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Development of Internship Monitoring and Supervising Web-Based System

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***Abstract* - Industrial Training is a compulsory course that must be taken by Electrical Engineering students who follow five semesters program at Universiti Teknologi MARA (UiTM). A Web-Based System of Internship Management has been developed to computerize the whole process of the practical training and make it accessible online. The portal allows internship eligibility checking, registration, visit schedule and monitoring of industrial internship program at UiTM. This system gives advantage to the students' education process as the students can check their application status online. During their spare time, they can focus more on their lesson activities instead of checking their application status at coordinator's office. System Development Life Cycle (SDLC) is used in the development of this system. This system emphasizes online pre-registration by the student and online evaluation by industrial supervisor and faculty. This online system which is integrated with database system can help the coordinator to manage and monitor the application process that was done by the students. This system has special features as it introduces the pre-registration stage for the student to register information about the host of organization that they would like to apply for internship program. The system also has online system assessment for industrial supervisor to evaluate the trainee. The system can be easily used to aid the process of internship program. Thus, in general aspect, this system will benefit the students, as well as every party involved in this internship program.**

Keywords - web based system; internship; online; database; monitoring

I. INTRODUCTION

Industrial training or internship program is part of the Diploma of Electrical Engineering course requirement. All students have to complete eight (8) weeks of compulsory industrial attachment. Students are free to choose either government or private sector organizations for this purpose. From this training, students are exposed to the real working environment whilst at the same time benefiting in terms of personal and professional development. Moreover, feedbacks gathered from the participating organizations help the students as well as the faculty in improving the character and professional skills of the graduates [1].

All the proper guidelines are explained in the guidebook to make sure students will follow the standard of procedures (SOP) in the process of placement application. This procedure requires cooperation from industrial training coordinator. For the current practice, coordinator needs to entertain each student manually. These procedures are very tedious and time consuming due to the large number of students who plan to undergo industrial training. Hence online system is the best solution to overcome this problem. By using this system, students will perform online registration process in order to get the application letter from the coordinator. Since the process can be done anytime and anywhere, students can save their time. They can focus on their lessons instead of spending huge amount of time with internship application matters. This helps to smooth outtheir education process. Furthermore, from the online database, coordinator can trace the status of application for each student. This will make the monitoring process easier. The proposed system is called Internship Monitoring and Supervising System (iMAPS). It is a web-based system that can be accessed by students, coordinator, industrial supervisor and visiting lecturer.

II. RELATED WORK

Data management is an important aspect in each organization nowadays. Educational institution, especially tertiary education institutions require a data management system in order to function properly since accurate information is crucial for each student's academic record [3]. Hence a database management system (DBMS) is the best solution to accommodate this requirement.

A. DBMS (Database Management System)

A DBMS is a software designed to assist in maintaining and utilizing large collections of data [4]. Data represents information of the real world. Certain organizations use data to keep track of their day-to-day operations [5]. The data, is then processed into information which can be used for information processing system. Data is likely to be managed most efficiently when it is stored in a database. A database is defined as a coherent collection of data, typically describing the activities of one or more related organization that has the following properties [6]:

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- Represents some aspects of real world and changes in the real world are affected in the database.
- Logically coherent collection of data with some inherent meaning.
- Built and implemented with data for a specific purpose. It has a group of users who can access, modify and update the database.

B. System Development Methodology

Design development is the most important factor that affects the whole design process as the elements of design requirements are interrelated and should be treated as a whole during design [7]. The advantage of waterfall model is it provides a very clear-cut method for managerial control [8]. However, it is sometimes difficult to see progress in the early stages since these are mainly document-oriented. Visible and operational results in term of software can only be tested much later in the software development process [8].

C. Web-based system

Web-based information system is an information system that uses internet web technology to deliver information and services, to users or other information system or applications. It is a software system which the main purpose is to publish and maintain data by using hypertext-based principles [2]. The advantage of using web-based application is that, it can be run from any computer and the software is routinely upgraded and maintained by the hosting organization [12]. A web-based application is an application that is accessed with a web browser over a network such as the Internet or an intranet. The web-based or automated system provides far more efficiency in processing any task domain especially for a system that involves a lot of data collections and retrievals [9]. Web-based systems should meet its stakeholders' (users') requirements and expectations. Thus, web-based applications should be developed on-top of a carefully studied business process of the organization in which it is to be deployed. The research project will apply the similar strategy that is to create a web-based system built based on the current business process of Student Industrial Internship Web Portal (SIIU). A web portal would be the most appropriate web-based system for SIIU.

To ensure the information and data stored are protected, this system emphasizes security features before users can access the system. Users are required to change the password during their first time login. Furthermore, each type of user only can access the restricted system functions and at certain period of time in order to ensure security of the data and the system itself. Coordinator will grant the access for each user according to the UiTM academic calendar.

D. Reviewing other system

There are some universities in Malaysia that use web-based system to monitor and manage the data for internship training. For example, University Technology PETRONAS (UTP) has developed a Student Industrial Internship Web Portal (SIIWP)[9] and a prototype of Online Industrial Training System (OITS)[10] from manual processes to automatic processes. SIIWP allows internship eligibility checking, registration, visit schedule, online-logbook submission and monitoring as well as grade book of industrial internship program. Meanwhile, OITS was developed to reduce potential problems in communication, data redundancy and data loss. SIIWP and OITS can be easily used as an aid for the internship program and as a communication medium for all parties involved during the industrial internship program.

Pusat Pengajian Diploma Industrial Training Online System (PiTOS) is an online system that was developed by University Tun Hussein Onn Malaysia to be a user friendly, generic, web-based system to ease accessibility to all vital information related to students' industrial training in a more organized and efficient way in a paperless environment [11]. PiTOS is a web application, written using PHP and utilizes MySQL as the database management system. PiTOS allows immediate and flexible feedback to students and supervisors through important bulletin and news posted by their respective supervisor.

The first industrial training web-based system developed by Faculty of Information Technology, UNIMAS is the Industrial Training Management System (INTMS) [12]. The system has been developed to reduce heavy workload for the Industrial Training Coordinator and supporting staff. The system is also developed to provide better management system and provide a clear guideline of the Industrial Training for students and company. Students can obtain Industrial Training information through web-based system by surfing the website easily since the web-based system is accessible by students from anywhere and anytime. Besides, the company also will get more information through this web based system by viewing students' qualification easily. INTMS is a system that has been developed by using System Architecture like Context Diagram, Entity Relationship Diagram (ERD), Data Normalization, Data Dictionary, Input and Output Design and Structure Chart.

Moreover, the federal government of Nigeria developed Students Industrial Work Experience Scheme (SIWES) [13] to expose and prepare students of universities, polytechnics and colleges of education for industrial work site. The current registration and payment processes for the SIWES are semiautomatic and not completely manual. Therefore, the industrial training student's registration and payment system was developed to automate the functions of SIWES unit to help transforming it from its manual state to an automated state. This system was developed to provide anytime access for students to register. SIWES can also manage the large amount of data inflow that comes in during the exercise. This system adopted the Object-Oriented Analysis & Design (OOAD) approach with the

Structured System Analysis and Design Methodology (SSADM). The Top-Down Design, Hypertext Preprocessor (PHP), MYSQL, and Cascading Style Sheets (CSS) were used as development tools.

Web based system is developed not only in education field, but such system is also developed in industry field. For example, the implementation of web-based project management systems (WPMS) [14] by the general contractor to transfer document from hard-copy to digital format. WPMS is also developed to identify the training needs of project managers and administrative personnel. WPMS presents administrative and document management challenges which the general contractor must overcome in order for a construction project to be a success. The system is developed by College of Technology, Purdue University, and West Lafayette, Indiana.

The iMAPS system has similarities to the development of other web based systems such as SIIWP, OITS, PiTOS, INTMS and SIWES. However, iMAPS has its own specialty. iMAPS will fully utilize the online system for the whole process including pre-registration process by the students. Furthermore, evaluation by industrial supervisor also can be done via online. All the systems support the process of pre-placement, in-placement and post-placement of internship. After reviewing the related system, the objective of this development is to reduce manual handling by coordinator. Besides, it is easier for student to access the system via online at anywhere andanytime. Hence, they will have more time for their education affairs. On the other hand, all the reviewed systems convert paper based system to digital version.

This paper explains about the development of monitoring and supervising system for industrial training of UiTM Diploma of Electrical Engineering students. First section is about the background of the project while second section explains about similar projects which are related to iMAPS. Section three describes about design methodology that is applied to develop the proposed system. Section four elaborates the results that are expected to be produced by the system. The last section will summarize the paper and outline future works.

III. RESEARCH METHOD

Before online monitoring system is developed, a full understanding of the current workflow is required. Roles of the coordinator and students are identified based on the previous practice which has been conducted manually. Hence from this information, the flow of the activity is outlined to make sure all the procedures are covered by this system. System Development Life Cycle (SDLC) is used in the development of this system. Phase (1) Planning, (2) Analysis, (3) Design, (4) Implementation, and (5) Support and Maintenance measures through Waterfall model as a system development methodology. XAMPapplication is used to setup local-host server and HeidiSQL is used for database applications. Meanwhile, the programming tools used are Adobe Dreamweaver and PHP language.

A. Coordinator

By using the proposed system, at the beginning of every semester, coordinator must download the student's information from UiTM database, i.e: *Student Information Management System* (SIMS). This information includes name of students, MyKad number and student identification number. This information will appear in the student's database for monitoring purpose by coordinator.

B. Students

On the student interface, they must login into the system by using the ID number as username and MyKad number as password. At this stage, students should key in the company information that they wish to apply for internship. This action will prompt notification to the coordinator's email so that the coordinator will prepare the application letter with UiTM letterhead based on information that is retrieved from the student's database. When the letter is ready, students will collect it, and then submit the letter to the organization for internship application process. Finally, if the organization agrees to accept the students for the internship program, students should submit acceptance or rejection letter based on their preference as shown in Fig. 1.

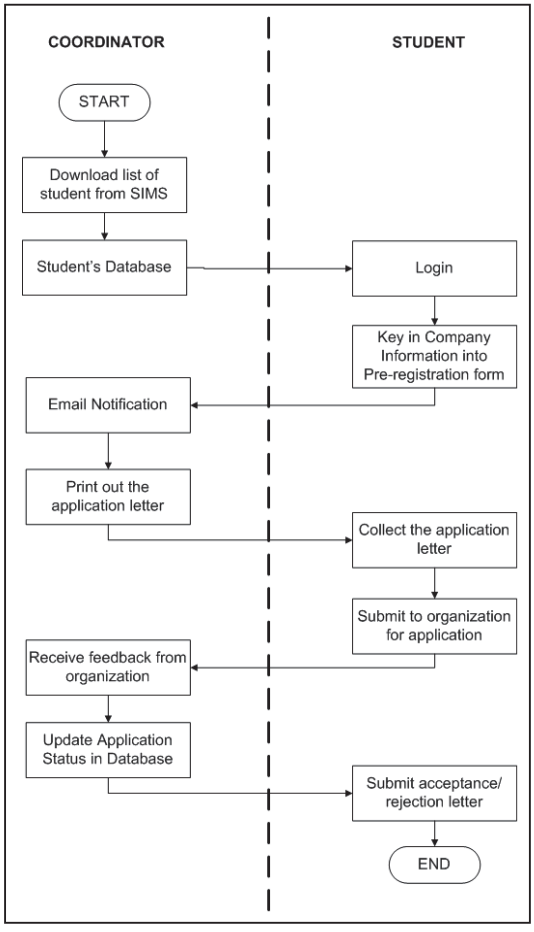

Fig.1. Activity Diagram of the Proposed System

C. Other User

Besides students and coordinator, visiting lecturer and industrial supervisor should also have access to this system for evaluation and assessment purpose. After six weeks of attachment to the host organization, coordinator will assign a visiting lecturer to evaluate the student's training process at industry. Visiting lecturer and industrial supervisor will do an online assessment through respective user interface.

IV. RESULT

Based on the analysis and design phase outcomes, an Entity Relational Diagram (ERD) is designed accordingly as shown in Fig. 2. The intuitive interface of the system is also developed for average user by providing quick access to common features.

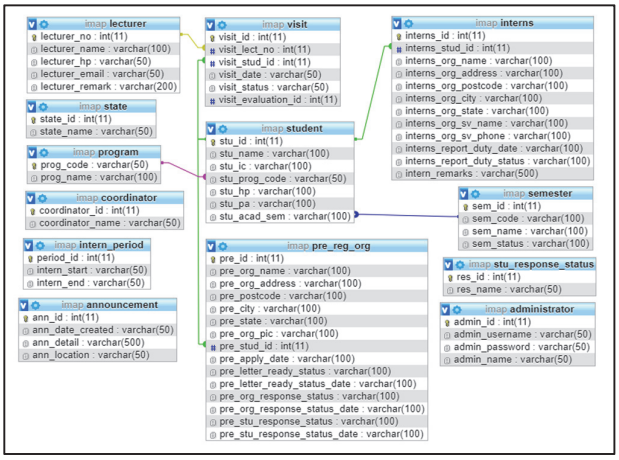

Fig. 2.Entity Relational Diagram

In this project, a management system called iMAPS will be established. This system computerizes the whole process of practical training and makes it available online. This medium eases the communication of practical student with the coordinator or their visiting lecturer. iMAPS will be fully utilized by the coordinator and the practical students because it is more reliable and effective compared to the manual system. This web-based system also can give real time notification about their acceptance or rejection into the company. All the progress updates on their practical session will also appear on this website. This project website will benefit the visiting lecturer because they can see their student list that is provided by the coordinator.

All UiTM Electrical Engineering students should undergo Industrial Practical session in semester 4. When the students are in semester 3, the coordinator will upload their name into the iMAPS system. Hence, they will be authorized to access the system. Fig. 3 shows the list of students that is uploaded by the coordinator which is then sorted into their respective program.

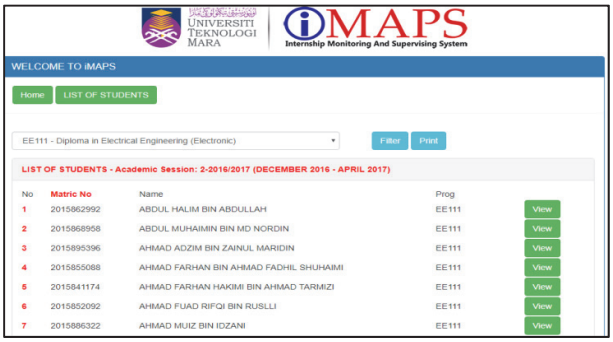

Fig. 3. List of Student

When the students' names are uploaded into the iMAPS, the system will display the number of students of respective programs that should undergo the internship session during semester break for the current academic session. Coordinator can view this information from the dashboard as shown in Fig. 4.

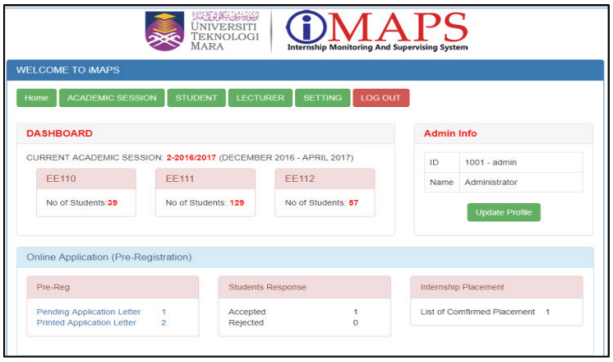

Fig. 4.Coordinator's Dashboard

When the student accesses into the system, they may update their personal information by clicking the 'update' button as shown in Fig. 5. This information is important for application letter purpose that will be prepared by the coordinator.

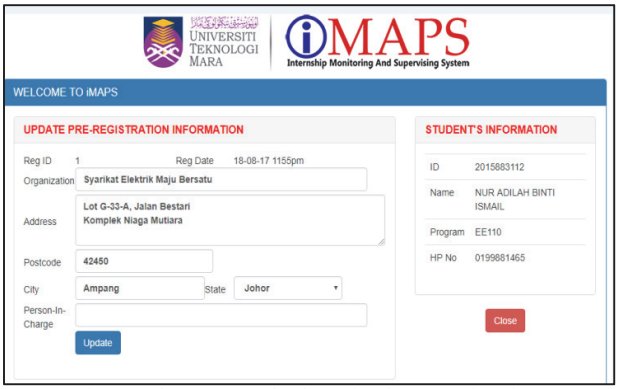

Fig. 5.Student's Personal Information for Pre-registration

When a student keys-in information regarding the host organization, it will be stored in the student's database. At the same time, the information will be displayed at the student's pre-registration page. Coordinator may change the status of student's application at 'Application Workflow Status' as depicted in Fig. 6.

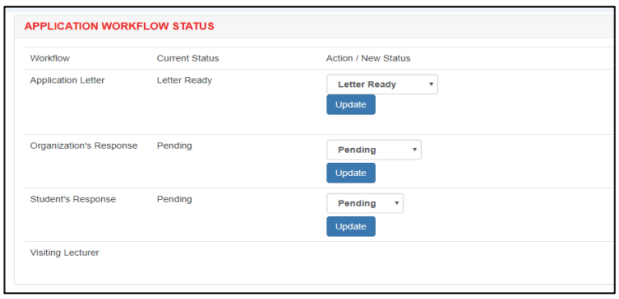

Fig. 6. Workflow Status

By updating the workflow status, students will be more alert about their status of application and will react accordingly. Fig. 7 shows the application status for each of organization. Every single process is recorded and displayed by the iMAPS. Once the students accept the internship offer, the information regarding the host organization will be displayed at 'Internship Information'field. Later, this information will be used by coordinator to assign visiting lecturer during evaluation process.

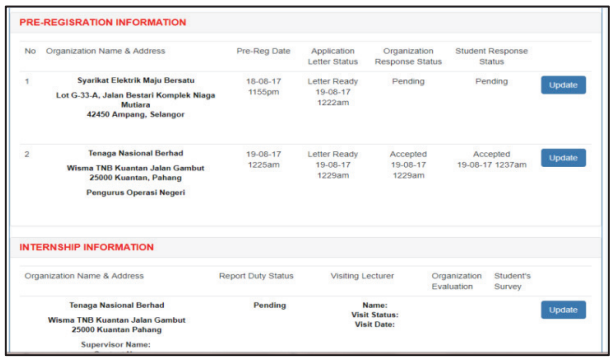

Fig. 7.List of Host Organization

Students are not allowed to change host organization without valid reason. To ensure that this rule will be obeyed by the student, they need to press 'confirm' button if they decide to accept the offer.

V. Conclusion and Future Work

Prior to development of iMAPS, the industrial training management and monitoring process has been handled manually by the industrial training coordinator. Initial testing of this system will include small number of students as users. The system is expected to be able to reduce a lot of manual processes. Since iMAPS is still in developmental phase, more internal and external factors are still under consideration to ensure the system could benefit the students, coordinator, industrial supervisor and visiting lecturer. More evaluation regarding the functionality of the system will be done to ensure it meets user expectation. iMAPS has special features because student can start to use the system starting from the pre-registration stage. All information regarding the applications and host of organizations are safely kept in the database and can be retrieved by administrator for future references of other students. Besides, industrial supervisors are able to assess the students by using online system. Another additional feature to be considered is providing option for the user to give feedback regarding the system to enhance the quality of the usability. Forum feature is also considered to be added to allow students to communicate with each other and to encourage two-way communications between students and coordinator.

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