survey / questionnaires analysis.

4.2 Data Obtained

Figure 4.1 below are the pie charts of the result obtained from the survey form:

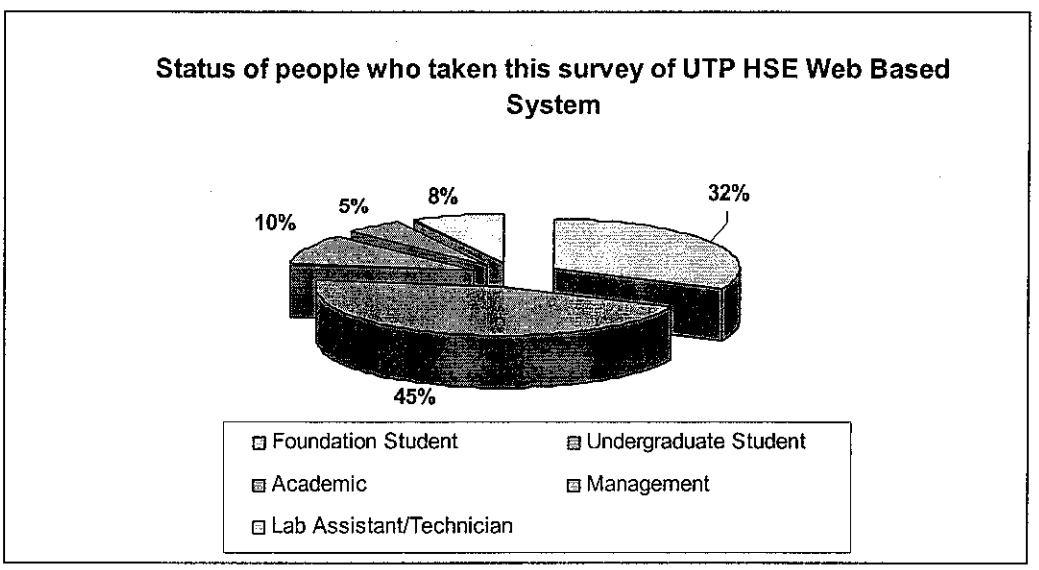

Figure 4.1: Result – status of people who taken this survey

Majority of people who has taken this survey were from Undergraduate student rather than Foundation student.

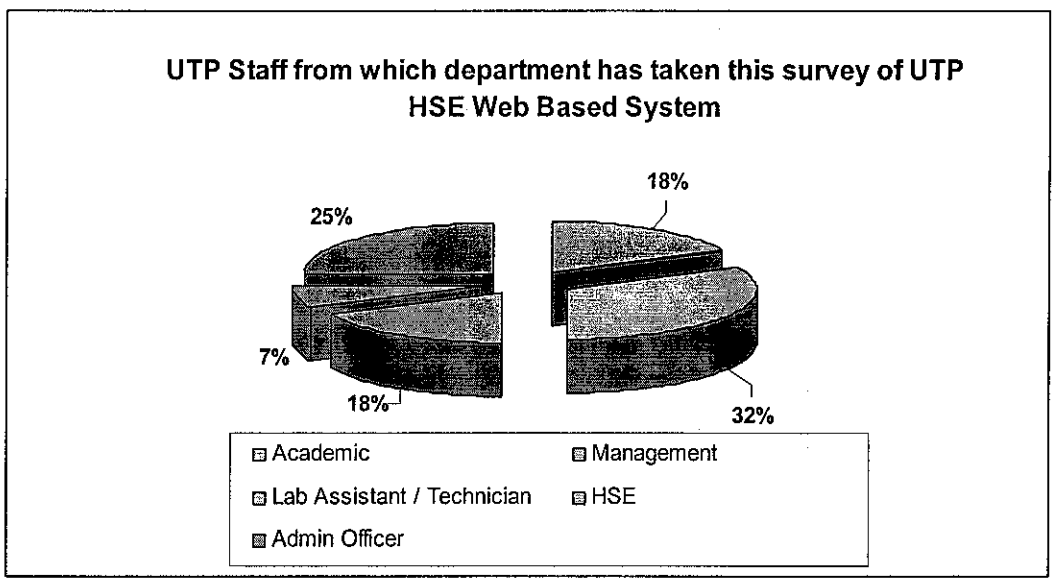

Figure 4.2: Result – UTP staff who taken this survey

Figure 4.2 above shows that the majority from UTP Management staff has taken this survey.

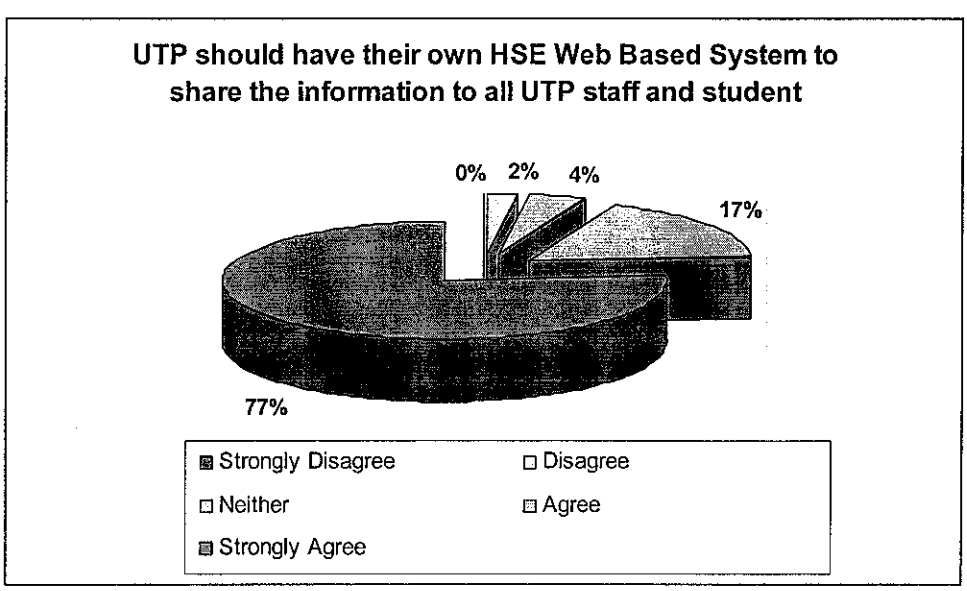

Figure 4.3: Result – UTP should have the HSE web based system or not

Majority of people were strongly agree that UTP should have their own website which called as UTP HSE Web Based System in order to share the information to all UTP staff and student besides to help the HSE Administrator in handling their work as illustrated in Figure 4.3 above. So, by having this web based system, HSE Administrator can eliminate all the paper based method system and make their work become more systematic and faster.

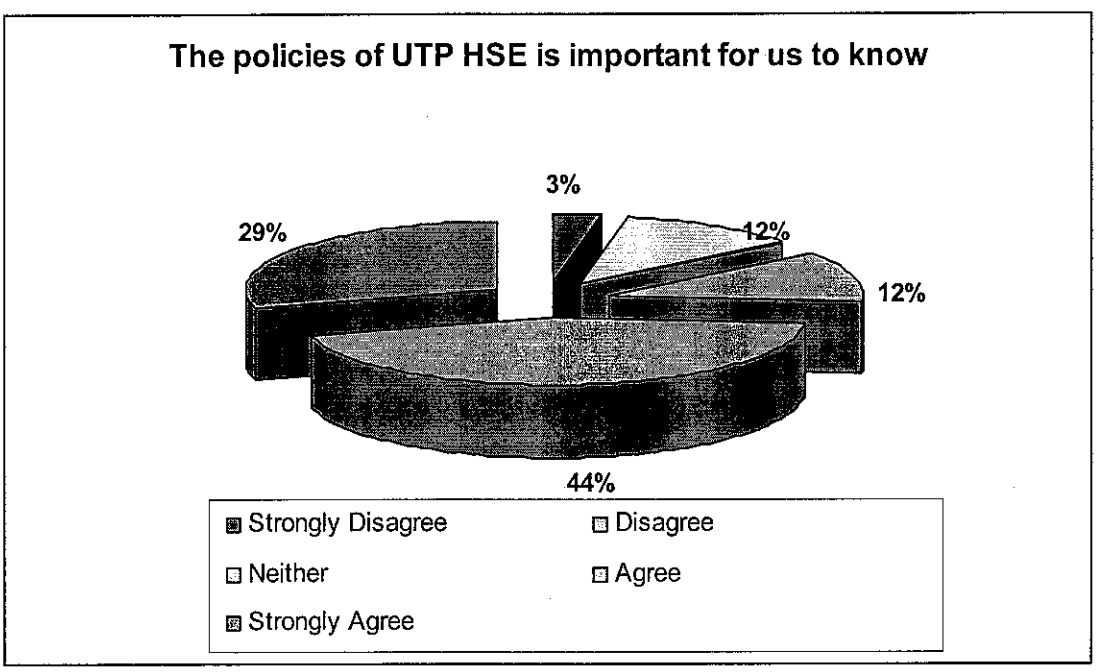

Figure 4.4: Result – UTP HSE policies important or not

Most of the people agree that it is important to know the UTP HSE policies in order to integrate a safe, healthy and environmentally responsible culture into the working and learning experience in UTP. Figure 4.4 also shows that a quite number of people cannot decide whether the policies of UTP HSE is important or not for them to know since they do not have enough information on why HSE aspect is very important for us to adapt in our working environment.

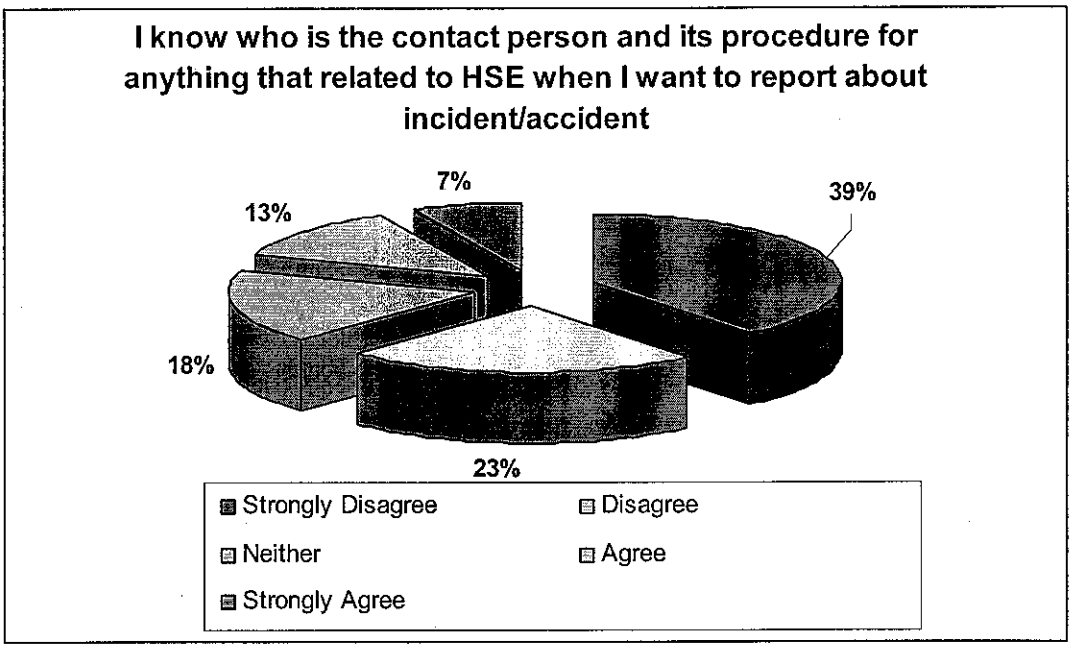

Figure 4.5: Result – people feedback on knowing the accident/incident procedures

In Figure 4.5, it shows that most of people do not know who were the contact person and its procedure for anything that related to HSE. For example, when they want to make a report about accident/incident happened in the labs or any work locations.

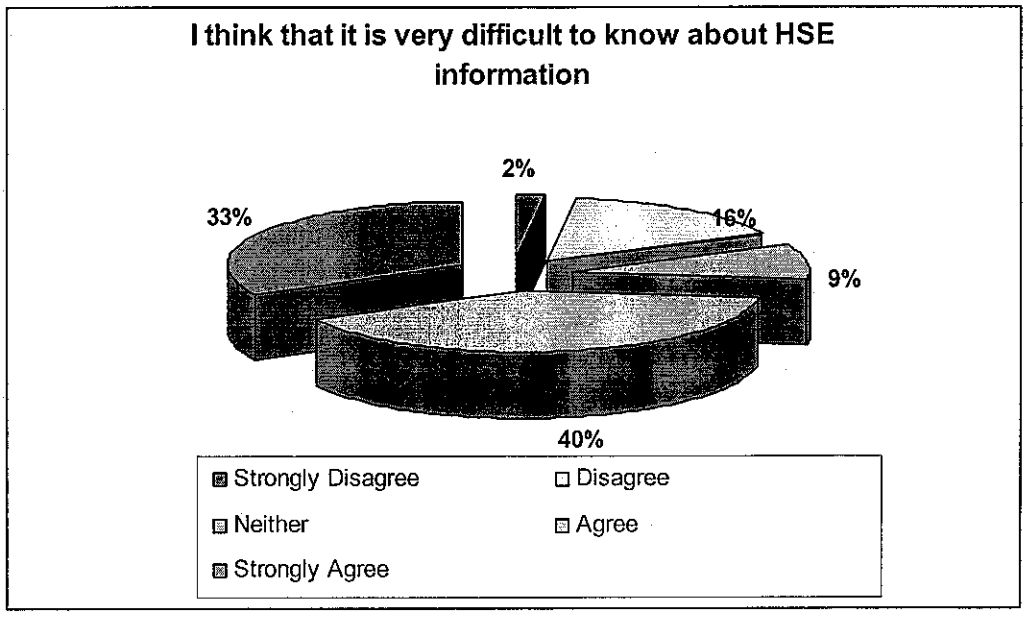

Figure 4.6: Result – difficult to know about HSE information or not

Most of the people agree that it is very difficult to know about HSE information and also their activities. In Figure 4.6, it shows that mostly all UTP staff and student believe that they are having difficulties when across finding the information that related to HSE department.

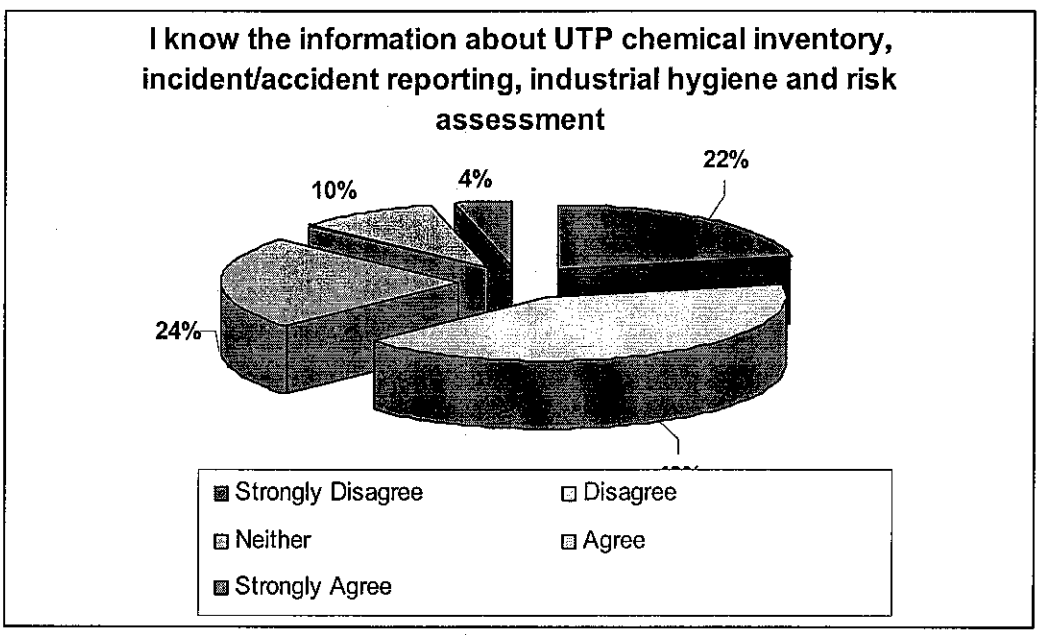

Figure 4.7: Result – know the chemical inventory, IH, CHRA or incident/accident reporting information or not

Most of the people totally disagree when they were asked by a question whether they really know about the information related to HSE department activities or task especially in UTP Chemical Inventory, Incident/Accident Reporting, Industrial Hygiene and also Chemical Health Risk Assessment (CHRA) details information as shows in the Figure 4.7 above.

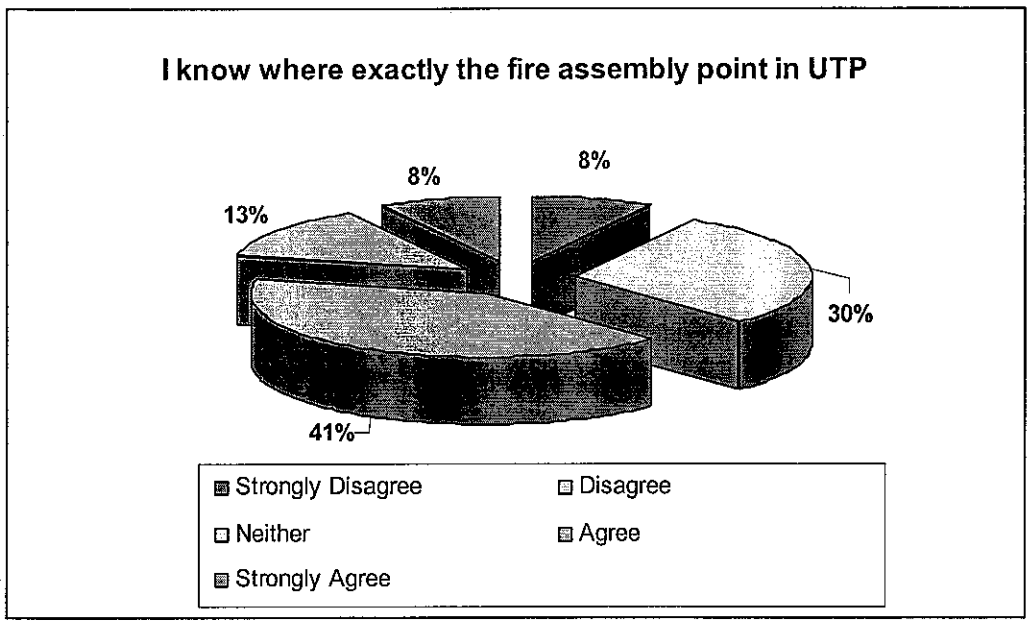

Figure 4.8: Result – know where fire assembly point or not

Figure 4.8 shows that most of the people actually do not know all of the fire assembly point in UTP.

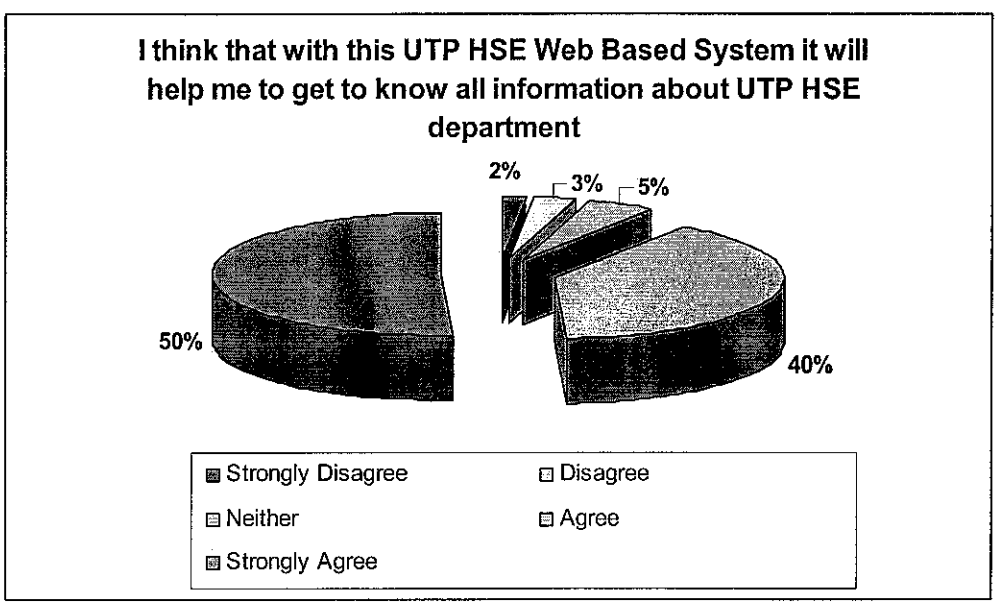

Figure 4.9: Result – whether UTP HSE web based system will help to get information or not

Figure 4.9 shows that most of the people strongly agree that by having UTP HSE web based system they can easily know and update all the HSE department information and its activities.

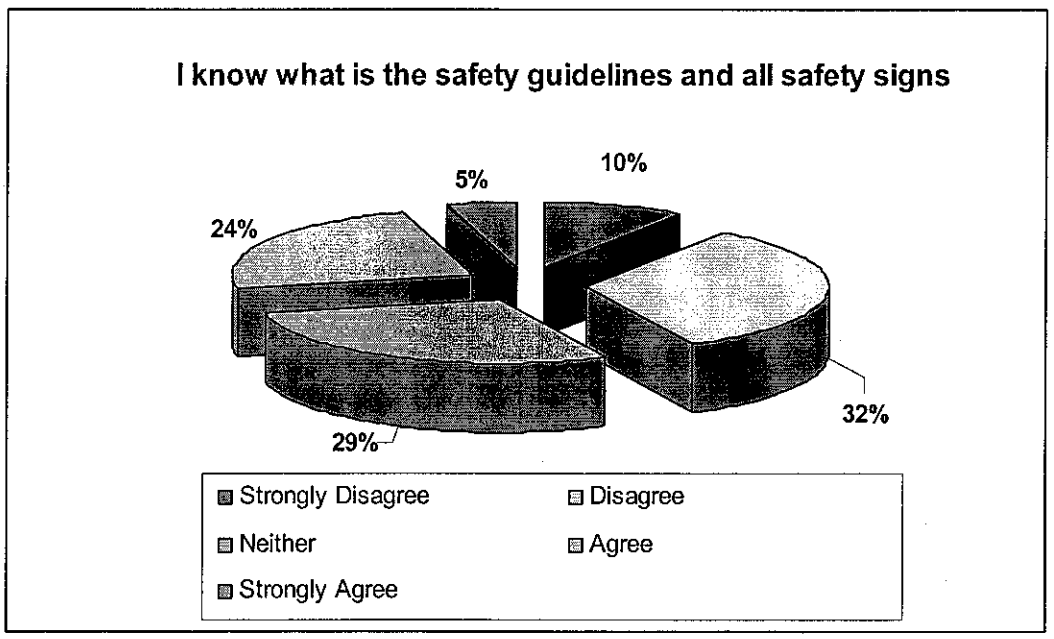

Figure 4.10: Result – know about safety guidelines & signs or not

Figure 4.10 shows that most of the people actually do not know the safety guidelines and safety signs during handling their work in Lab or other process locations.

4.3 System Requirements & System Flow

From the analysis, all important information that needs to be included in the design phase is identified. Project analysis captured the requirements and solves problems mentioned in the problem statement.

The Figure 4.11 below shows the architecture of the system that divided into four parts:

- Presentation Layer
- Application Layer
- Server Layer
- Database Layer

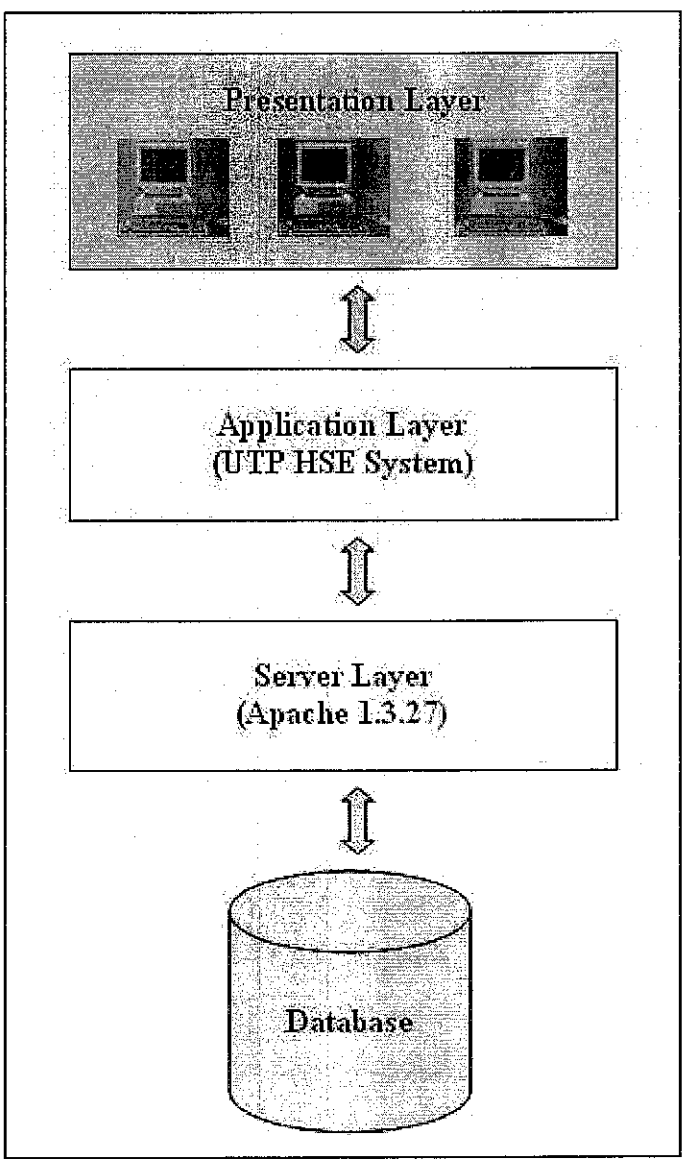

Figure 4.11: UTP HSE Web Based System Architecture Diagram

UTP HSE System Architecture Diagram illustrates the interaction between interdependent layers. The interconnections between layers are designed according to the standard of general information system development.

It illustrates how clients are interacting with the server. It could be seen in the presentation layer which is consisting of several clients issuing the requests to the server. Application layer consists of the application software that provide presentation layer with the data and model. Server layer is an intermediary for connection between application layer and database layer.

4.2.1 Presentation Layer: Users Module and User Interface

4.2.1.1 Users Module

The user of the system has been determined and they would be:

- **Student and UTP Staffs (Lecturer/Lab Assistant etc)**

They are able to:

- view all information about HSE system and its organization
- view selected information about chemical inventory, CHRA and all the information regarding HSE information
- search at a particular chemicals information & safety equipments
- view all the safety guidelines and UTP HSE policies
- know the contact person if emergency case
- can report the incident/accident by online
- can register themselves to join safety training
- view current activities or update about HSE department activities
- can insert any suggestion to improve the HSE department

- **UTP HSE Administrator**

HSE Administrator is able to:

- updating announcement and information
- insert record about labs, process/location
- view, edit and delete all HSE records or information
- insert new record regarding CHRA, chemical inventory, incident/accident investigation reporting and etc.
- insert record of current or latest activities about HSE department
- view, edit and delete record of all information regarding UTP HSE department activities
- do all work not using paper based method anymore

4.2.1.2 User Interface

This system is a web based system. The usage of intensive user friendly UI would be implemented here. The combination between HTML and PHP make it possible in order to implement interactive UI.

4.2.2 Application Layer

Application Layer would accommodate the interaction between users.

4.2.3 Server Layer

The server is a middle tier between application layer and the database layer. All requests by the clients through application layer would be process in this server layer.

4.2.4 Database Layer

The database is organized around problem reports and suitable data structure to record entries. In order to synchronize the UTP HSE web based system with UTP main website, PHP and HTML language has been selected which is by using the EasyPHP that has been installed that offers the dynamic language PHP and efficient use of database under Windows. The package used includes Apache 1.3.27, PHP 4.3.3, PHP MyAdmin 2.5.3 and also MySQL 4.0.15. With the Unix/Linux platform as a recommendation to develop this system in order to get synchronize with UTP main website. For the project's database management system, MySQL has being used and also Apache as web server to configure both of them.

4.4 Project Development

Figure 4.12 below is the main page of UTP HSE web system:

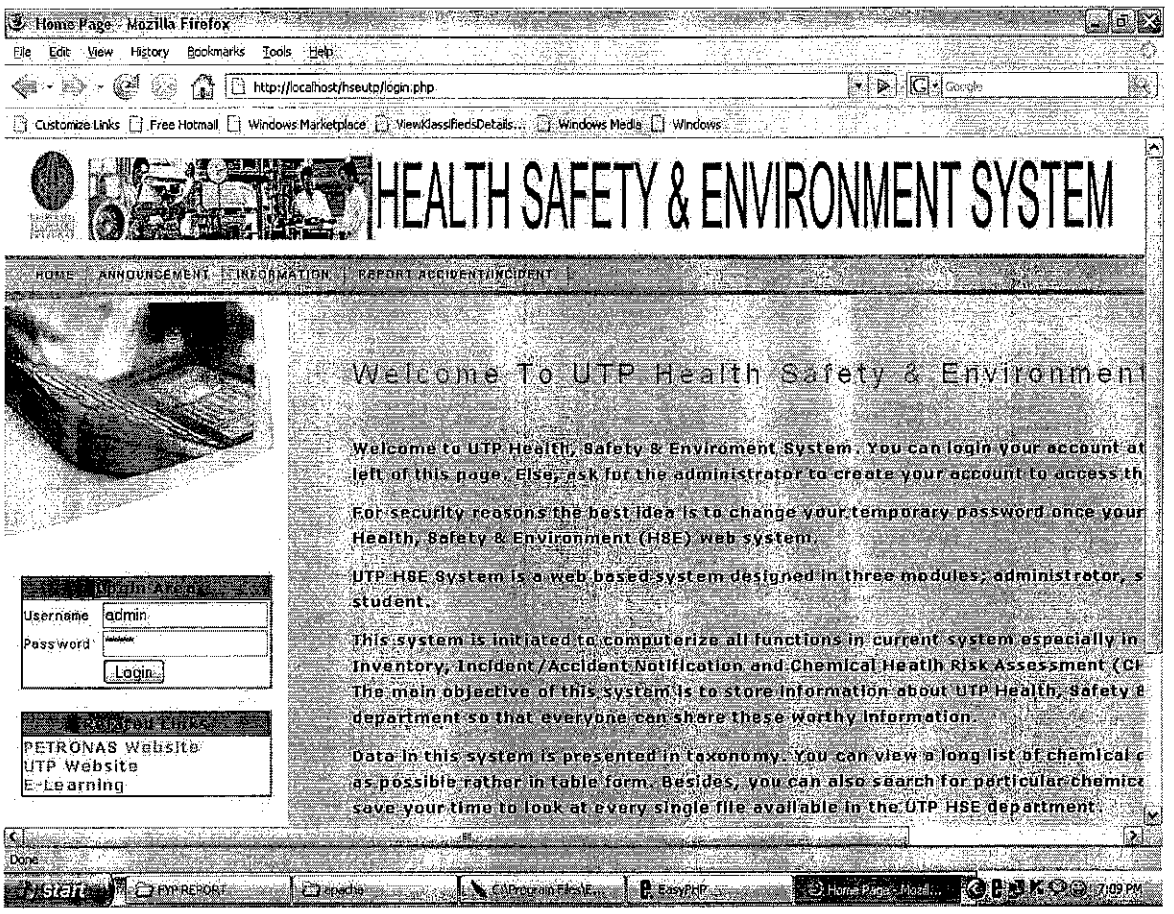

Figure 4.12: Main page of UTP HSE website

The main page for UTP HSE web based system can be view by all UTP staff and student without have to login. The login area is only for the UTP HSE administrator. After the HSE administrator has login with their password, the main page for UTP HSE administrator will be display unless it will show that the login session has expired or the username or password are wrong which is do not matched. Figure 4.13 below show the administrator main page after successfully login the system.

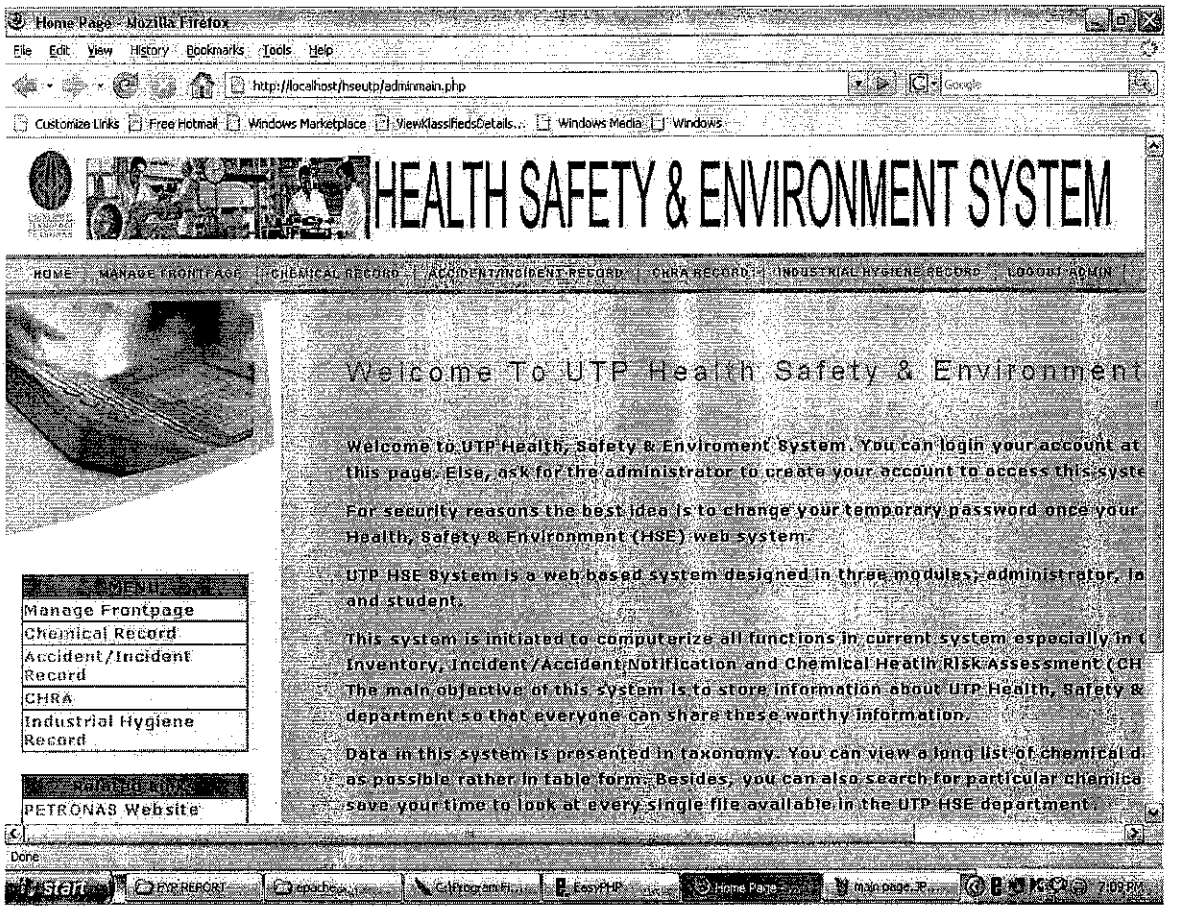

Figure 4.13: HSE administrator main page

The HSE administrator main page will be divided into ten (10) main menus that can be edit, update or delete the records. The administrator has no limit to access the information regarding all of the HSE information and activities. The Figure 4.14 below shows that if the person does not login in the time specifically given, the login session for HSE administrator will expired automatically.

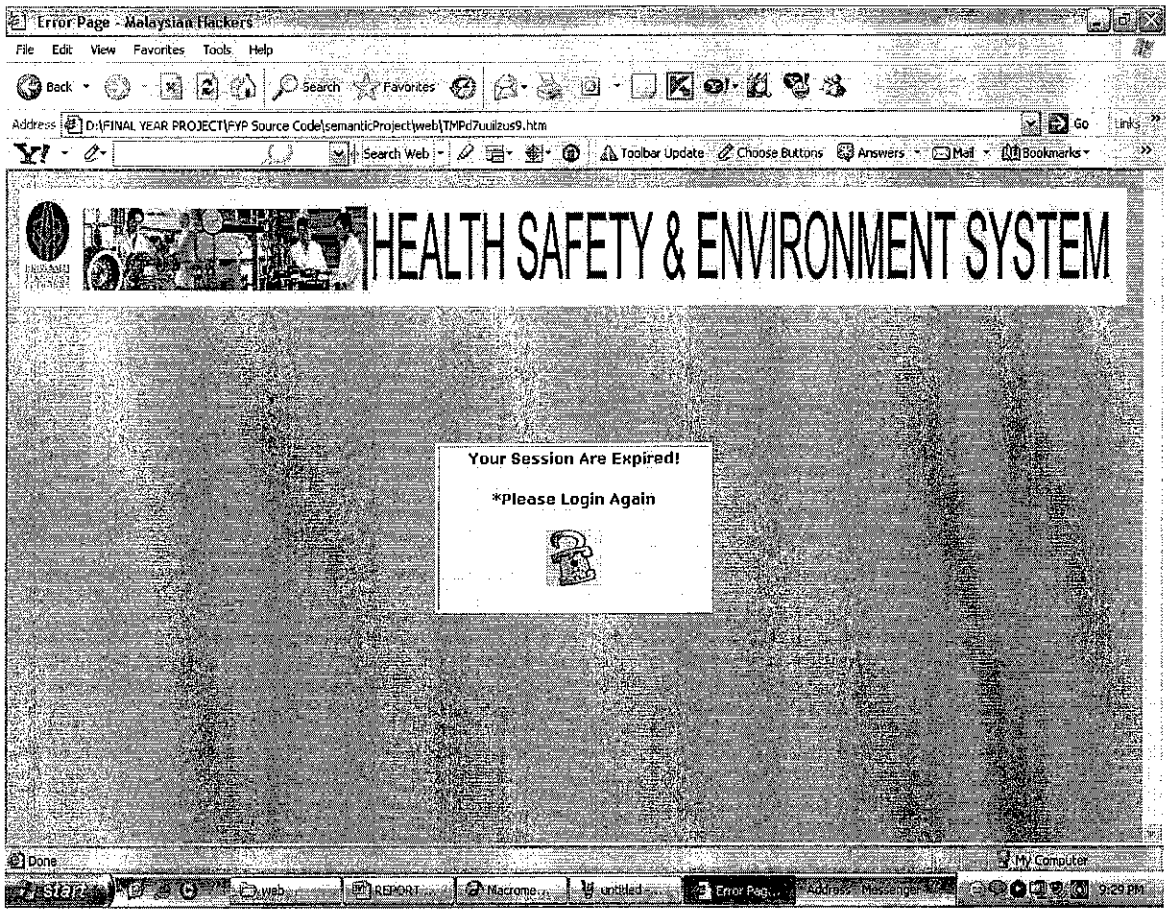

Figure 4.14: Error login page

Figure 4.15 below shows that the HSE administrator can manage the front page which contain announcement and information page that will be viewed by the user. The administrator can insert, update or delete the data that have been recorded.

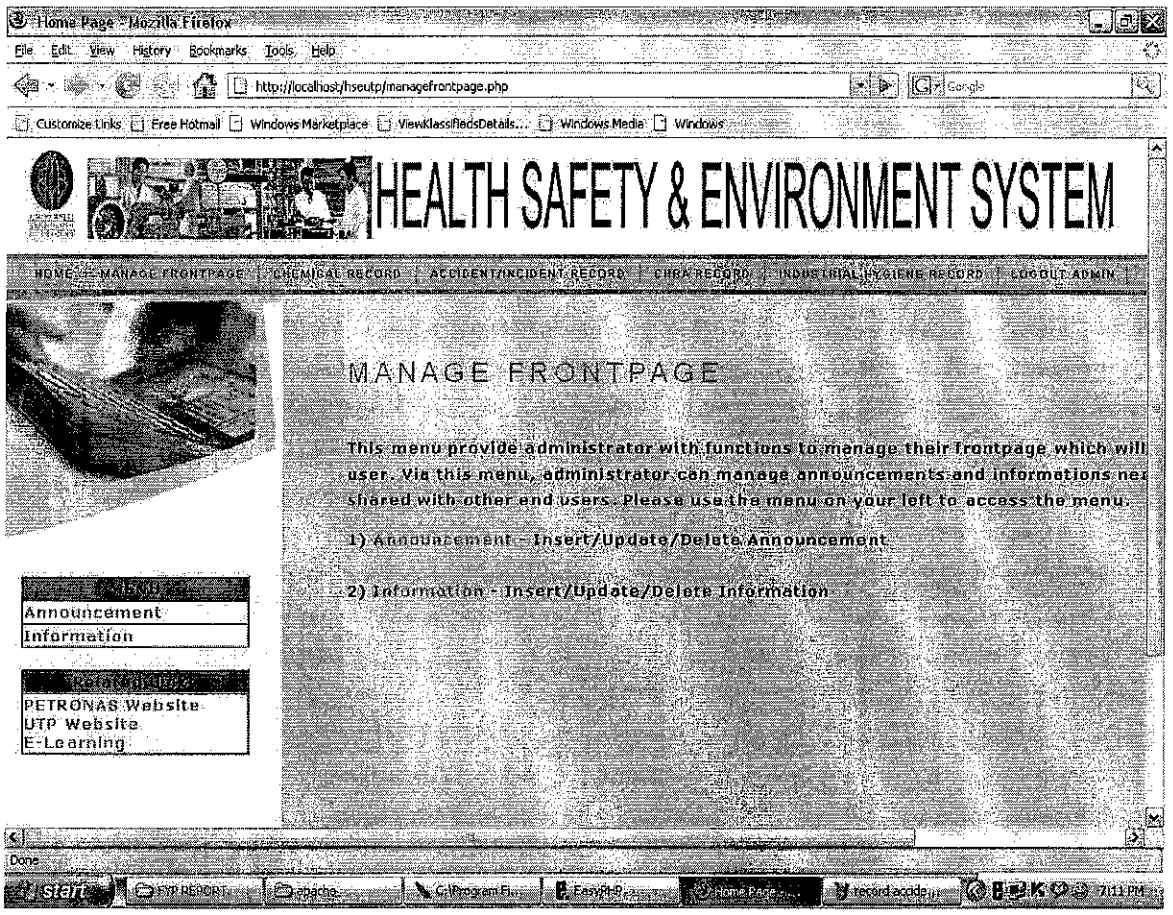

Figure 4.15: Manage front page

Figure 4.16 shows a page where HSE administrator can manage the information that will be displayed to all the UTP staff and student. The HSE administrator can edit or delete the information besides adding new information at that page. Then, they also can decide whether to publish or not the information to all users. All information that being published will also display the time and date the information has been published.

Figure 4.17 below shows the edit page for HSE administrator to edit, delete or add a new process location in UTP for HSE department records.

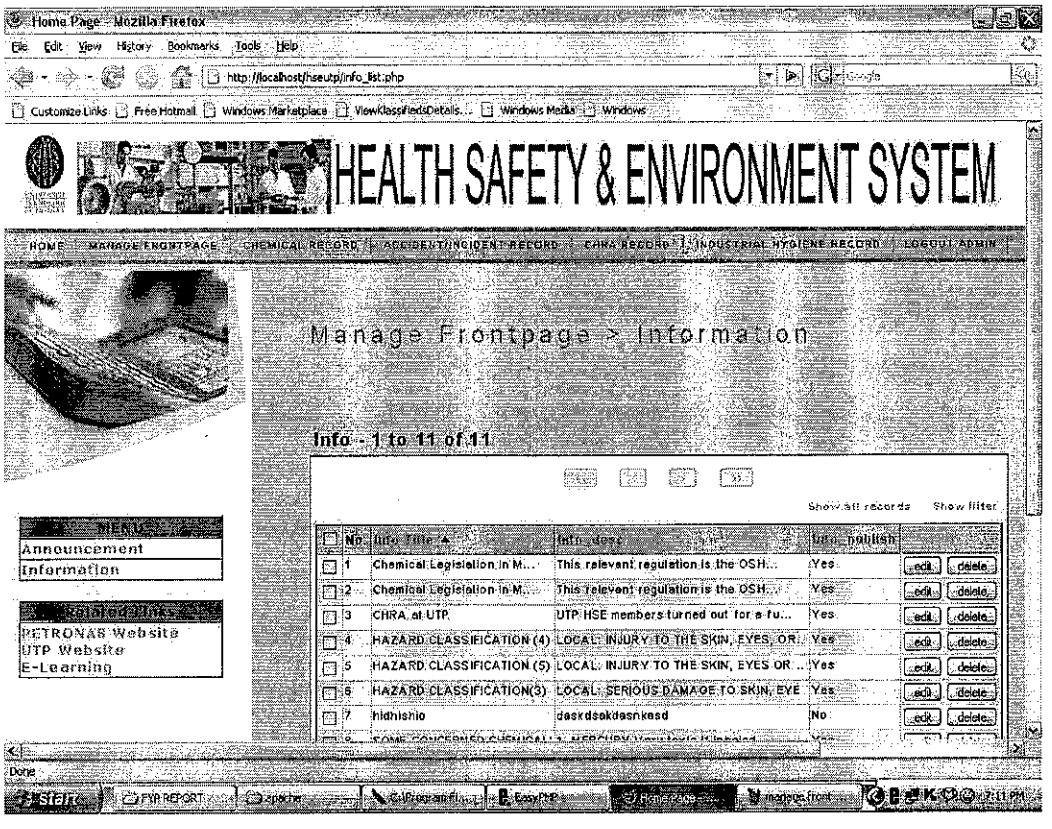

Figure 4.16: Edit information page

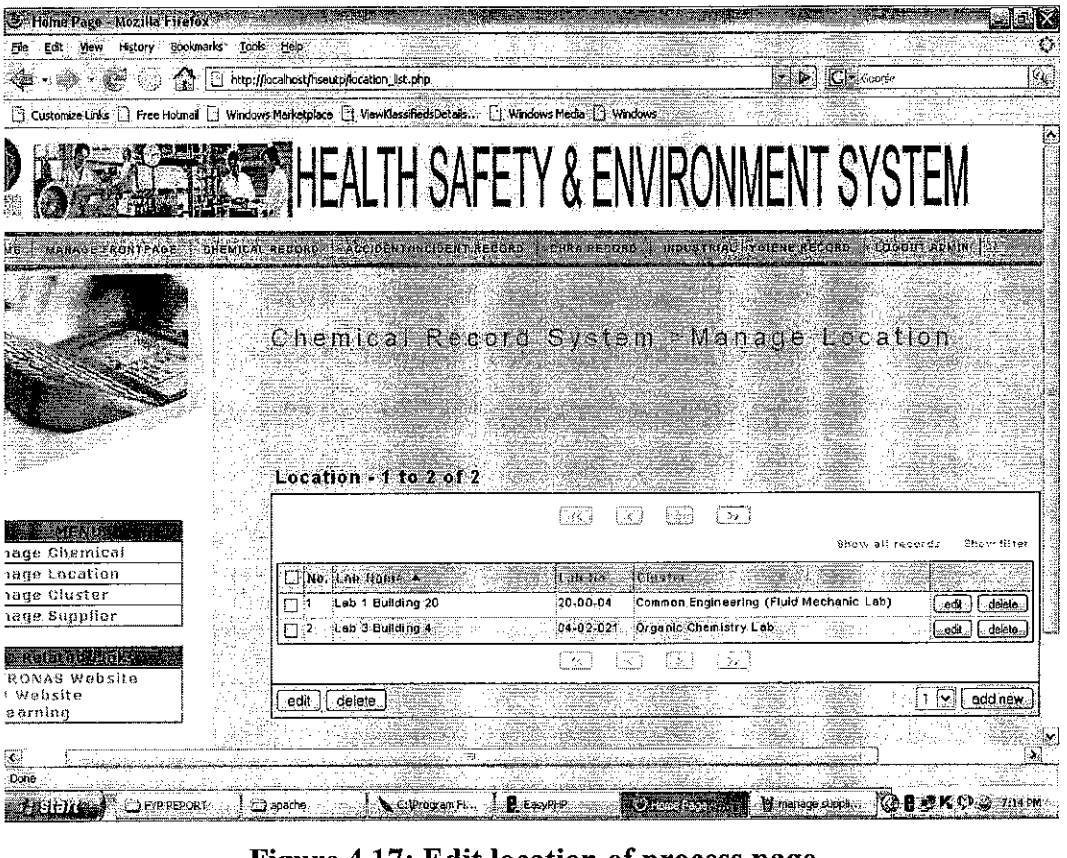

Figure 4.17: Edit location of process page

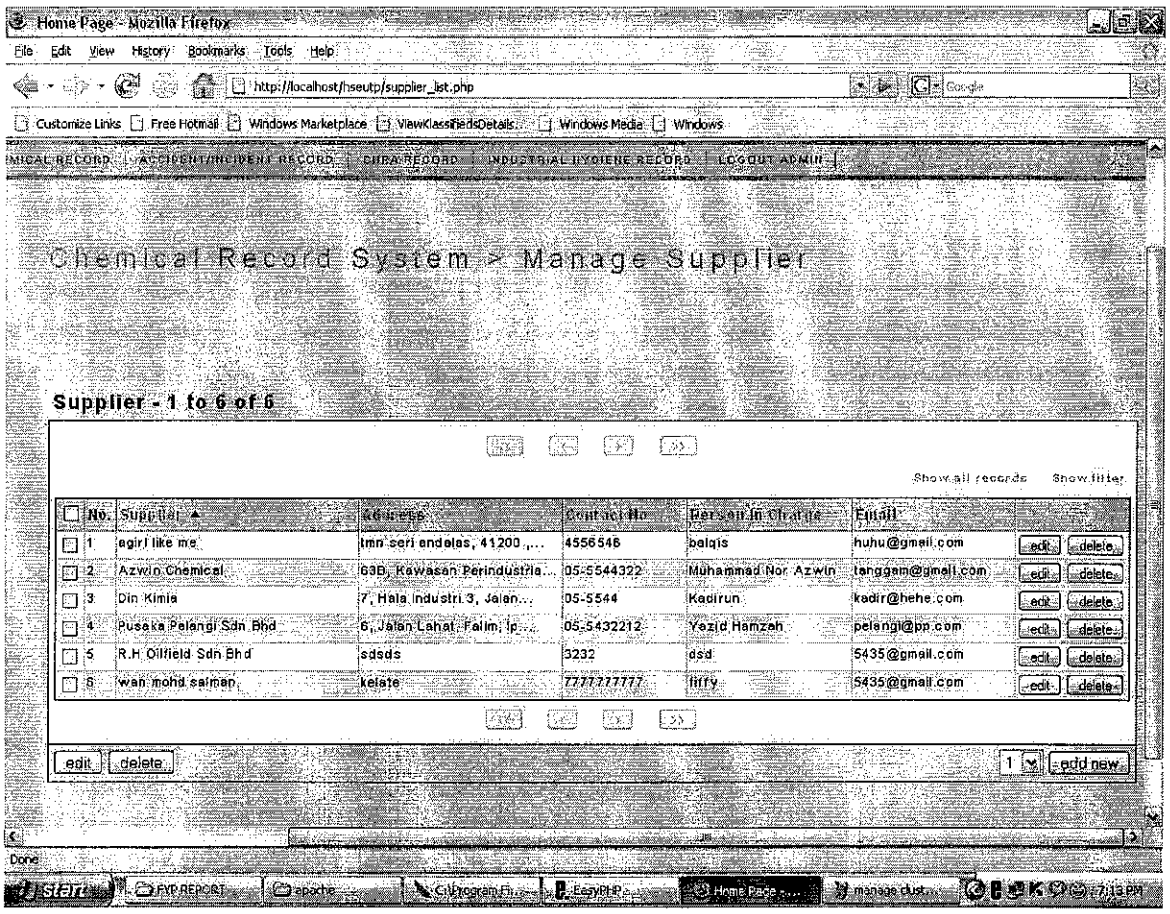

Figure 4.18: Edit supplier page

Figure 4.18 above shows that the HSE administrator can edit, delete or add new supplier of chemicals stored in UTP whether it is non hazardous chemical or hazardous chemical. Besides, this page also stored the equipment supplier and not only chemical suppliers.

4.4.1 HSE Administrator Module

The functions in administrator module are:

- View and edit the accident/incident record

Administrator can view, edit or delete the record of all users of this system who has submitted their report form. The report can be edit or delete. The HSE administrator also can manage it using the reference number. Besides, HSE administrator can sort all the data accordingly by looking at the report status whether in progress, completed or a new record as illustrated in Figure 4.19 below:

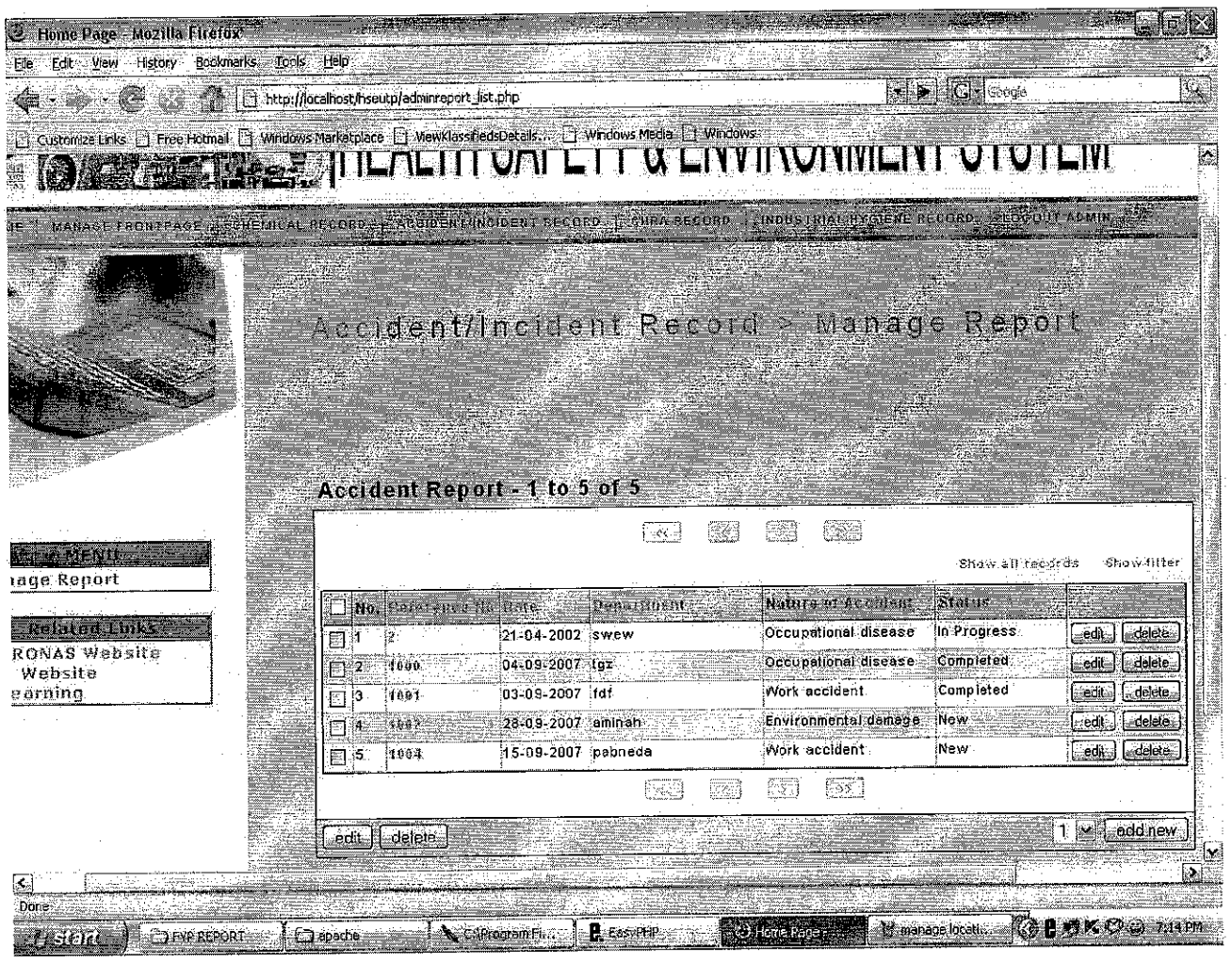

Figure 4.19: Edit record incident/accident page

- View All Record

HSE Administrator can view, edit and delete all record at the admin main interface after they have login. Besides, HSE administrator can sort all the data accordingly. HSE Administrator also can insert any record of HSE department activities, latest news and updating all the current activities in order to be shared among UTP staff and also student.

- Insert New Record

HSE Administrator can insert new record such as the records for every chemical register report which is the chemical inventory record, CHRA record, Incident/Accident Reporting record, HSEMS record, ERP record and also the new information and announcement as illustrated in the Figure 4.20 below:

Figure 4.20: Edit announcement record page

- Insert Record (Forms)

For example, HSE administrator can insert all record regarding chemical inventory and also can update or delete that record. Figure 4.21 below show the chemical record system for UTP HSE web based system that can be divided into four (4) main sections which is chemical details, manage location, manage cluster and manage supplier.

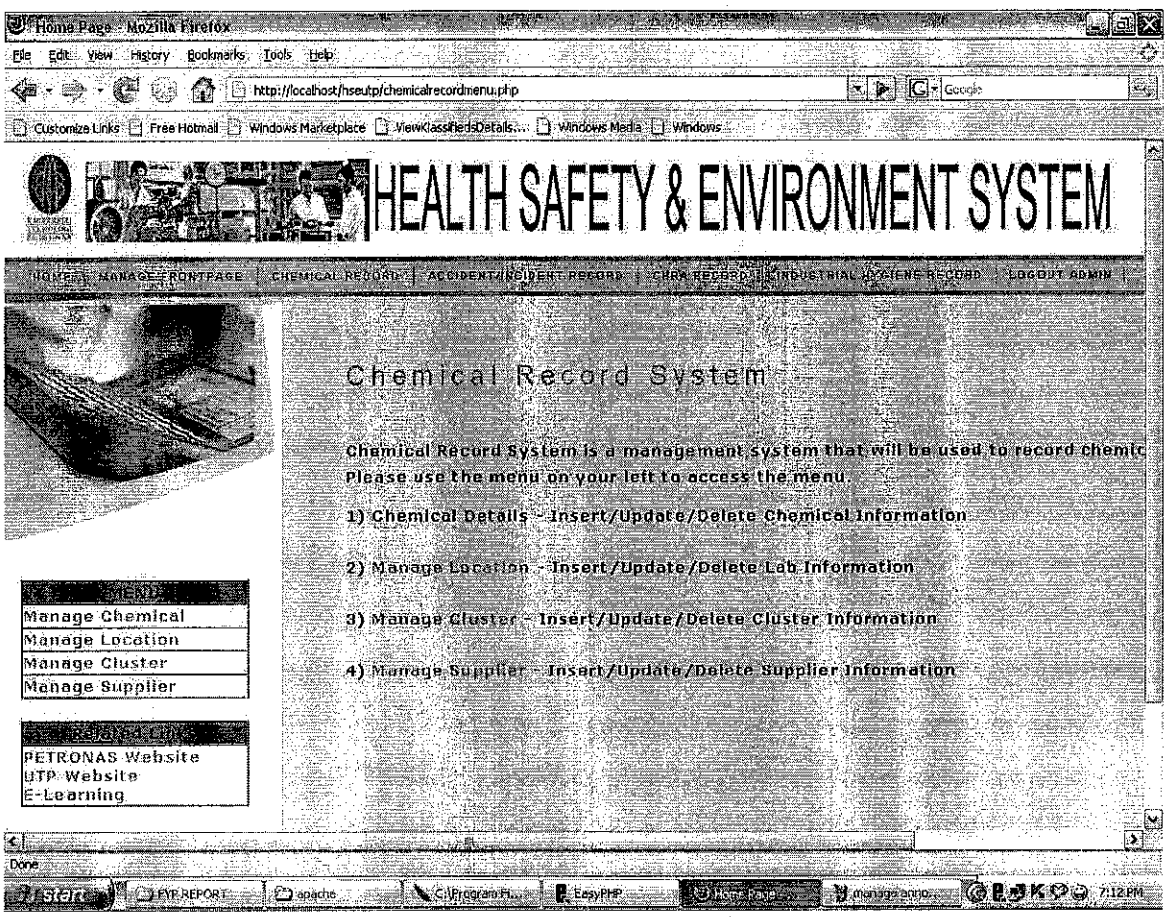

Figure 4.21: Edit chemical inventory record page

Figure 4.22 below show the chemical record system regarding the information about clusters. The HSE administrator can add, edit or delete the cluster where the chemical are stored in UTP.

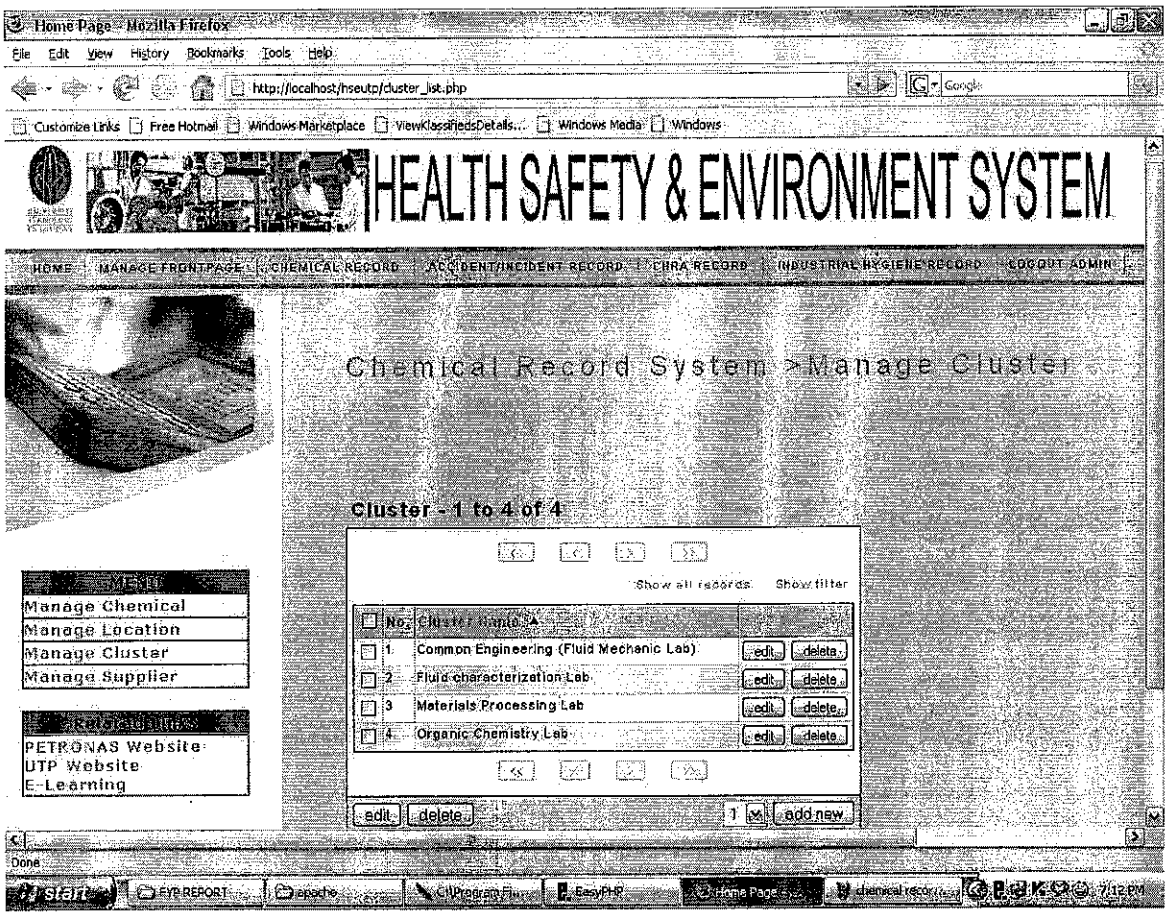

Figure 4.22: Edit cluster record page

4.4.2 All UTP Staff and Student Module

The functions in this module are:

- View All Information

Student and staff can view all information regarding HSE department. Information about the HSE information as illustrated in Figure 4.23 below. The information that can be viewed also consists of HSE organization chart, UTP HSE policies, safety and guidelines in About Us menu. Details about the chemical register, CHRA, incident/accident reporting and all procedures can also be viewed but cannot make any changes.

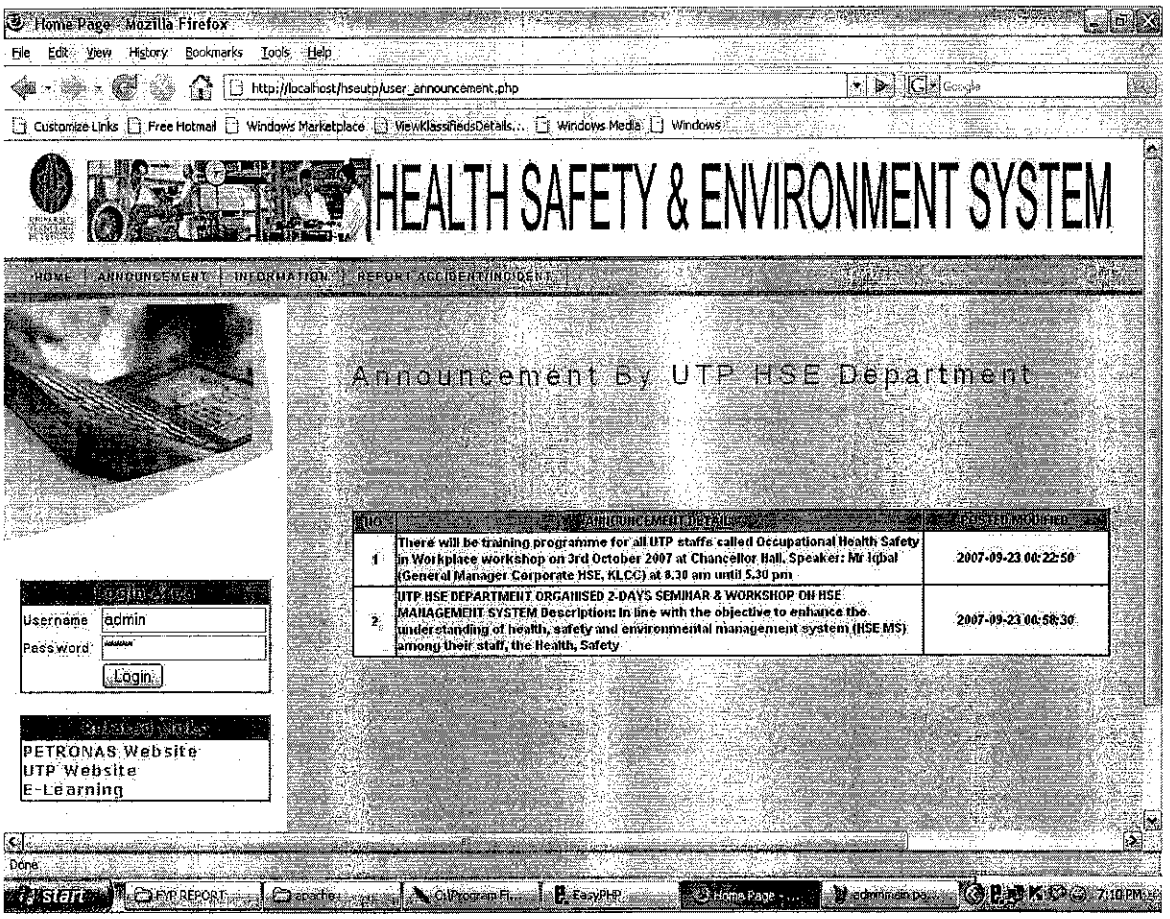

Figure 4.23: View announcement record page

Student and staff can view for particular information by click at the link provided like the Lecturer and staff can view all information regarding HSE department. Information about the HSE activities or any training or workshop that will be conducted can be known from the website. Details about latest and upcoming events can be viewed from the bulletins / news page as shows in Figure 4.24 below:

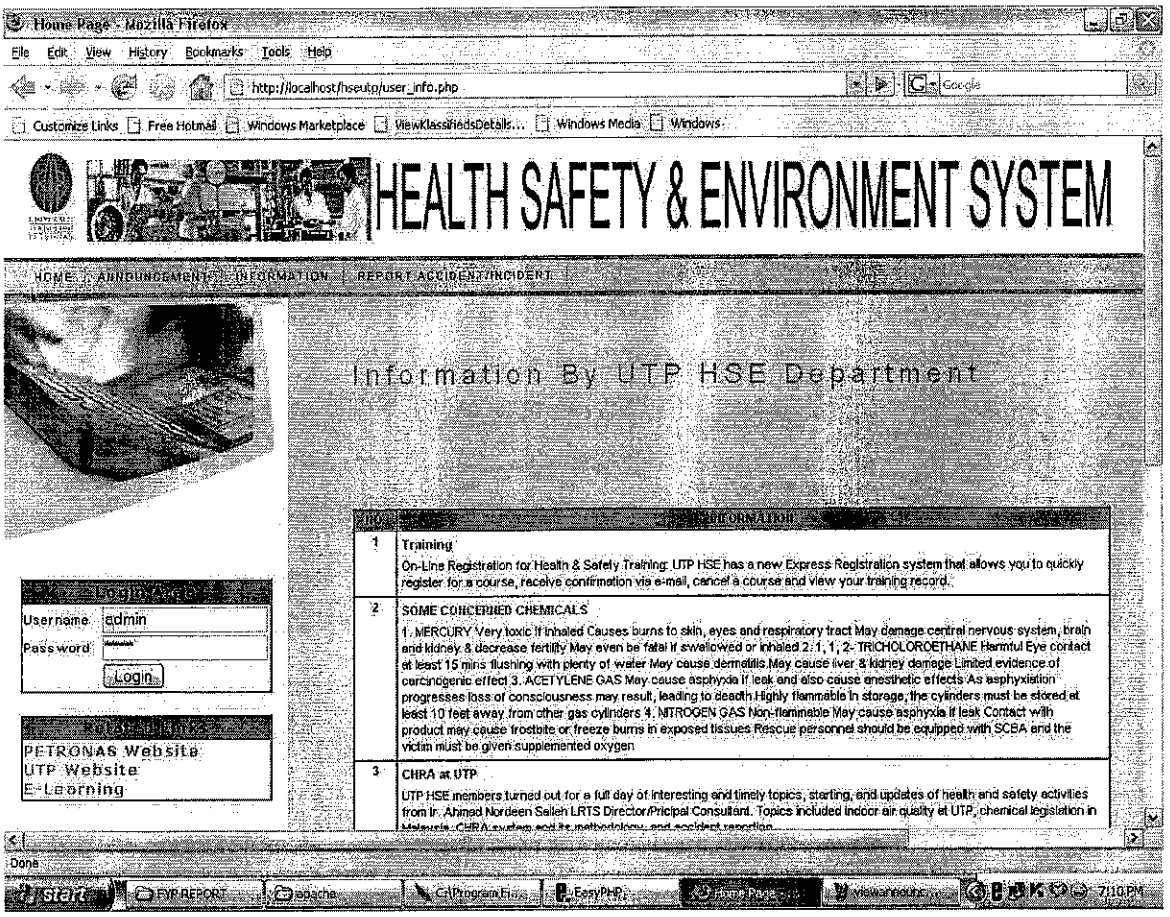

Figure 4.24: View information record page

- Insert New Incident /Accident Reporting Record

All UTP staff and student can insert new record for incident/accident reporting record. Compulsory information need to be inserted in order for them to submit the report form to HSE administrator. They can report any incident or accident happened in the lab or any process location area online without have to wait or to report to the Lab Assistant or Technician. Figure 4.25 shows the page which is the form that all UTP staff and student can fill in to report any injuries but must be reported within 24 hours.

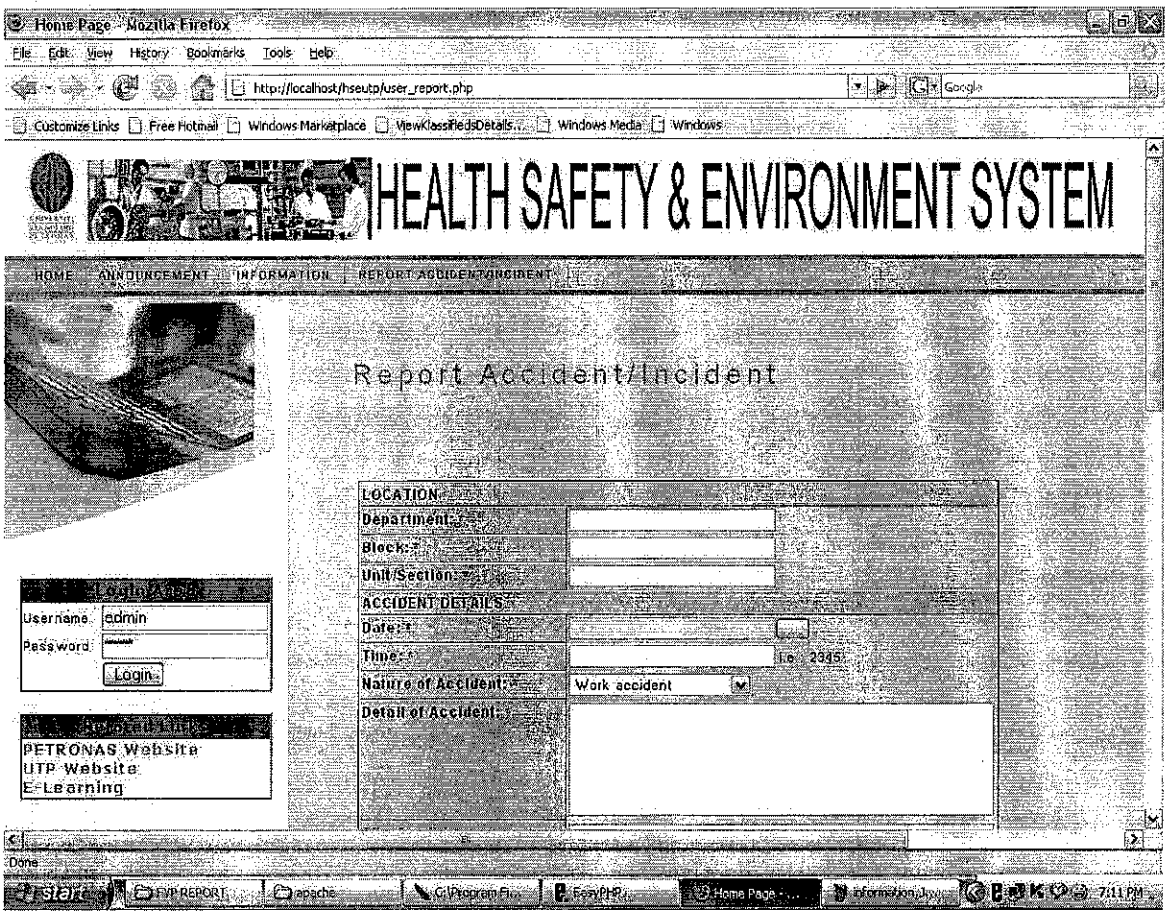

Figure 4.25: Form of accident/incident page

4.5 Acceptance Testing

This acceptance testing will be conducted after the system is fully developed. It will be evaluated according to four (4) main categories which are from the view of:

- System Requirements
- System Functionality
- Overall Rating
- Suggestion

CHAPTER 5
CONCLUSION AND RECOMMENDATION

5.1 Conclusion

As a conclusion, this project had achieves the objectives stated and fulfilled all requirements. The functions in this system helps to overcome problems stated. UTP HSE Web Based System provides function which can save time for HSE administrator to do some task and also can make the HSE administrator feel easy in handling their works because they will not do their work using paper based method anymore. They can store all data and records by retrieving, updating and deleting data because this UTP HSE web based system also will act as an online system.

Besides, all UTP staff and student can view and update the information about HSE department that will be link from UTP main website. All UTP staff and student will keep track on the safety policies and guidelines in order to ensure a safe environment in UTP because UTP HSE web based system also provides function for searching which can save the time for users to search for particular information regarding HSE. They also can report any incident or accident that occurred at the lab or any process location by online.

This system also allow HSE administrator to share information about HSE activities or latest news with all UTP staff and student. It will computerize the process of storing information about UTP HSE department such as the process of recording and updating the information of chemical register hazardous to health, ERP, Industrial Hygiene, HSEMS, Training, the process of CHRA system and also the process of retrieving and updating the data of incident/accident notification report summary.

5.2 Recommendations

One of the future enhancements that can be made is by adding more information of UTP HSE department at the menus. Displaying more data in taxonomy gives advantage to users to view data as specific as possible according to the HCI principle. Perhaps, future enhancement of this project is to implement ontology based application using protégé plug-in.

It is also recommended to add more multimedia elements in the UTP HSE web based system. As an example is a human narrator voice who will inform the user about current information or new announcement. Besides, it also can guide the user to explore the whole system because the user will not lose when they want to search or know some information. Hence, the narrator is very needed to solve this type of problem. Overall, multimedia elements are really useful in building this system and by adding more multimedia; this system will become more interactive and interesting to use in order to share information to all UTP staff and student.

Besides, perhaps this project can be broadening to all university in Malaysia and not only in UTP because HSE aspect is very important in order to ensure safe and healthy working/business environment. However, it required modification as other university might have different structure and information of their HSE department.

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APPENDICES

Appendix – 1: Questionnaire

Appendix – 2: System Interfaces (UTP HSE Web Based System)

SURVEY FORM

ear Prof/Dr/Mr./Ms,

ppreciate if you can spare a few minutes of your times to fill in the survey form. The purpose of this rvey is to help in getting information towards the acceptance of UTP Health, Safety & Environment HSE) Web Based System to store and sharing information of the HSE department activities. Please nswer all questions as truthfully as possible. Your answer will be kept confidential. Your willingness to nswer this questionnaire is highly appreciated. Thank You!

ART A: Background

lease provide your answer by checking the box(s) that applies.

1. Please indicate your current status:

Foundation Student	☐
Undergraduate Student	☐
Academic	☐
Management	☐
Lab Assistants/ Technicians	☐

2. a) If you are a student, please state your Department:

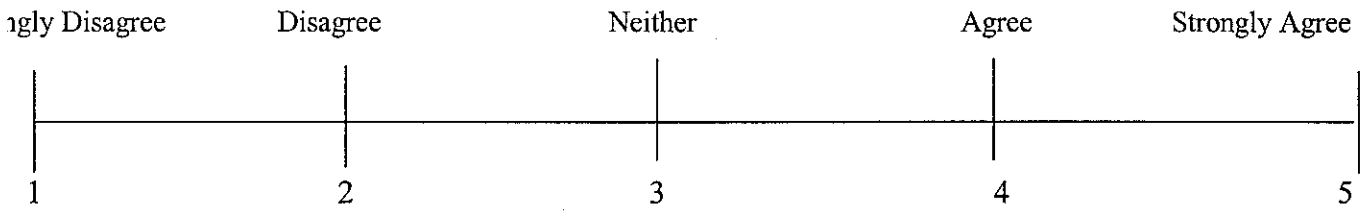
ICT	☐	EE	☐
BIS	☐	CHE	☐
ME	☐	CVE	☐

b) If you are not a student, what is your department?

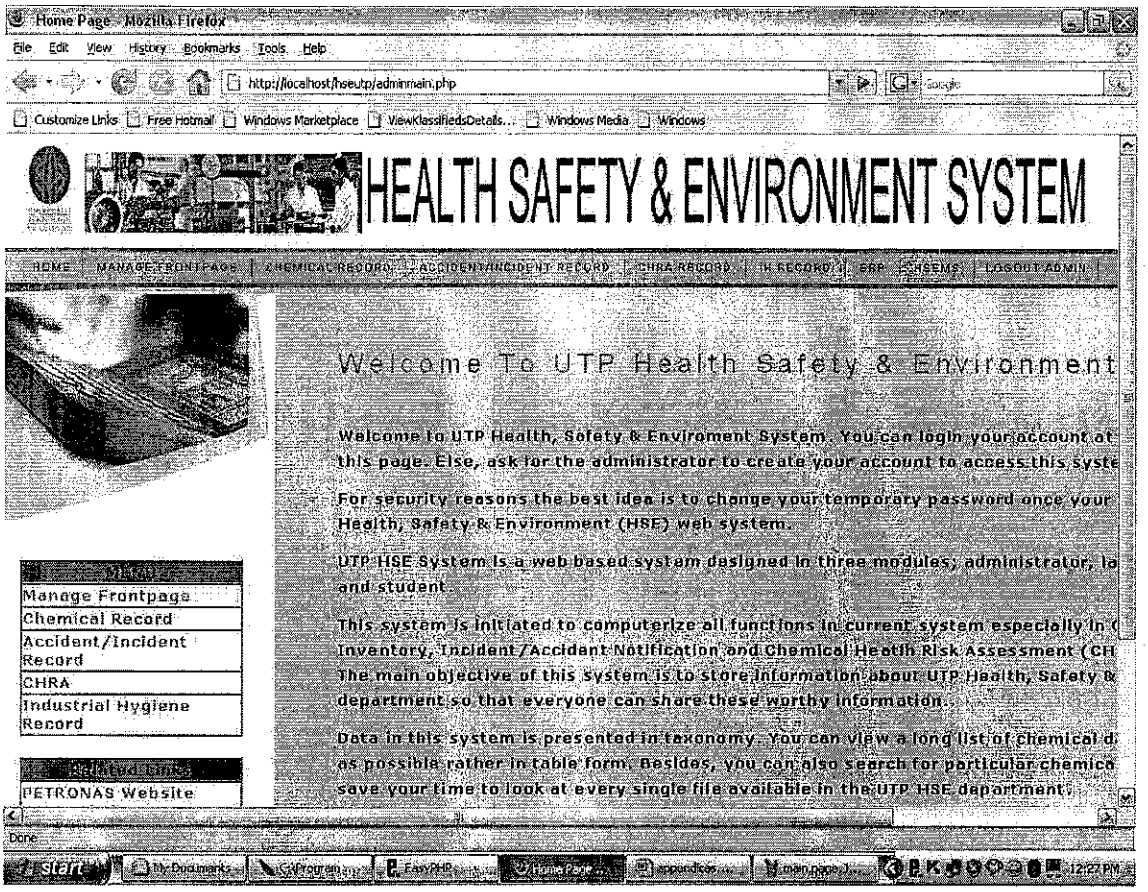
Please specify: _____

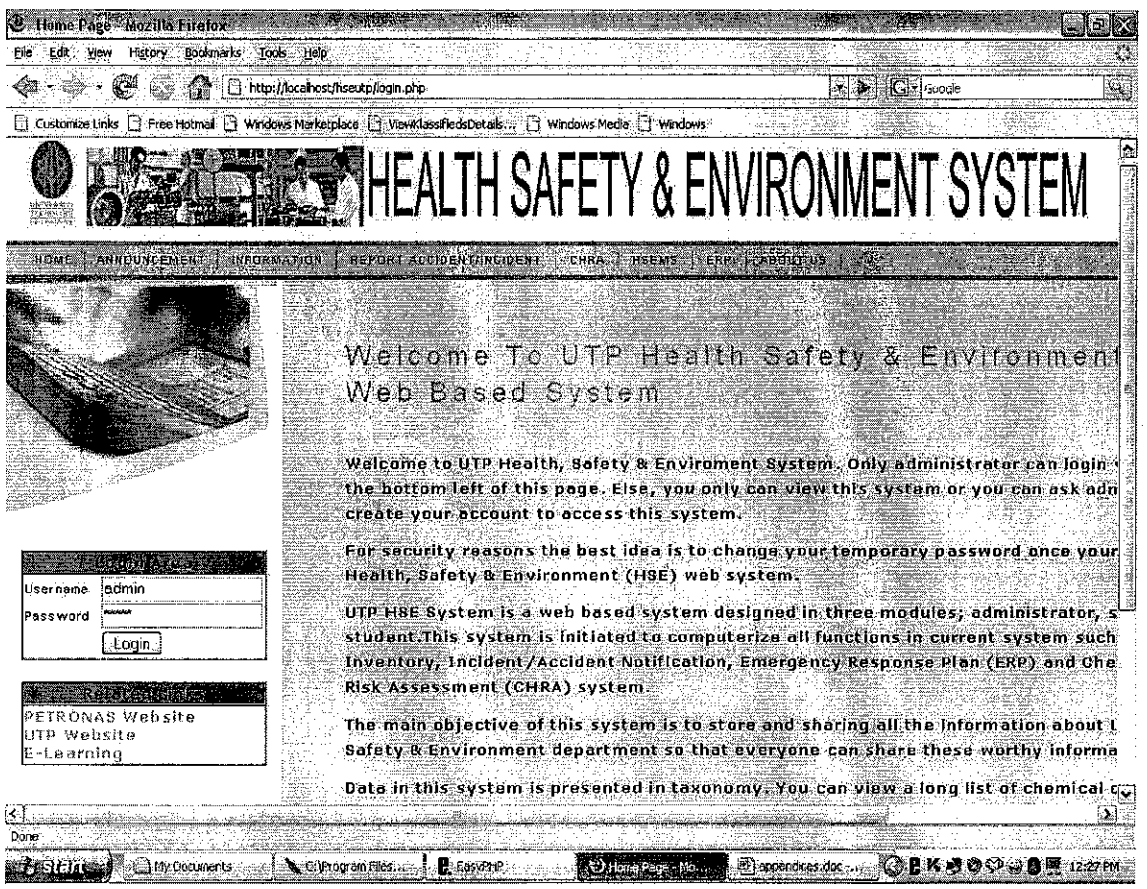
PART B:

Indicate the extent to which you agree with the following:



. UTP should have their own HSE Web Based System to share the ıformation to all UTP staff and student	1	2	3	4	5
. The policies of UTP HSE is important for us to know	1	2	3	4	5
. I know who is the contact person and its procedure for anything ıat related to HSE when I want to report about incident/accident	1	2	3	4	5
. I think that it is very difficult to know about HSE information	1	2	3	4	5
. I know the information about UTP chemical inventory, ıcident/accident reporting, industrial hygiene and risk assessment	1	2	3	4	5
. I know where exactly the fire assembly point in UTP	1	2	3	4	5
. I prefer to read about HSE information from online rather than ːinted sources	1	2	3	4	5
). I think that with this UTP HSE Web Based System it will help me › get to know all information about UTP HSE department	1	2	3	4	5
1. I know what is the safety guidelines and all safety signs	1	2	3	4	5


Home Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/hseutp/adminmain.php
Customize Links Free Hotmail Windows Marketplace ViewKlassifiedsDetails... Windows Media Windows
HEALTH SAFETY & ENVIRONMENT SYSTEM
HOME MANAGE FRONTPAGE CHEMICAL RECORD ACCIDENT/INCIDENT RECORD CHRA RECORD IH RECORD ERP HSEMS LOGOUT ADMIN
Welcome To UTP Health Safety & Environment
Welcome to UTP Health, Safety & Enviroment System. You can login your account at this page. Else, ask for the administrator to create your account to access this syste
For security reasons the best idea is to change your temporary password once your Health, Safety & Environment (HSE) web system.
UTP HSE System is a web based system designed in three modules; administrator, la and student.
This system is initiated to computerize all functions in current system especially in C Inventory, Incident/Accident Notification and Chemical Health Risk Assessment (CH
The main objective of this system is to store information about UTP Health, Safety & department so that everyone can share these worthy information.
Data in this system is presented in taxonomy. You can view a long list of chemical d as possible rather in table form. Besides, you can also search for particular chemica save your time to look at every single file available in the UTP HSE department.
Menu
Manage Frontpage
Chemical Record
Accident/Incident Record
CHRA
Industrial Hygiene Record
Related Links
PETRONAS Website
Done
Start
My Documents
C:\Program...
EasyPHP
Home Page - Mo...
appendices...
main.page.j...
12:27 PM


Home Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/hseutp/login.php
Customize Links Free Hotmail Windows Marketplace ViewKlassifiedsDetails... Windows Media Windows
HEALTH SAFETY & ENVIRONMENT SYSTEM
HOME ANNOUNCEMENT INFORMATION REPORT ACCIDENT/INCIDENT CHRA HSEMS ERP ABOUT US
Welcome To UTP Health Safety & Environment
Web Based System
Welcome to UTP Health, Safety & Enviroment System. Only administrator can login the bottom left of this page. Else, you only can view this system or you can ask adm create your account to access this system.
For security reasons the best idea is to change your temporary password once your Health, Safety & Environment (HSE) web system.
UTP HSE System is a web based system designed in three modules; administrator, s student.This system is initiated to computerize all functions in current system such Inventory, Incident/Accident Notification, Emergency Response Plan (ERP) and Che Risk Assessment (CHRA) system.
The main objective of this system is to store and sharing all the information about t Safety & Environment department so that everyone can share these worthy informa
Data in this system is presented in taxonomy. You can view a long list of chemical c
Login
Username admin
Password
Login
Related Links
PETRONAS Website
UTP Website
E-Learning
Done
Start
My Documents
C:\Program Files...
EasyPHP
Home Page - Mo...
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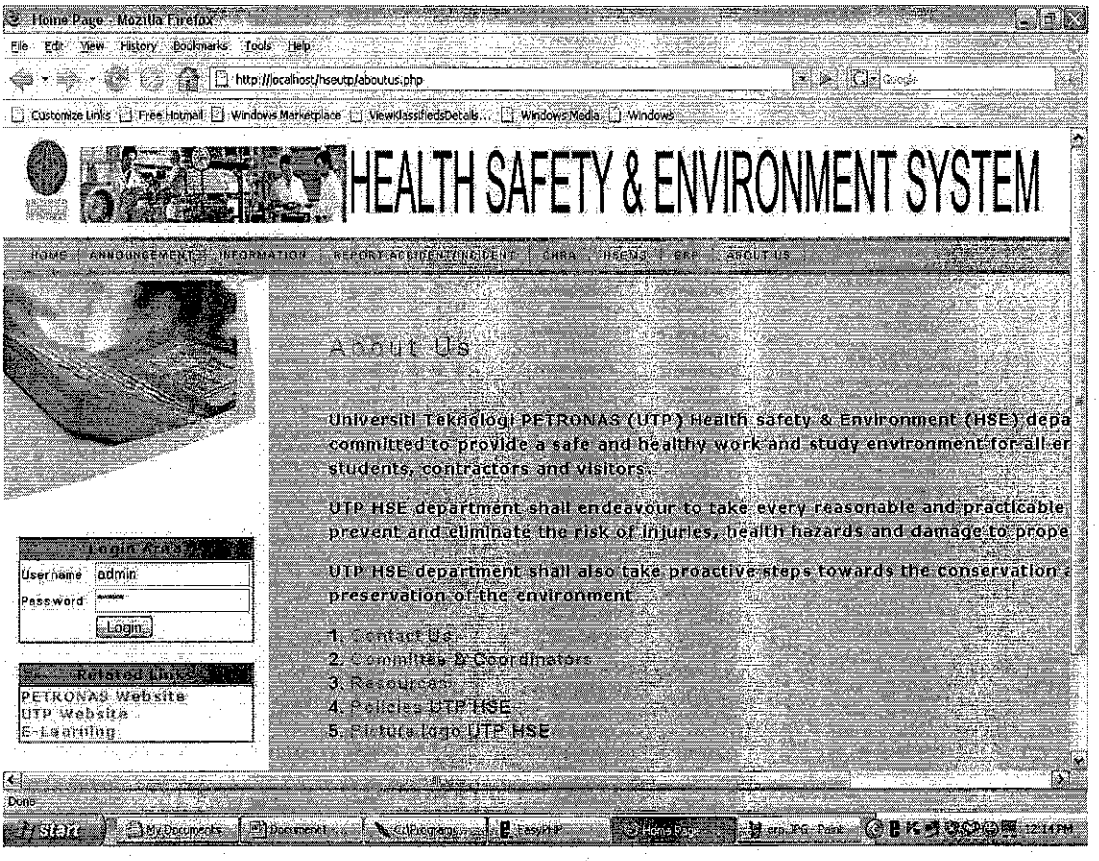
12:27 PM


Home Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/hseutp/aboutus.php
HEALTH SAFETY & ENVIRONMENT SYSTEM
HOME | ANNOUNCEMENT | INFORMATION | REPORT ACCIDENT/INCIDENT | CHRA | HSEMS | ERP | ABOUT US
About Us
Universiti Teknologi PETRONAS (UTP) Health safety & Environment (HSE) depa
committed to provide a safe and healthy work and study environment for all er
students, contractors and visitors.
UTP HSE department shall endeavour to take every reasonable and practicable
prevent and eliminate the risk of injuries, health hazards and damage to prope
UTP HSE department shall also take proactive steps towards the conservation
preservation of the environment
1. Contact Us
2. Committee & Coordinators
3. Resources
4. Policies UTP HSE
5. Picture Logo UTP HSE
Login Area
Username admin
Password
Login
Related Links
PETRONAS Website
UTP Website
E-Learning
Done
Start
My Documents
Document1 ...
C:\Program ...
EasyPHP
Home Page ...
pic.JPG - Paint
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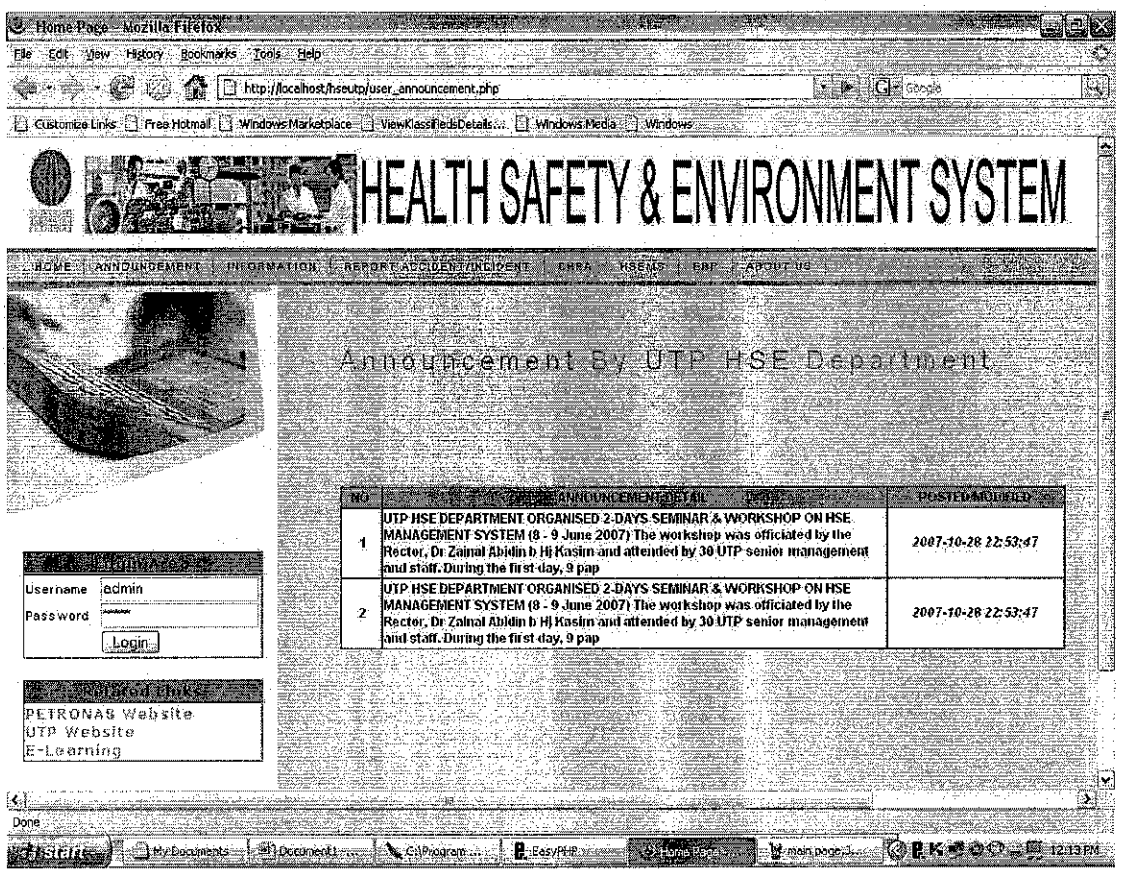
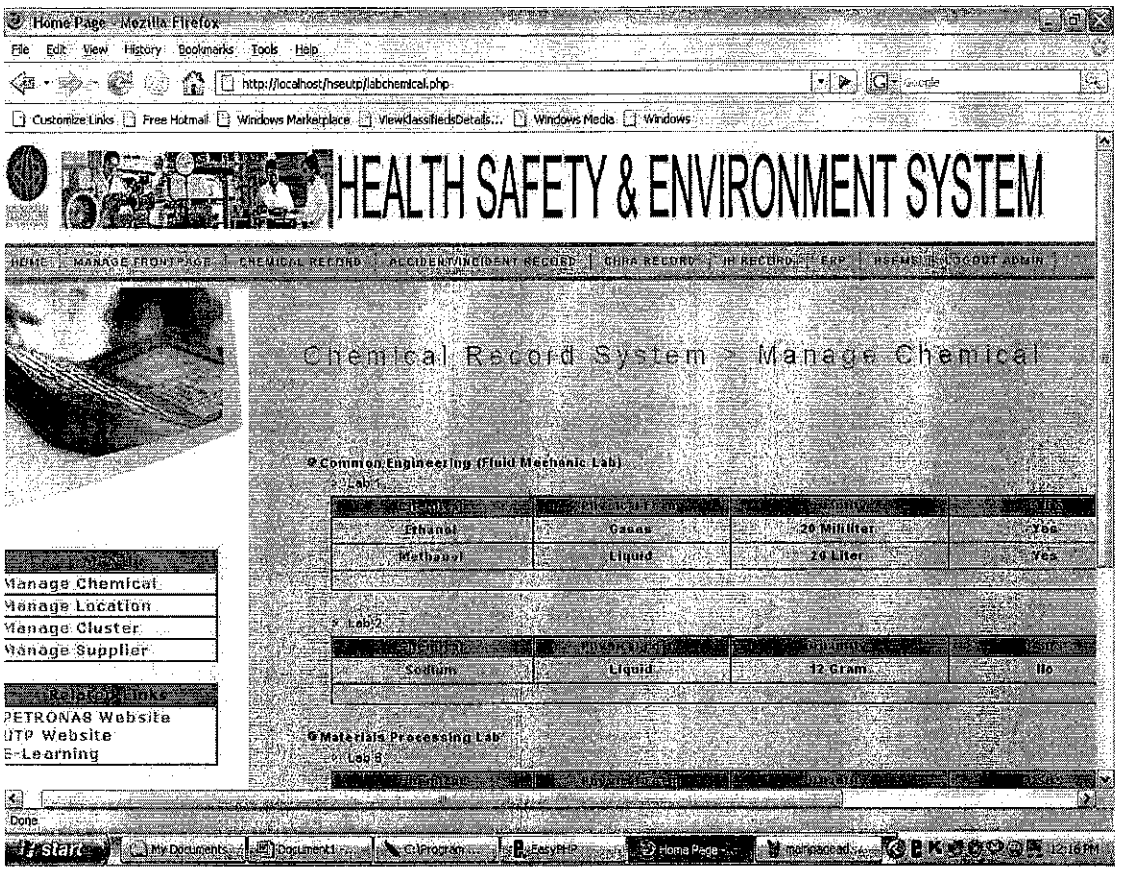
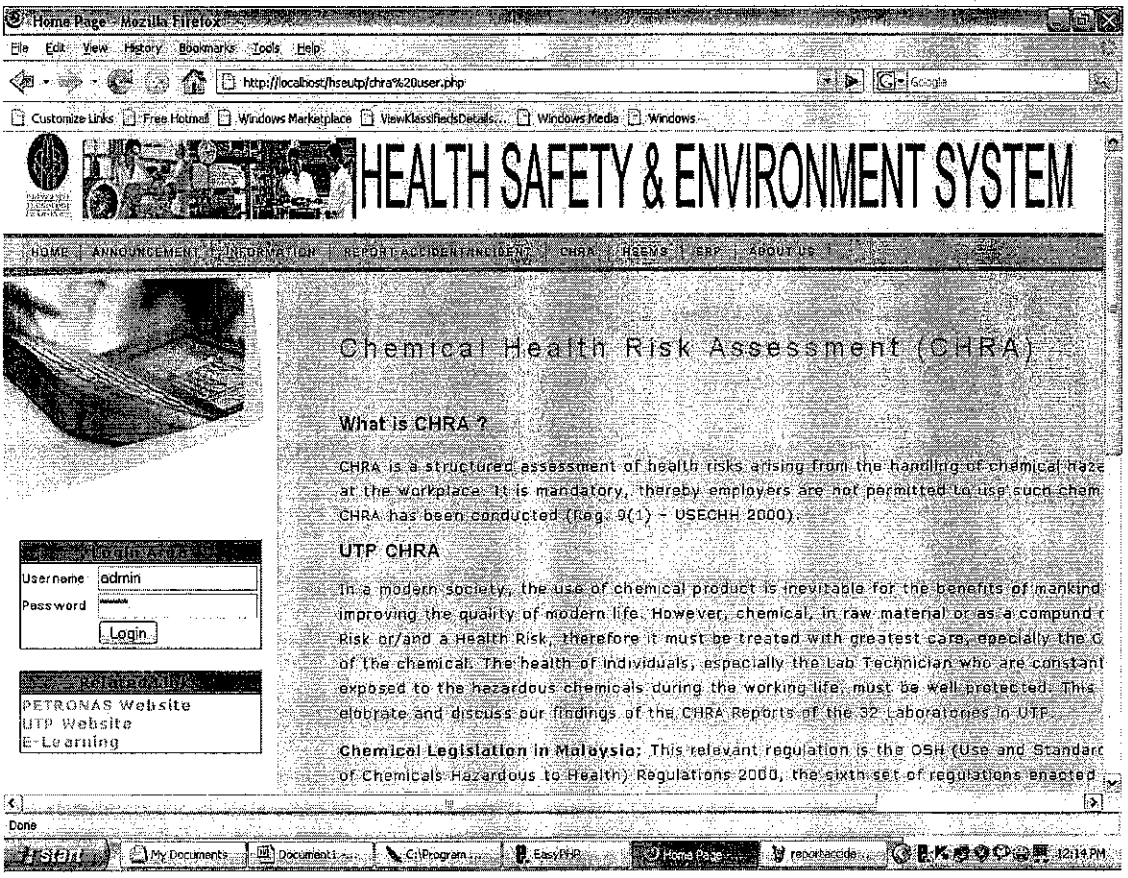
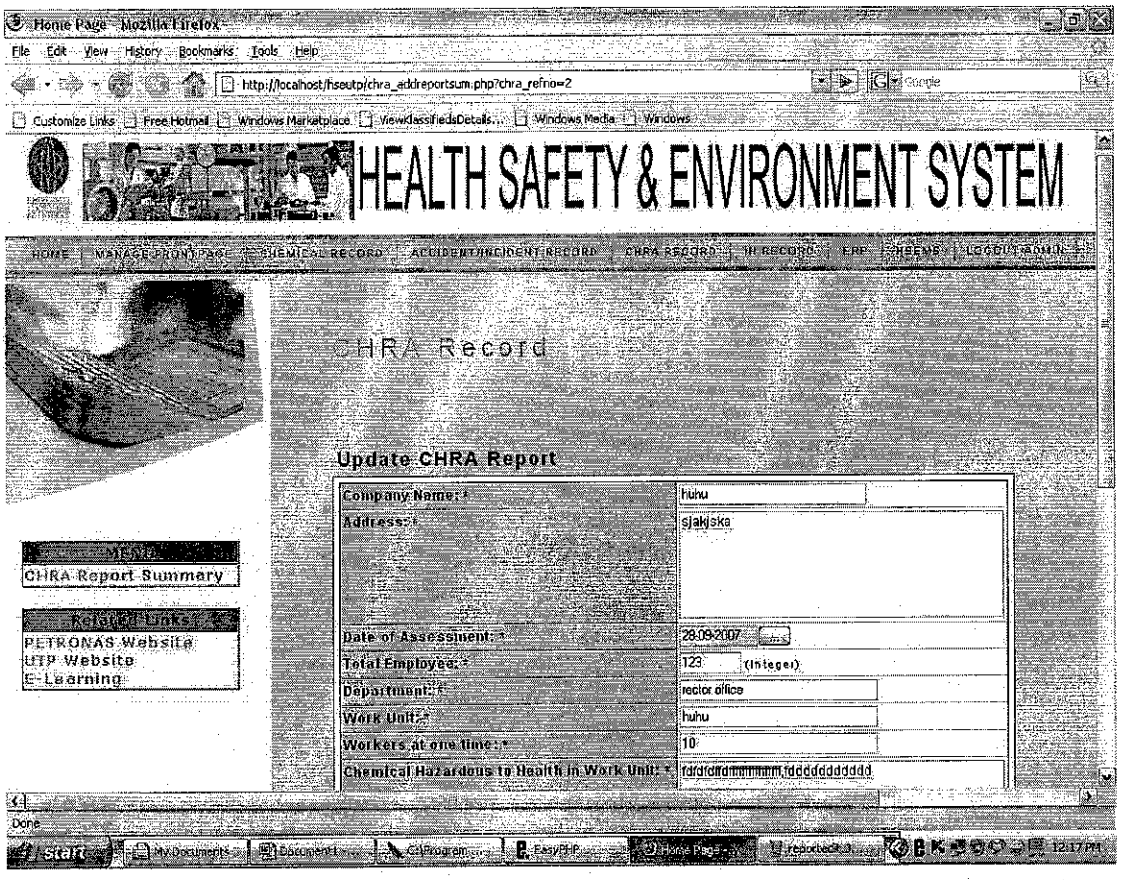
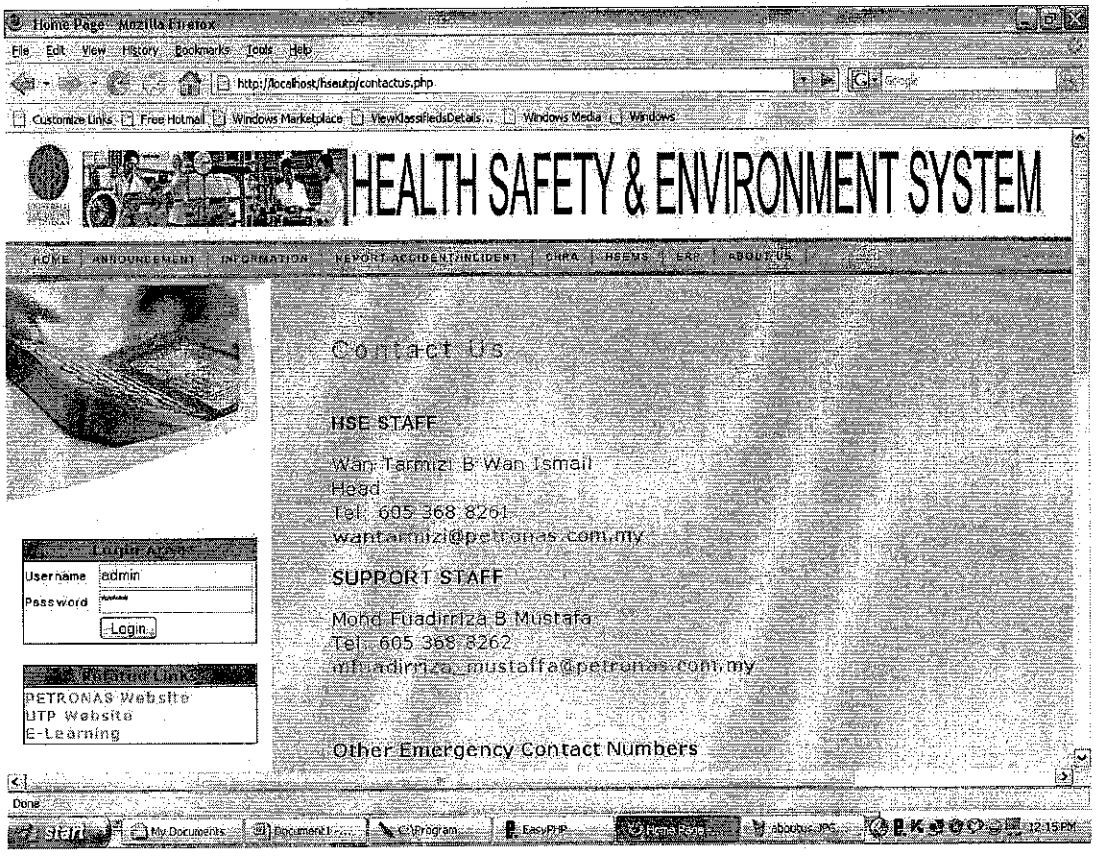
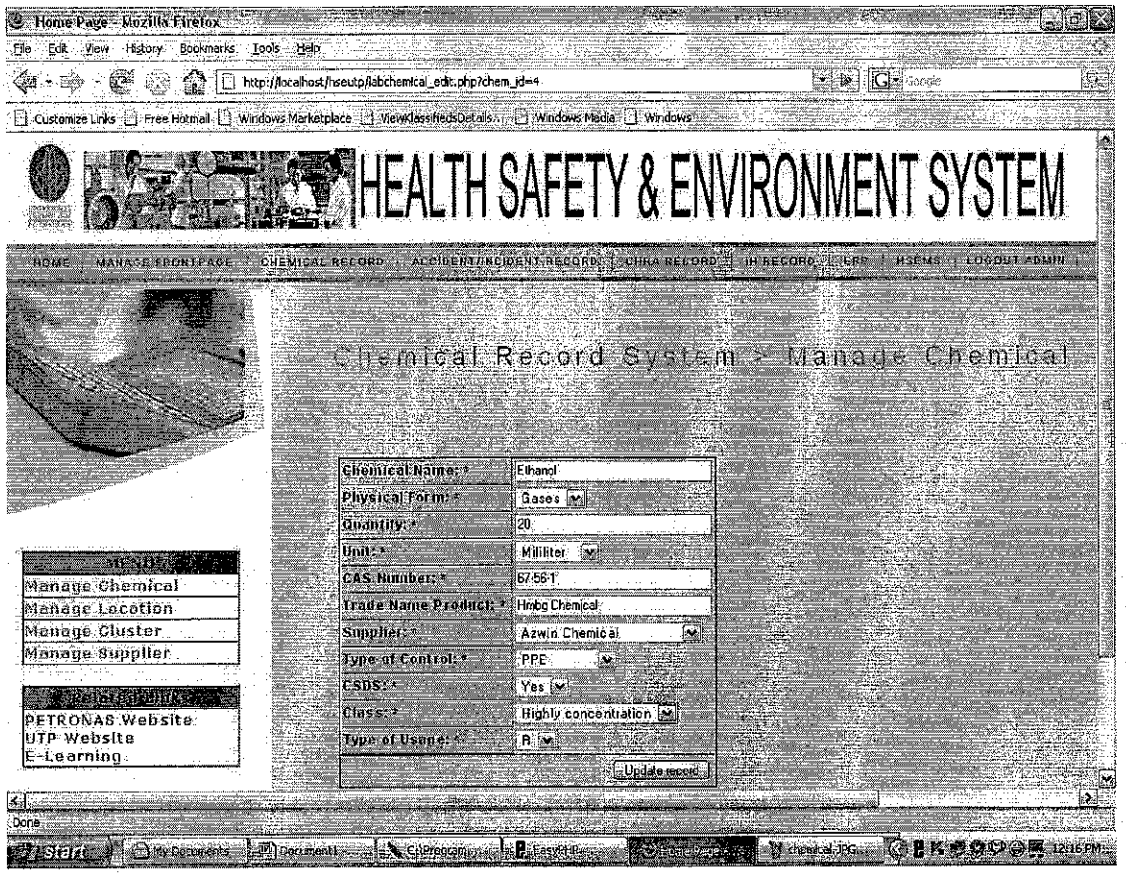

Home Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/hseutp/user_announcement.php
HEALTH SAFETY & ENVIRONMENT SYSTEM
HOME | ANNOUNCEMENT | INFORMATION | REPORT ACCIDENT/INCIDENT | CHRA | HSEMS | ERP | ABOUT US
Announcement By UTP HSE Department
NO
ANNOUNCEMENT DETAIL
DATE
POSTED/MODIFIED
1
UTP HSE DEPARTMENT ORGANISED 2-DAYS SEMINAR & WORKSHOP ON HSE MANAGEMENT SYSTEM (8 - 9 June 2007) The workshop was officiated by the Rector, Dr Zainal Abidin b Hj Kasim and attended by 30 UTP senior management and staff. During the first day, 9 pap
2007-10-28 22:53:47
2
UTP HSE DEPARTMENT ORGANISED 2-DAYS SEMINAR & WORKSHOP ON HSE MANAGEMENT SYSTEM (8 - 9 June 2007) The workshop was officiated by the Rector, Dr Zainal Abidin b Hj Kasim and attended by 30 UTP senior management and staff. During the first day, 9 pap
2007-10-28 22:53:47
Login Area
Username admin
Password
Login
Related Links
PETRONAS Website
UTP Website
E-Learning
Done
Start
My Documents
Document1 ...
C:\Program ...
EasyPHP
Home Page ...
main page.j...
12:13 PM

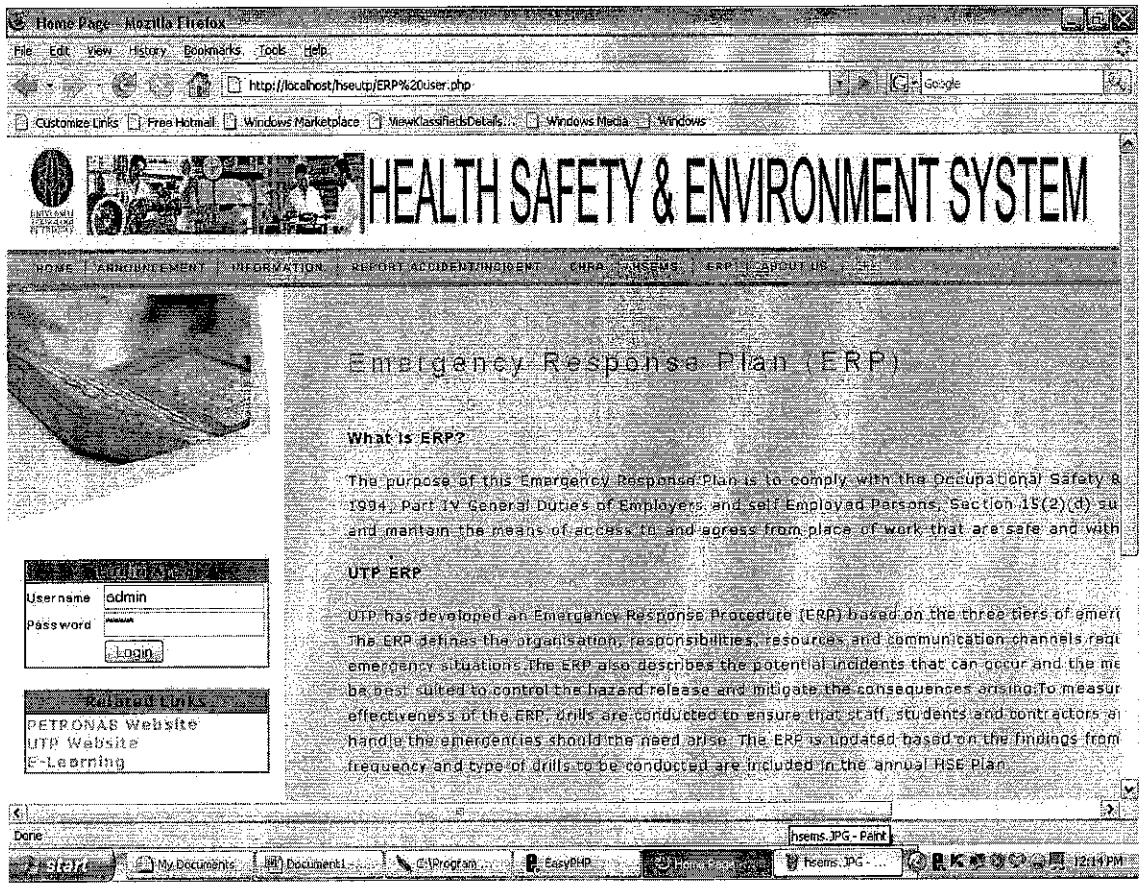

Home Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/hseutp/labchemical.php
HEALTH SAFETY & ENVIRONMENT SYSTEM
HOME | MANAGE FRONTPAGE | CHEMICAL RECORD | ACCIDENT/INCIDENT RECORD | CHRA RECORD | IH RECORD | ERP | HSEMS | ABOUT ADMIN
Chemical Record System > Manage Chemical
Common Engineering (Fluid Mechanic Lab)
Lab 1
Ethanol
Gaseus
20 Milliliter
Yes
Methanol
Liquid
20 Liter
Yes
Lab 2
Sodium
Liquid
12 Gram
No
Materials Processing Lab
Lab 3
Manage Chemical
Manage Location
Manage Cluster
Manage Supplier
Related Links
PETRONAS Website
UTP Website
E-Learning
Done
Start
12:18 PM


Home Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/hseutp/chra%20user.php
HEALTH SAFETY & ENVIRONMENT SYSTEM
HOME | ANNOUNCEMENT | INFORMATION | REPORT ACCIDENT/INCIDENT | CHRA | HSEMS | ERP | ABOUT US
Chemical Health Risk Assessment (CHRA)
What is CHRA ?
CHRA is a structured assessment of health risks arising from the handling of chemical haze
at the workplace. It is mandatory, thereby employers are not permitted to use such chem
CHRA has been conducted (Reg. 9(1) - USECHH 2000).
UTP CHRA
In a modern society, the use of chemical product is inevitable for the benefits of mankind
improving the quality of modern life. However, chemical, in raw material or as a compound
Risk or/and a Health Risk, therefore it must be treated with greatest care, especially the C
of the chemical. The health of individuals, especially the Lab Technician who are constant
exposed to the hazardous chemicals during the working life, must be well protected. This
elobrate and discuss our findings of the CHRA Reports of the 32 Laboratories in UTP.
Chemical Legislation in Malaysia: This relevant regulation is the OSH (Use and Standard
of Chemicals Hazardous to Health) Regulations 2000, the sixth set of regulations enacted
Login Admin
Username admin
Password
Login
Related Links
PETRONAS Website
UTP Website
E-Learning
Done
Start
12:14 PM


Home Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/hseutp/chra_addreportsum.php?chra_refno=2
HEALTH SAFETY & ENVIRONMENT SYSTEM
HOME | MANAGE FRONT PAGE | CHEMICAL RECORD | ACCIDENT/INCIDENT RECORD | CHRA RECORD | HP RECORD | ERP | HSEMS | LOGOUT ADMIN
CHRA Record
Update CHRA Report
Company Name: *
huhu
Address: *
sjakjska
Date of Assessment: *
28-09-2007
Total Employee: *
123
(Integer)
Department: *
rector office
Work Unit: *
huhu
Workers at one time: *
10
Chemical Hazardous to Health in Work Unit: *
CHRA Report Summary
Related Links
PETRONAS Website
UTP Website
E-Learning
Done


Home Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/hseutp/contactus.php
HEALTH SAFETY & ENVIRONMENT SYSTEM
HOME | ANNOUNCEMENT | INFORMATION | REPORT ACCIDENT/INCIDENT | CHRA | HSEMS | ERP | ABOUT US
Contact Us
HSE STAFF
Wan Tarmizi B Wan Ismail
Head
Tel: 605 368 8261
wantarmizi@petronas.com.my
SUPPORT STAFF
Mohd Fuadirriza B Mustafa
Tel: 605 368 8262
mfuadirriza_mustaffa@petronas.com.my
Other Emergency Contact Numbers
Login Admin
Username admin
Password
Login
Related Links
PETRONAS Website
UTP Website
E-Learning
Done


Home Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/hseutp/labchemical_edit.php?chem_id=4
Customize Links Free Hotmail Windows Marketplace ViewClassifiedsDetails... Windows Media Windows
HEALTH SAFETY & ENVIRONMENT SYSTEM
HOME MANAGE FRONTPAGE CHEMICAL RECORD ACCIDENT/INCIDENT RECORD CHRA RECORD IH RECORD ERP HSEMS LOGOUT ADMIN
Chemical Record System > Manage Chemical
Chemical Name: * Ethanol
Physical Form: * Gases
Quantity: * 20
Unit: * Milliliter
CAS Number: * 67-56-1
Trade Name Product: * Hmbg Chemical
Supplier: * Azwin Chemical
Type of Control: * PPE
CSDS: * Yes
Class: * Highly concentration
Type of Usage: * R
Update record
Manage Chemical
Manage Location
Manage Cluster
Manage Supplier
PETRONAS Website
UTP Website
E-Learning
Done
Start
12:16 PM


Home Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/hseutp/ERP%20user.php
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HEALTH SAFETY & ENVIRONMENT SYSTEM
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Emergency Response Plan (ERP)
What is ERP?
The purpose of this Emergency Response Plan is to comply with the Occupational Safety &
1994, Part IV General Duties of Employers and self Employed Persons, Section 15(2)(d) su
and maintain the means of access to and egress from place of work that are safe and with
UTP ERP
UTP has developed an Emergency Response Procedure (ERP) based on the three tiers of emer
The ERP defines the organisation, responsibilities, resources and communication channels requ
emergency situations. The ERP also describes the potential incidents that can occur and the me
be best suited to control the hazard release and mitigate the consequences arising. To measur
effectiveness of the ERP, drills are conducted to ensure that staff, students and contractors a
handle the emergencies should the need arise. The ERP is updated based on the findings from
frequency and type of drills to be conducted are included in the annual HSE Plan.
Username admin
Password
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UTP Website
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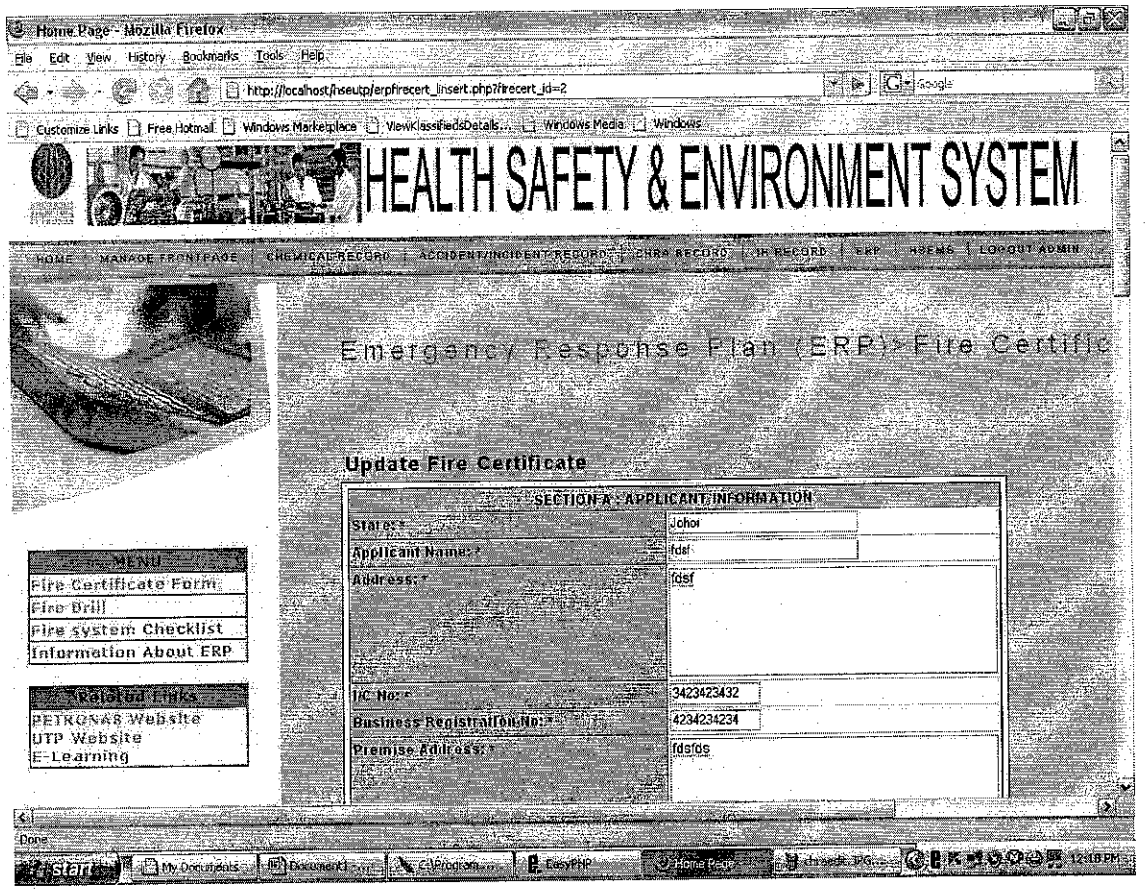
Done
hsems.JPG - Paint
Start
12:11 PM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http://localhost/hseutp/erpfirecert_insert.php?firecert_id=2
HEALTH SAFETY & ENVIRONMENT SYSTEM
HOME MANAGE FRONTPAGE CHEMICAL RECORD ACCIDENT/INCIDENT RECORD CREA RECORD IH RECORD ERP HSEMS LOGOUT ADMIN
Emergency Response Plan (ERP) > Fire Certific
Update Fire Certificate
SECTION A : APPLICANT INFORMATION
State: * Johor
Applicant Name: * fdsf
Address: * fdsf
I/C No: * 3423423432
Business Registration No: * 4234234234
Premise Address: * fdsfds
MENU
Fire Certificate Form
Fire Drill
Fire system Checklist
Information About ERP
Related Links
PETRONAS Website
UTP Website
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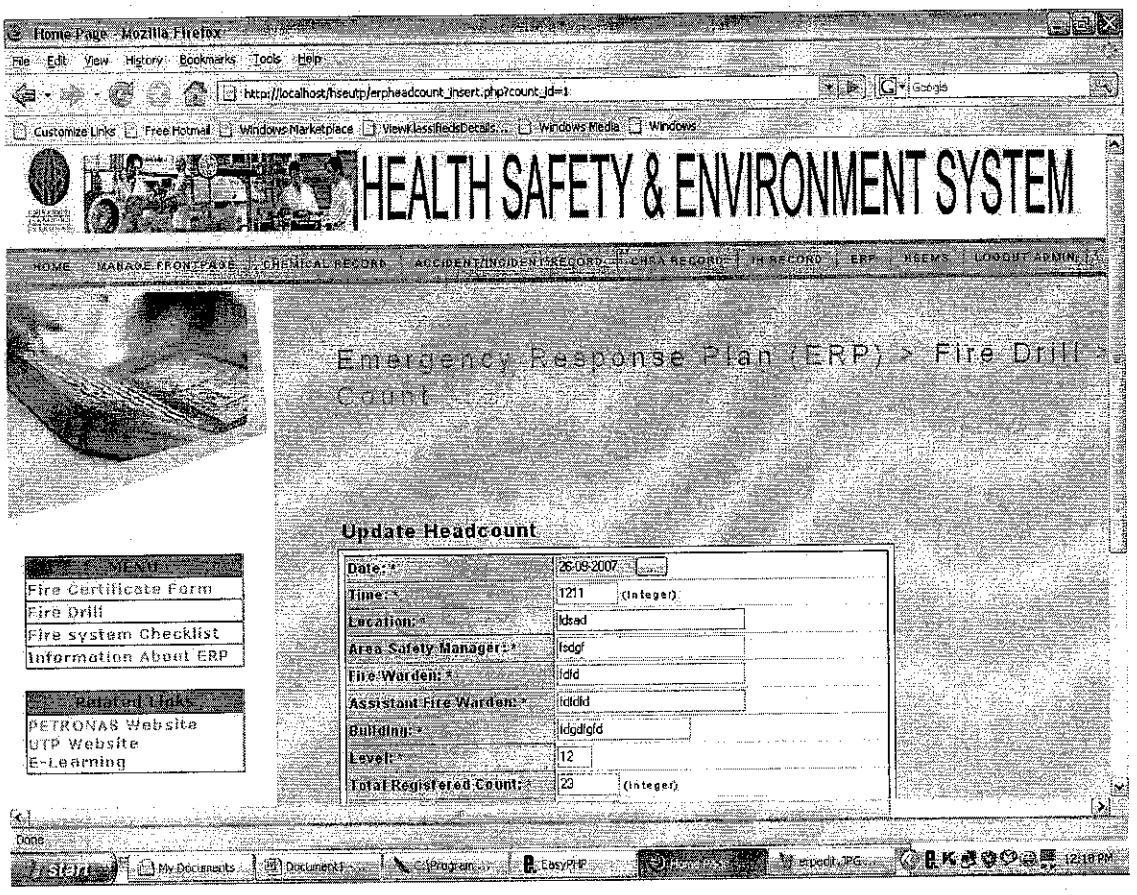
Done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http://localhost/hseutp/erpheadcount_insert.php?count_id=1
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HOME MANAGE FRONTPAGE CHEMICAL RECORD ACCIDENT/INCIDENT RECORD CREA RECORD IH RECORD ERP HSEMS LOGOUT ADMIN
Emergency Response Plan (ERP) > Fire Drill >
Count
Update Headcount
Date: * 26-09-2007
Time: * 1211 (Integer)
Location: * fdsad
Area Safety Manager: * fsdgf
Fire Warden: * fdfd
Assistant Fire Warden: * fdfdfd
Building: * fdgdfgfd
Level: * 12
Total Registered Count: * 23 (Integer)
MENU
Fire Certificate Form
Fire Drill
Fire system Checklist
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Related Links
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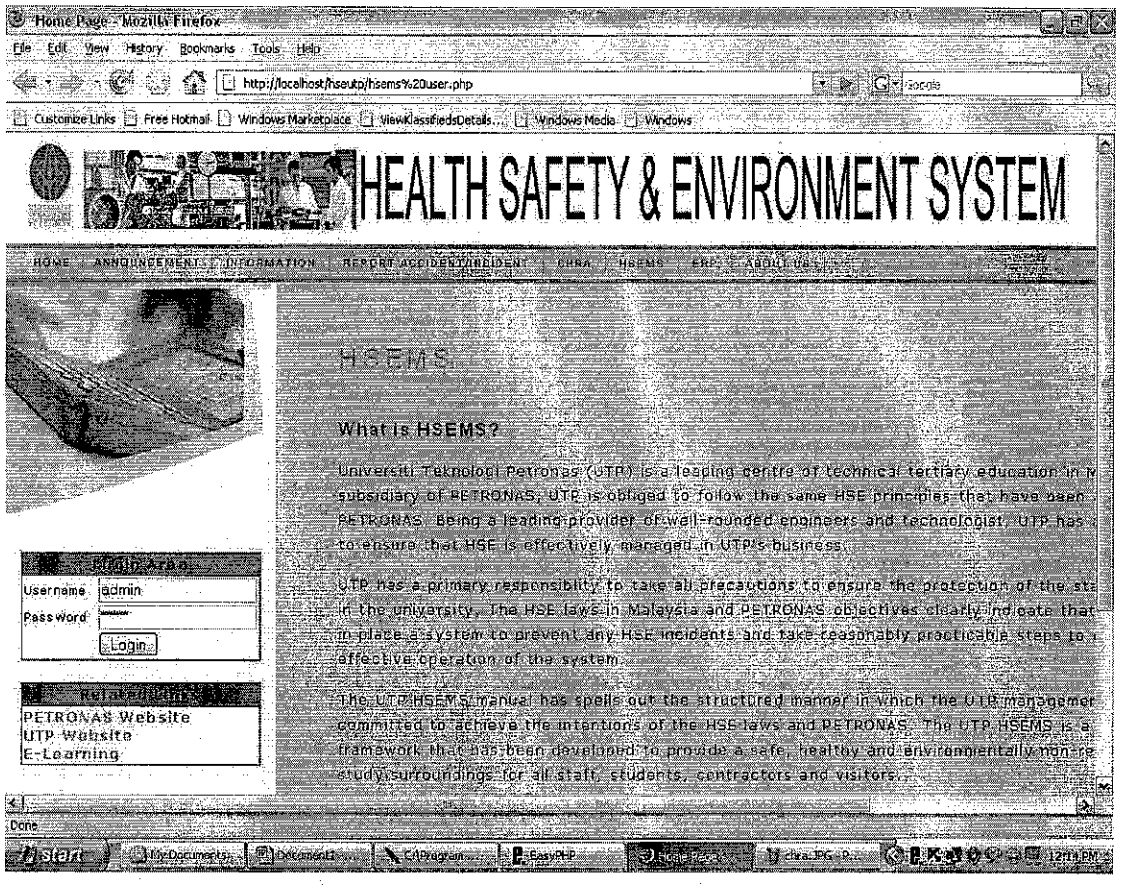
Done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HSEMS
What is HSEMS?
Universiti Teknologi Petronas (UTP) is a leading centre of technical tertiary education in M
subsidiary of PETRONAS, UTP is obliged to follow the same HSE principles that have been
PETRONAS. Being a leading provider of well-rounded engineers and technologist, UTP has
to ensure that HSE is effectively managed in UTP's business.
UTP has a primary responsibility to take all precautions to ensure the protection of the st
in the university. The HSE laws in Malaysia and PETRONAS objectives clearly indicate that
in place a system to prevent any HSE incidents and take reasonably practicable steps to
effective operation of the system.
The UTP HSEMS manual has spells out the structured manner in which the UTP managemer
committed to achieve the intentions of the HSE laws and PETRONAS. The UTP HSEMS is a
framework that has been developed to provide a safe, healthy and environmentally non-re
study surroundings for all staffs, students, contractors and visitors.
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