

## Development of Pusat Pengajian Diploma Industrial Training Online System (PiTOS): A Step Forward

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**Abstract.** This paper describes the design and implementation of the Pusat Pengajian Diploma Industrial Training Online System (PiTOS), which was designed 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. The solution we developed is a web application, written using PHP and utilizes the MySQL as the database management system.

### Introduction

The Internet exists before the 1990s but it only began receiving attention from the mid-1990s onwards. However, it was not widely used by organizations (business, government, etc) as much as they do today in improving various aspects of the business or tasks [1]. The web or Internet which originated as a communication network among universities and research laboratories is no longer just a way of presenting information on a computer screen [2] and following the evolution of web browsers, it has now expanded as a tool in managing data. Each day, new Internet applications and more efficient ways of doing tasks are discovered [3]. In an effort to improve and increase the use of technologies in the education management environment, an online system named Pusat Pengajian Diploma Industrial Training Online System (PiTOS) was developed. The proliferation of the use of Internet, low cost of hardware and the enhancements in wireless communication enabled us to develop this system which provides all relevant parties easy accessibility to all vital information related to students' industrial training in a more organized and efficient way.

### Current Implementation

Students who are eligible to undergo industrial training will register through the SMAP (Student Academic Information System) Online. After the industrial training placement has been made, the Industrial Relations Society, also known as HIM, will send the details of the students to the Chief Industrial Training Coordinator at the Center for Diploma Studies for further action. Under this chief coordinator are four other coordinators who represents each department at the Center for Diploma Studies: Department of Electrical Engineering, Department of Mechanical Engineering, Department of Civil Engineering and Department of Information Technology. Figure 1 shows the current flow of the process involved in handling the industrial training activities. As illustrated in the figure, the activities after the hand over are done manually making the task tedious and time consuming. The documentation process is not systematic with files stored in different formats and data kept separately in each department. This results not only in data incompatibility but also make the retrieving and updating of information as well as combining of files problematic for the various users.

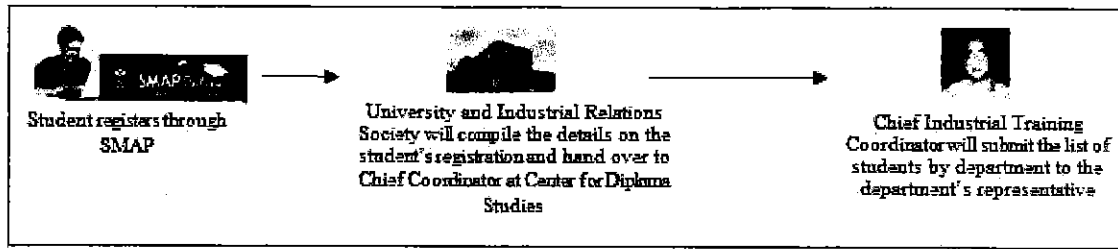


Fig. 1 Current Implementation of Industrial Training at Center for Diploma Studies

**Benefits of Online System**

The popularity of online system relates directly to the perceived advantages of the delivery method, that is the factors that motivate students [4]. In this section, some benefits of web-based system over former paper-based systems are given. PiTOS was developed to target the specific needs of the Center for Diploma Studies. One benefit is immediate and flexible feedback available to students and supervisors through the bulletin where students can read the important news posted by their respective supervisors. The industrial supervisors and PPD supervisors can evaluate their supervisees by filling in the online assessment rubrics. The online system is much easier to administer than paper-based. Since the rubrics are in digital format, time and money spent on overhead tasks are reduced. Digitally stored data could also be readily used for analysis to produce student's result online.

**System Design**

The design goal of PiTOS is to resolve some of the issues raised in paper-based system. Specifically, it is developed to make it accessible and customizable to serve the Center for Diploma Studies, as well as being user friendly. PiTOS is designed as a "thin-client" web application [5] requiring only a web browser administer and use. Thin-client computing refers to multi-tier client server paradigm where the client (end-user) programs are displayed in a browser (such as Internet Explorer or Netscape) but the execution of that user code takes place in a central web server rather than at the desktop PC [6]. When designing a system, it is helpful to identify the people, organizations, or things that might interact with it [7]. In order to make PiTOS easy to use, the users are treated as role players. A single user, called the administrator, create academic session on behalf of the Center for Diploma Studies. Rubrics forms are to be completed by evaluators i.e. the supervisors. Those students who are being rated have the role as 'evaluatees'. A reviewer i.e. the chief coordinator of industrial training is able to view the full results. The system brings up the proper interface for an individual user based on their role(s). Users do not have to navigate through interfaces unrelated to their roles. In Unified Modeling Language (UML) [8], a use case diagram describes the interactions of users and components in a software system. The use case diagram in Figure 2 was developed to show actions that can be performed by each role player. Figure 3 shows the state transition for the system.

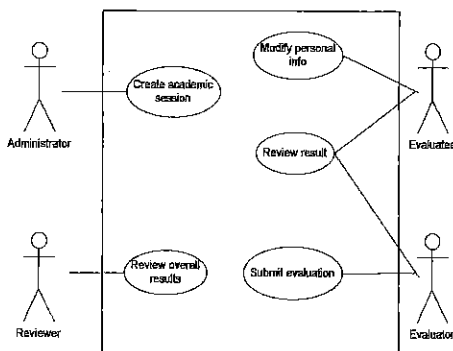


Fig. 2 PiTOS Use Case Diagram

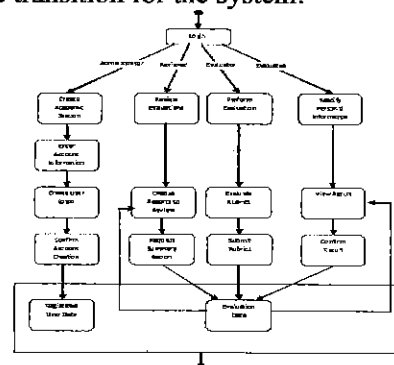


Fig. 3 PiTOS State Transition Diagram

### System Implementation

PiTOS takes advantage of the free and open source technologies in its implementation by using phpMyAdmin. The free and open source tool written in PHP is intended to handle the administration of MySQL with the use of a Web browser [9]. It can perform various tasks such as creating, modifying or deleting databases, tables, fields or rows; executing SQL statements; or managing users and permissions. Netbeans IDE 7.1 is used as the programming editor. Programming editors, also known as source code editors, are text editors that are specifically designed for programmers or developers for writing the source code of an application or a program [10]. Figure 4 shows the main interface of PiTOS. An authorized user needs to key in their username and password to enter the system. Different users will have different passwords to access different modules in the system. Once the students have successfully entered the system, they can update their industrial training information, get the latest information regarding the industrial training through the Bulletin Board and also know their results online as shown in Figure 5.

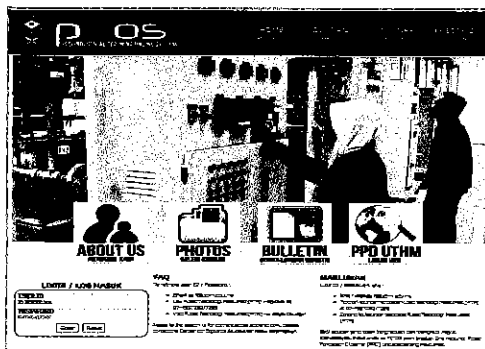


Fig. 4 The Main Interface of PiTOS

INDUSTRIAL INFO / INFO INDUSTRI	
STATUS	STATUS: FIRST ONLINE IN SENIOR
PROFIL	SUPERVISOR
PROFIL	BAIK
PROFIL	DEKSA TAY
PROFIL	NAMA PERUSAHAAN
PROFIL	COMPANY
PROFIL	ALAMAT
PROFIL	ALAMAT
PROFIL	STREET
PROFIL	POSTKOD
PROFIL	PERIOD
PROFIL	TUJUH
PROFIL	BANDAR
PROFIL	STATUS
PROFIL	RESEKI
PROFIL	PHONE / GSM
PROFIL	TELEFON / FAX

Fig. 5 Student Interface

As for the PPD and Industrial Supervisors, they can complete the standardized online form to evaluate the student's performance in key areas as can be seen in Figure 6. They also do not have to calculate the marks manually since the system will generate it automatically. The use of radio buttons make it easy for the supervisor to tick the relevant sections and this makes rewarding of marks more standardized and also reduces human error in calculating the marks.

RUBRIC / RUBRIK PENILAIAN	
HOME	STUDENT NAME : MUHAMMAD FERDIAUS BIN KAMARUDDIN
LAMAN UTAMA	NAMA PELAJAR
STUDENT LIST	MATRIK : AA100151
SENARAI PELAJAR	MEMBER MATRIK
STUDENT RESULTS	PROGRAMME PROGRAM : DIPLOMA TEKNOLOGI MAKLUMAT
REKODAN PELAJAR	
UPDATE	
KELAS RENCANA	
BULLETIN	
BERITA LATIHAN INDUSTRI	
RUBRIC	
RUBRIK PENILAIAN	

2.5 Mengemukakan format penilaian  
 2.0 Format penilaian tidak teratur dan ayat tidak diklah dengan baik  
 1.5 Format penilaian kurang teratur dan terdapat sebarang sahaja ayat yang diklah dengan baik  
 1.0 Format penilaian teratur tetapi sebarang susunan ayat tidak diklah dengan baik  
 0.5 Format penilaian teratur dan susunan ayat diklah dengan baik  
 0.0 Format penilaian teratur dan susunan ayat diklah dengan baik berserta huraian yang jelas

Fig. 6 Online Rubrics Used for Evaluating Student's Performance

### Conclusion and Recommendations

For those considering designing a similar online system in managing industrial training, the presented system is very useful and easy to use by all relevant parties even with minimal computer knowledge. All the data inside the database can be easily secured and maintained since everything is being stored

on a central server. Since PiTOS is aimed to create a paperless environment in managing industrial training at Center for Diploma Studies, so the next advancement would be on the log book. It is planned to have an online log book to help the students update their activities from time to time.

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