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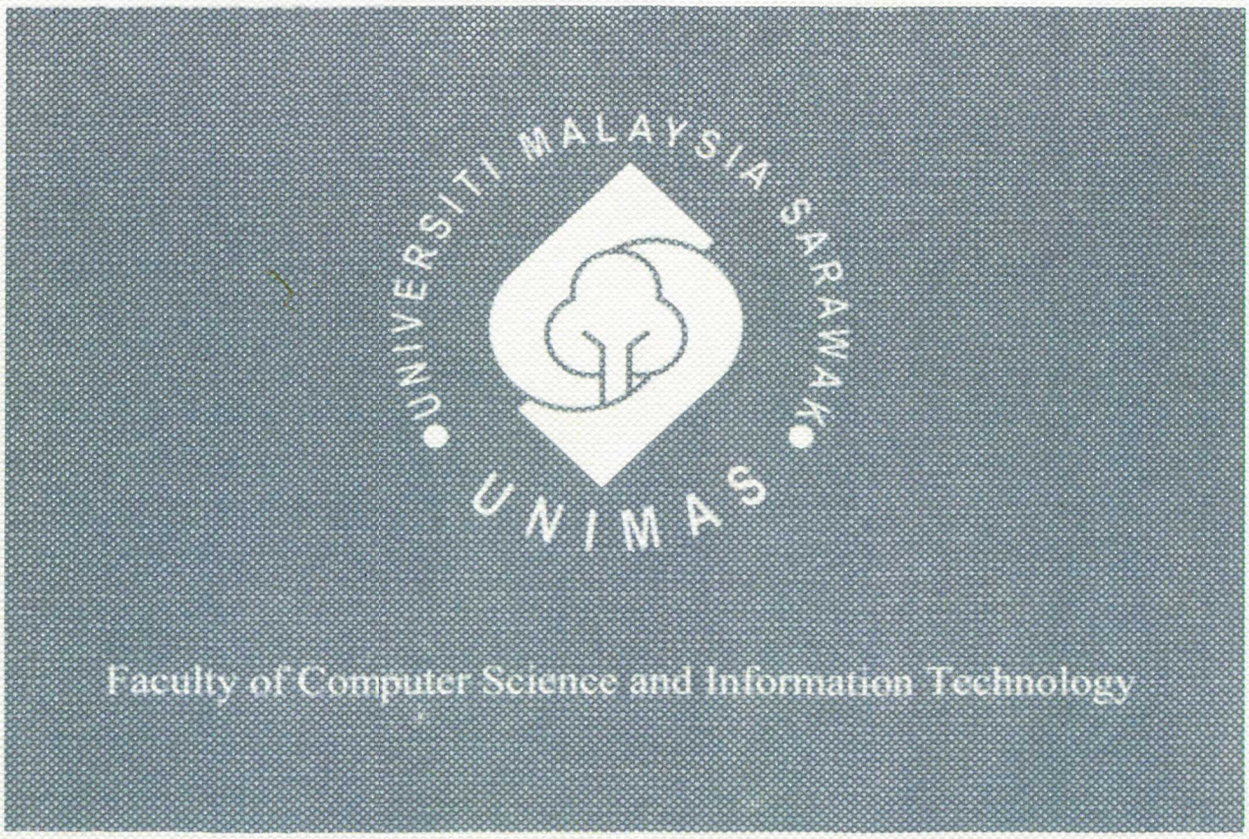

ENHANCING FCSIT INDUSTRIAL TRAINING WEB SYSTEM

Mark Ding Wan

Bachelor of Computer Science with Honors
(Software Engineering)
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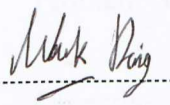

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Table of Contents

List of Figures V

List of Tables VIII

Abstract IX

Abstrak X

Chapter 1: Proposed System 1

1.1 Introduction 1

1.2 Problem Statement 2

1.3 Objectives 2

1.4 Methodology 2

1.5 Scope 4

1.6 Project Schedule 5

1.7 Significance of Project 5

1.8 Conclusion 5

Chapter 2: Literature Review 6

2.1 Introduction 6

2.2 Criteria for effective Internship management website 10

2.3 Study of similar systems 11

2.3.1 Facebook 11

2.3.2 Universiti Teknologi Malaysia LI System (ITS-UTM) 12

2.3.3 FCSIT LI system 13

2.3.4 Comparison of systems 16

2.4 Proposed Enhancements 17

2.4.1 Improved functions or features 17

2.4.2 New functions or features to be added 18

2.5 Conclusion 18

Chapter 3: Analysis and Design 19

3.1 Introduction 19

3.2 Requirements Analysis 20

3.2.1 External Interface Requirements 20

3.2.2 Functional Requirements 21

3.2.3 Non-functional Requirements 22

3.3 Architectural Design 24

3.3.1 Data Flow Diagram 24

3.3.2 Entity Relationship Diagram 29

3.3.3 Process diagrams 29

3.4 User Interface Design 37

3.4.1 Login page 37

3.4.2 Intern's home page 38

3.4.3 Coordinator's home page 39

3.4.4 Supervisor's home page 40

3.5 Conclusion 41

4.1 Introduction 42

4.2 Implementation of System 42

4.2.1 Login Section 42

4.2.2 Intern Section 43

4.2.3 Coordinator Section 48

4.2.4 Supervisor Section 57

4.3 Testing methods 61

4.3.1 Unit Testing 61

4.3.2 Integration Testing 61

4.3.3 System Testing 61

4.3.4 Acceptance Testing 61

4.4 Conclusion 62

Chapter 5: Future works and Conclusion 63

5.1 Introduction 63

5.2 Limitations 63

5.3 Future works 63

5.4 Conclusion 65

References: 66

Appendix A : Project Schedule 68

Appendix B : Paper 69

Appendix C : Test Plans and Results 73

1. Unit Testing 73

2. Integration Testing 81

3. System Testing 84

4. User Acceptance Testing 84

Appendix D : User manual 90

List of Figures

Figure 2.1: Facebook's main page. Source: https://www.facebook.com 11

Figure 2.2: ITS-UTM's main page. Source: http://its.utm.my 12

Figure 2.3: FCSIT LI system's main page. Source:

http://omega.fcsit.unimas.my/tmy3912/index.php 13

Figure 2.4: FCSIT LI system's student update log page. Source:

http://omega.fcsit.unimas.my/tmy3912/students.log.php 14

Figure 2.5: FCSIT LI system's discussion board. Source:

http://omega.fcsit.unimas.my/tmy3912/forum/main.php 15

Figure 3.1: Context diagram of Enhanced Industrial Training System 25

Figure 3.2: Level 0 diagram of Enhanced Industrial Training System 26

Figure 3.3: Level 1 diagram of validate login function 27

Figure 3.4: Level 1 diagram of processing emails function 28

Figure 3.5: Level 1 diagram of route planner 28

Figure 3.6: This ERD diagram of enhanced Industrial Training system 29

Figure 3.7: Process diagram of validate login function 30

Figure 3.8: Process diagram of forgotten password function 31

Figure 3.9: Process diagram of searching function 32

Figure 3.10: Process diagram of updating company details 33

Figure 3.13: Process diagram of route planner 34

Figure 3.15: Process diagram of send email function 35

Figure 3.16: Process diagram of intern approval function 36

Figure 3.17: Mock-up diagram of main login page 37

Figure 3.18: Mock-up diagram of Intern's home page 38

Figure 3.19: Mock-up diagram of coordinator's home page 39

Figure 4.1: Main login page of Internship System 42

Figure 4.2: Main home page of Intern 43

Figure 4.3: Javascript coding to modify the calendar after changes have been made to the log 44

Figure 4.4: Screenshot of Log report to be printed 45

Figure 4.5: Company page before being approved by supervisor 46

Figure 4.6: Send mail function in PHP 47

Figure 4.7: Company page after approved by supervisor 47

Figure 4.8: Profile page of intern 48

Figure 4.9: Home page of coordinator's section 49

Figure 4.10: The modal box triggered after clicking on a state/country. 50

Figure 4.11: Intern page of coordinator section. 50

Figure 4.12: PHP codes to validate the file type being uploaded. 52

Figure 4.13: Intern page of coordinator section. 53

Figure 4.14: HTML and Javascript for initializing Google map and autocomplete function 54

Figure 4.15: The shortest route between the starting point (Kuching International Airport) and other 8 companies 55

Figure 4.16: Profile page of coordinator section 56

Figure 4.17: Content of email sent to supervisor's mail client by the system 57

Figure 4.18: Registration page for new supervisor 58

Figure 4.18: Home page of supervisor section 58

Figure 4.19: Rating an intern in the Home page 59

Figure 4.20: Profile page of Supervisor 60

List of Tables

Table 2.1: The six criteria established to measure the effectiveness of an internship management website. 10

Table 2.2: The comparison of three systems against the six important criteria that has been established 16

Table 2.3: Features and functions available in the FCSIT LI system and reason for improvement or deletion 17

Table 2.4: Features and functions to be added into the LI system and supporting reasons 18

Abstract

Enhanced Industrial Training (LI) System is a new version of the current LI system used by Faculty of Computer Science (FCSIT), Universiti Malaysia Sarawak. Major improvements include the addition of search bar, access for supervisors, question & answer page, route planner for coordinators, report uploading and email notification. This system is developed from scratch using the modified Waterfall Model method and implemented using PHP, HTML and Javascript. It is also hoped that this system will enable supervisors, coordinators and intern to communicate their work more effectively.

Abstrak

Sistem Latihan Industri (LI) Baharu merupakan versi baharu untuk sistem yang kini digunakan oleh Fakulti Sains Komputer dan Teknologi Maklumat, Universiti Malaysia Sarawak. Antara penambahbaikannya ialah bar carian, akses untuk penyelia, perancang laluan, dan notifikasi melalui emel. Sistem ini dibina menggunakan kaedah modified Waterfall model dan dikod menggunakan PHP, HTML dan Javascript. Amatlah diharapkan agar sistem ini dapat membantu pengguna-pengguna untuk berkomunikasi antara satu sama lain secara lebih efektif.

Chapter 1: Proposed System

1.1 Introduction

Industrial Training (LI) is an essential part of the degree program offered by Faculty of Computer Science and Information Technology (FCSIT), Universiti Malaysia Sarawak. This one semester course serves to prepare students for professional work in the Information Technology industry as well as its expectations and also serves as an opportunity for students to gain valuable insights of their chosen career. During this course, student's performance will be assessed based on the following criteria;

i. Visiting supervisors report
ii. Company supervisors report
iii. Students LI Final report and Log Book Report

The current FCSIT LI website was developed in order to facilitate the process of preparing those reports and to keep track of students' performances as well as the details of their workplace. This could be accessed by three main groups of user which is the coordinator, students and administrator. It was created mainly using Hypertext Preprocessor (PHP) and HyperText Markup Language (HTML) with My Structured Query Language (MySQL) to handle data from database. Some of the main functions include; update and print Log Book report, download important documents, chat with friends/coordinator and broadcast important news.

1.2 Problem Statement

The current LI system has many problems such as; needing to explicitly type *
* for newline, unable to use apostrophe when submitting a form, and requiring user to re-update the date to current date (default date is 10 May 2010) every time interns try to update their logbook.

Also, it lacks some important features such as; search for questions and links, planning routes for coordinators and lecturers, uploading reports and notifying students via email. These limitations make the website looked very unprofessional and hard to use especially on mobile devices.

1.3 Objectives

The main objective of this project is to provide an enhanced version of the LI web system with at least 2 new features, no user-related errors and a new-look user interface while maintaining the current functions. Other objectives include:

i. To identify the problems encountered by the clients when using the current system.

ii. To produce a structured and well-documented architectural design of the new web system.

1.4 Methodology

This project follows the modified Waterfall development methodology which is a type of Software Development Life Cycle (SDLC) Methodology. It is considered modified because the clients would be evaluating the deliverables after every phase and it is possible for the deliverables to be modified as well. Besides that, after each function is developed,

they are then integrated into the main system and the development phase is re-iterated for the next function to be developed.

In the requirements gathering phase, the current LI system is studied by observation with a focus on functions currently provided, potential problems, issues and possible features that could be added to. Other similar systems would also be studied. A meeting or discussion with the clients (Mr. Rajan and students who have used the system) would then be held to understand more on the information gathered earlier. Besides that, the requirements of the hosting server and the final product are also identified.

Next, a thorough analysis on these requirements is conducted. The requirements are divided into functional and non-functional which are further divided into different more categories such as performance and system requirements. This is to ensure that the system to be built fulfills the requirement of the faculty's hosting server as well as compatible with major browsers. Since the system will use student's details, we also need to check the possibility of the system having access to the faculty's student database. Additionally, the requirements are compared against each other to determine its feasibility and modified if required.

In the systems design phase, the system's architecture is laid out using data-flow diagram (DFD), entity-relationship (ER) diagram and process diagrams. This will help us to understand which data can be accessed by the student or coordinator, how it is accessed, and gives us a more analytical value on the requirements. It will also help us to determine inputs required such as login details of the student and information about their workplace

and also determine the outputs of user actions. Besides that, a mock-up diagram of the system's user interface will be designed as an early prototype.

Next, the development and implementation phase is initiated. The system is developed from scratch because permission to obtain source code isn't granted by the Network Administrator due to security reasons. After each function is developed, it is integrated straight away into the main system, tested and evaluated by the clients. This is to ensure that nothing goes amiss and the prototype can be shown to the clients as soon as any function is finished. Also, a test plan is designed and the development and integration phase is iterated all over again for each system part.

After the completion of the development phase, the whole system is subjected to a wholesome testing based on the testing plan drawn out in the previous phase. If needed, the local test servers are configured to match the faculty's servers. Even so, the developer will try to obtain permissions to test on the faculty's servers.

Finally, the system is officially handed over to the faculty and the final report is prepared.

1.5 Scope

i. The final product of this project shall only be used by students, coordinators and lecturers and/or companies involved in the LI course.

ii. This project shall attempt to address all the server and user-interface related issues in the current system.

iii. The basic functionality of the current system shall remain.

iv. This project will attempt to add at least two new functions to the system.

v. The back-end side shall use PHP and MySQL languages while the front-end side will use HyperText Markup Language (HTML), JQuery and JavaScript.

vi. All third-party plugins used should be open-sourced.

1.6 Project Schedule

Please refer to Appendix A.

1.7 Significance of Project

In essence, this project would be used by all students, supervisors and coordinators involved in the current LI program. Students would no longer find it troublesome to prepare their report and update logs. Coordinators would also not have to deal with papers and stacks of reports cluttering up in their room.

1.8 Conclusion

This project aims to produce an enhanced version of LI web application which can be viewed on all major browsers.

Chapter 2: Literature Review

2.1Introduction

Many projects have been done previously on a web-based LI system. However, this chapter will cover on the required criteria of effective web design, analysis on three different types of content management systems, comparing similar systems based on the required criteria and proposing enhancements to the current LI portal.

The criteria of an effective web design will be identified and based on different studies and articles. These studies and articles have somewhat different principles due to different objectives. The principles will be combined into several criteria that will be used to evaluate similar systems and influencing proposed enhancements.

The similar systems compared are not necessarily directly similar to each other in the same domain but they do have similar functions and features.

2.1 Principles and factors of Effective Web Design

Friedman (2011) stated that visual design does not determine the failure or success of the website but rather the usability and the utility. However, it was also reported that visual design allows organization, navigation, differentiation and create a more positive and rewarding online experiences for users (HSMAI, 2010). It is possible that Friedman was actually trying to imply that design should complement the usability of the website and not the other way round. This was further evidenced in his 10 principles of effective web design whereby he emphasized on organizing elements (which can be translated to visual designing) to make it more usable.

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There are 10 principles that Friedman (2011) proposed would determine the effectiveness of web design.

i. **Don't make users think.** Websites should be as intuitive as possible.

ii. **Don't squander users' patience.** Performance should be fast and navigating to certain pages should require as little work as possible.

iii. **Manage to focus users' attention**. Elements on the website should be able to grab the users' attention and helping them to carry out tasks without thinking how it is supposed to be done.

iv. **Strive for feature exposure.** Functions should be as able to be seen clearly and make users feel comfortable with the way they interact with the features.

v. **Make use of effective writing.** Writing should be as clear and concise as possible so that users can understand how to use the website immediately.

vi. **Strive for simplicity.** Using pure text as a design platform is considered the best design strategy.

vii. **Don't be afraid of the white space.** Whitespace allows visitors to perceive information presented on the screen and reduce their cognitive load.

viii. **Communicate effectively with a "visible language"**. Based on Marcus (1995) for effective communication; organize, economize and communicate.

ix. **Conventions are our friends**. Conventional design reduces learning curve and doesn't result in a boring website.

x. **Test early, test often.** Tests often provide crucial insights into significant problems and issues related to a given layout.

While Friedman do makes some common sense, his principles seem to be opinionated and experience-based. A report contributed by a group of marketing and strategic designing planners from the Hospitality Sales and Marketing Association International (HSMAI) give a very different take on principles in web design. The report listed 6 important factors; Color, Typography, Navigation, Photography, Videos and Maps.

i. **Color.** Colors can be effectively leveraged to reinforce brand identity, build emotional connections with viewers and enable greater website personalization.
ii. **Typography.** Typography was also claimed to be able to create consistency which can help users quickly filter and sort information on a site.
iii. **Navigation**. Navigational features such as tabs, headings and list has to be clear and consistent across all web pages.
iv. **Photography**. Photographic images capture the attention of online viewers and encourage viewers to navigate and learn more.
v. **Videos**. Video adds an entirely different dimension to a website when compared with still images, creating a more compelling and immersive environment that builds strong emotional connections to consumers.
vi. **Maps**. Maps provide essential geographic information and can also act as part of a website's navigational scheme while encouraging efficient and productive flow of actions that can lead users to make appropriate decisions.

It should be noted that HSMAI report's main objective was to show users how properties in contemporary web design can be used to enhance the sales and marketing performance of companies and organizations within the global hospitality, travel and tourism sector. This does not mean that this report does not carry any weight in the

enhancement of an LI (LI) web design because those criteria are essentials to attract and improve users' experience on a website.

It is interesting to note that these articles do not emphasize data security and privacy. A reasonable explanation would be that these sources focus only on the visualization of a website and how a user perceives it to be. For example, Friedman (2011) explained how membership should be prioritized but not how it should be implemented.

Laird & Turner (2008) did take into account data security and privacy when outlining principles of support for work-integrated learning websites:

i. **Quality Assurance** – able to comply with the various quality standards.
ii. **Accuracy** – all users require correct and accurate information for carrying out their tasks.
iii. **Flexibility for Updating** – provide the ability for updating various information in order to avoid delays and further errors in the quality of the service.
iv. **Presentation of Relevant Information** – only relevant information should be presented to users that the system recognizes from the individual's login credentials to protect privacy and prevent clutter.
v. **Data Migration from Student Record System (SRS)** – Students should have their relevant personal data from a centralized record connected to the system so that no registration is required. However, this is often optional due to privacy policies of institutions.
vi. **Management Reports** – Customizable paper-based reports should be able to be obtained digitally by the required user to support decision-making processes.

vii. **Records** – Needs to hold and protect the integrity of records of placements for as long as the institution's policy demands.

viii. **Auditable** – provide the trace and record of actions and achievements, with dates, for any user.

2.2 Criteria for effective Internship management website

Based on the various sources, some criteria can be established to measure the effectiveness of an internship management website:

Table 2.1: Six criteria established to measure the effectiveness of an internship management website.

Criteria	Description and requirements
Usability	Elements in the website should be clear, concise and unambiguous so that it is easy to learn and use. Normal users should not be required to think in order to access certain links and functions in the website.
Simplicity	The website must implement simple typefaces with a great use of white space and consistent way of organization of elements.
Functionalities	Only important functions should be kept and the unimportant ones discarded. Also, relevant functions should only be presented to the relevant users.
Security	All students, staff and company data should not be able to be accessed or obtained from the system by unauthorized users.
Privacy	Among authorized users the personal data of one should not be viewable by another, unless the owner had chosen otherwise. However, the coordinator or administrator (or any person who had similar privileges assigned) needs viewing and editing rights over almost all data (Laird & Turner, 2008).
Digital storage and updatability	There must be a digital, centralized storage that would be able to replace most paper-based works. In other words, the user must be able to store information digitally-which is otherwise done on paper. Also, this storage must permit its record to be updated by the relevant user at any time of the day.