# Student Exchange Program Web Based Application System (Outbound)

By

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16319

Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
(Information & Communication Technology)

May 2015

# CERTIFICATION OF APPROVAL

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

Approved:

_____
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UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK

May 2015

# 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.

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NUR ASHIQIN BINTI SUWARTO

# ABSTRACT

One of the objectives of Universiti Teknologi PETRONAS (UTP) is to produce well-rounded graduates who are creative and innovative with the potential to become leaders of industry and the nation. In order to achieve this objective, UTP offered Student Exchange Program (SEP) to the local and international students which manage by Centre of Student Internship, Mobility, and Adjunct Lectureship (CSIMAL). In Malaysia, student exchange program (SEP) has widely offered by the public and private universities, but UTP still using the traditional system to allow the students to apply for an exchange program and to manage the applications received in paper-based form.

A web based application system named Student Exchange Program System will be developed to replace the traditional system used by the CSIMAL. SEP system is focus mainly for outbound application which is enable UTP student to undergo exchange program in the partner institution by applying through online application system.

Qualitative research methodology is used to extract the information needed from the main stakeholder of the system, CSIMAL. Several interview sessions conducted with the CSIMAL to gain deep understanding on the problem faced by the students and CSIMAL staff and to gather all required data to develop SEP system. Rapid Application Development is used as the development methodology which focuses on the implementation of development of SEP system.

All the information regarding Student Exchange Program is shared in this system. The SEP system will ease the student effort to apply for student exchange program through an online application system and can easily check their application status. CSIMAL can manage the applications received through SEP system and update the application status which automatically will notify the students. This system will overcome the high chance of missing and losing the hardcopy of the application records.

# ACKNOWLEDGEMENT

I would like to express my gratitude and Alhamdulillah to Allah the almighty for his consent and plentiful endowment in order for me to complete this project. I would also like to prompt my gratitude towards my supervisor, Ms Nazleeni Samiha binti Haron for her guidance and continuous support throughout the whole duration of the Final Year Project. Her positive input and suggestions help in making this project go forward thus helping in a better understanding of research for the project. His attentiveness and inspiration have inspired me to be more proactive in completing this project and her advice motivates me to give my best in trying to complete the project and I thanked her for this wonderful opportunity.

Not to forget, I offer my highest appreciation to both of my beloved family for their ever loving support since inception of this project. Thank you also to all my fellow friends that help me a lot in completing this project. They always give advices and guidance to make sure that I will do the excellent work.

I would also like to thank CSIMAL department for entrusting me to do this project and guiding from their time, effort and feedback in developing the Student Exchange Program System. . Lastly, I would like to thank all of the people who have contributed directly or indirectly towards the success of this project.

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# CHAPTER 1

# Introduction

## 1.1 Background of Study

Creating paperless environment within the extremely sophisticated and exceptionally large organization is an important step toward staying current with developing technologies. Furthermore, the usage of technology in daily life is rapidly changing by moving towards developed nation in 2020. Manual processes using the papers are converted into computer-based processes which resulted in shortening long hours of works into several minutes. Universiti Teknologi PETRONAS (UTP) is taking the challenge to support paperless environment and work together to achieve 2020 vision. Therefore, the initiative starts gradually with a single department in UTP, Centre for Student Internship, Mobility and Adjunct Lectureship (CSIMAL).

One of the CSIMAL's responsibilities is handling the Student Mobility Program (SMP) which also known as Student Exchange Program (SEP). SEP is a standard programme for university students to study abroad at partnering's institutions for a period of time as to expose them to other cultures, languages and social experiences. UTP is offering the local students to undergo an exchange program (outbound) locally as well internationally, in line with the UTP mission to produce well-rounded graduates with the potential to become leaders of industry and nation. There are three types of mobility programmes offered by UTP; (i) Full Semester Exchange Program, (ii) Research Attachment, and (iii) Summer Program. CSIMAL is responsible to arrange and manage the application process as well as to ensure the success of exchange program outbound and inbound.

The SEP applications are opened every semester and UTP Students who are interested to join the SEP will submit their applications by hand to the personnel in charge in

CSIMAL. Currently, CSIMAL is using the manual system to manage the applications and no automation process exists to ensure the application process run smoothly. Most of the managerial tasks are executed manually and there is no proper database for keeping track of the applications. Receiving and process the SEP application in manual way will be time consuming and definitely inefficient for a department which dealing with large numbers of SEP applications every semester. Hence, a need for a proper Student Exchange Program System was identified as to overcome these issues as well as to establish credentials to support effectiveness of the exchange program.

Due to the nature of the business and the requirements, a web-based system is identified as the most feasible option for managing SEP. Among the identified important features of the system are online form submission and a centralized database system. The online form is required to enable students to submit applications from anywhere and anytime as well as for staff to process application directly from the system. The centralized database system is vital for managing historical and current data.

The rest of this chapter will be organized as follows: the next section will put forward the problem statement of this project. This will be followed with the objectives and scope of study sections.

### 1.2 Problem Statement

The current process of applying student exchange program is giving such problems to students and CSIMAL staff.

The main problem faced by the students is whoever would like to apply for student exchange program; they need to come to CSIMAL office to collect the hardcopy of

application form. The filled application form needs to be submitted to CSIMAL office together with supporting documents as been outlined by the CSIMAL. This manual process is burdening the students whom need to come to the office few times. This situation harden those students who do not have transport as they need to walk to CSIMAL office back and forth, which located quite far from the main academic block. Moreover, another problem arise when the supporting documents need to be submitted is not complete. They need to come again to the office to submit the incomplete supporting documents. This situation is really troublesome for the students.

UTP CSIMAL also encounters number of problems in handling and processing the application forms. Student exchange program has its own managerial file which compiled all the applications received. These records can be possibly missing and lost even if it is placed in a file and unfortunately hardcopy records do not have backup copies. The data records also are not protected properly as any unauthorized people can just access the data at any time. Most of the times, CSIMAL had hard times to read the details in the application forms due to bad or unreadable handwriting. This problem will complicate the situation if CSIMAL want to notify the students regarding the application but the student's email is hardly to read. In addition, manage and process large number of applications received in each semester will be time consuming and cumbersome.

As for current process, CSIMAL is using excel file to keep track the student application process. The problem is the application process consist of many stages and it is burdening the staffs to keep track using an excel file. There are five main stages in application process which include the processing form submission, interview, shortlist of candidates, sponsors and Visa and travel arrangement. When a student passes a stage, the CSIMAL staff needs to update the student application status.

There have been several complaints from the students relating to the current application process as many of them prefer to apply online rather than manual application process. CSIMAL also aware of this problem and identified the need of a proper application system.

## 1.3 Objective

This study will aim to achieve the objectives as below:

- To analyze current business process of CSIMAL in conducting Student Exchange Program (Outbound)
- To design and develop an online Student Exchange Program application system for CSIMAL

## 1.4 Scope of Study

The scopes of study of SEP application system are:

- This project requires an understanding of current Student Exchange Program (Outbound) procedure and process used by CSIMAL and proposes more efficient business process to enhance and increase the output productivity of the business.
- A system will be developed based on the current application procedure and demand from CSIMAL in conducting the student exchange program.

# CHAPTER 2

# Literature Review

## 2.1 Student Exchange Program

> Recharging our civic batteries is no simple task, but studying abroad gives students and faculty a chance to learn more about the rest of the world and almost inevitably that stimulate interest in our government and its policies.
>
> The late Senator Paul Simon (Durbin, 2009).

Student Exchange Program (SEP) is a short-term study abroad program in which students from an institutional education either high school or university, pursue study at one of their institution's partner institutions that last for a semester or academic year. Exchange program is generally offered in secondary school and higher education and almost all institution around the world is offering the students with this program. All students are eligible to apply as long as the requirements are met. Student exchange program comes with different type of program and the duration can be as short as two weeks and as long as one complete semester.

An exchange program student may involve in local or international travel, but not necessarily to study outside of the country. This program is one of the methods introduced by the higher institution in raising more quality graduates. A memorandum of understanding (MOU) is drawn up between two universities in order to establish the exchange programmes between the two universities. Liew and Melvis (n.d) claimed that most students affected with exchange program are from undergraduate level and

postgraduate level. Exchange program for undergraduate level more focus on study abroad, credit hours transferred and experiencing cultural differences, while postgraduate level is more on mutual research interests.

Each institution has a SEP department which managing students applying for an exchange program, outbound and inbound. SEP is a chance for students to experience student life in a foreign country and learn to be a global citizen. According to Lozano (2008), all the necessary skills required for the college students to succeed in today's global community can be gained from this exchange program. SEP exposes the students with different culture, religion and social environment in order to produce students with critical thinking skills and improved their behavior and social skills.

Keogh & Russel-Roberts (2009) debates whether exchange programs and student mobility is meeting student's expectations or just an expensive holiday. Some students may involve in students exchange program with intention to travel internationally. Students exchange programs should give benefits to the students in terms of learning and development, not only for enjoy the trip. One of the main goals of student exchange programs is to encourage a greater awareness of global issues, appreciation and respect for other countries and cultures. Being exposed to other country and cultures are valuable experiences, thus students were expected to engage and think globally. The students can enrich their local courses in more global perspective and gain a broader view of the world. Murphy et al. (2014) conducted an experiment and the results proved students involved in study abroad program were more globally engaged in terms of civic engagement, voluntary simplicity, knowledge production and philanthropy.

## 2.2 Uses of Technology

The usage of computers, tablets and smartphones has increased since the existence of technology and it is one of the primary ways of human communication. They communicate by sending emails, short message service, video calls and through the social media. It shows that people communicate with each other with the help of the technology. Hence, technology could help to solve problem that related to communication or information dissemination.

### 2.2.1 Internet

Internet is global network connecting millions of computer which helps two people or more to communicate with each other on long distance. Internet has grown exponentially over the years and become revolution to the modern technology that allows communication and sharing of knowledge for all over the world (Brdicka, 2013). The internet is still growing at a rate which cannot be imagined. The growth of internet cannot be denied as it has driven the increase of new technology, system and business to help in humans in any way possible. According to United Nations specialized agency in Information & Communication Technology (ICT) or known as ITU, there are 3.2 billion Internet users globally by mid of 2015 from 400 million in 2000. People spend time to surf Internet most while waiting for train, during leisure hours or before sleep. The number of users on the World Wide Web increases every day, its use in different areas is also growing rapidly where we can see changes and upgrade to the web in every second of the clock.

### 2.2.2 Database Management System

A database management system (DBMS) is the software that allows a computer to perform database function of storing, retrieving, adding, deleting, and modifying data.

Database management system (DBMS) has replaced the file system data management by having a group of data that can be stored and shared by multiple application programs and users synchronously (Wikipedia, 2014). Structure query language (SQL) is the language used by DBMS to isolate the data to different location, data redundancy and provided ad hoc enquiry capability. SQL can be defined as a universal non-procedural language that used to retrieve and manipulate data in database system efficiently and easily without having to write sophisticated computer program (Wikipedia, 2014). Other than that, it help provide logical and physical data independence, where any changes made in the structure of data or program application will not affect with each other. Besides that, it can also implement the relational model of tables and relationships where prioritizing on the relational database model order to proceed with system with the usage of Relational database management system (RDMS).

The advantages of having a database system is that data can be more secured and low tendency to be corrupted, the feature of DBMS is to ensure of database authorized access and recovery data during system failures. Where we compared to a manual database, a computerized data Compared to a manual database, a computerized database is more flexible, compact, and faster. It reduces the probability of inconsistent data and also time saving.

### 2.3 Web-based application

The number of Internet users has amplified tenfold from 1999 to 2013 based on statistics from Internet Live Stats. Internet users reaching millions worldwide and expected to increase more over the years is a sign for websites as the crucial medium of information transmission and dissemination. The World Wide Web (Web) has become one of our primary channels of information and communication, for private or professional use, a marketplace and one of the learning platforms (Weinreich, Obendorf, Herder, & Mayer,

2008). As the number of Internet users increase, the development of web also has been increase rapidly.

The growth of web development has been manifold in last few years and one of the reasons of the growth is the availability of web development tools and free of charge platform to aid in development. A website can be created easily using well-known easy use What You See Is What You Get (WYSIWYG) web development software, Adobe Dreamweaver. Anyone can develop a website even without any knowledge of HTML (Hyper Text Markup Language) by using such software.

The primary objective of developing a World Wide Web is the flexibility in time and location while browsing the websites (Bonham, Beichner, Titus & Martin, 2000). Information needed is available at all time and can be sent and retrieved from any location as long as the Internet can be accessed. This flexibility offered is the major objective of selecting web-based system as the outcome of this project. It eases the users to obtain the information and submit the application regardless the location and time. By developing a website to manage the application for the exchange program, the students could just browse the website from the Internet and submit the application easily.

Constantine and Lockwood (2002) claimed that the usability and users experience are the main elements of success in Web applications. According to Bruno, Tam, and Thom (2005), "The characteristics presented, represent aspects to a web application that researchers have found to be important to the usability of a web application". Hence, the usability of the website is the most important quality attribute need to be taken care of. Usability can be defined as the ease of use and the ability to learn of a human-made object. Poor interface design will increase the users errors thus the information that the users search for could not be found. Technically, the poor design of web application can

cause huge loss for some errors such as in making bank transaction. The costs of reconstruction of the web also need to be accounted.

## 2.4 Design pattern of Web based Applications

Christophe Alexander was the first one who introduced Design Pattern in 1977 in a book titled A Pattern Language: Towns, Buildings, Construction. An established structure of design is called Design Pattern. Many people know how the tab navigation bars, input forms and buttons in a web system looks like because of the Design Pattern. Sridaran, Padmavathi, and Iyakutti (2009) stated design pattern–based web application support architectural reusability and consistency. A developer of a web applications system can reuse the object-oriented code among projects in a convenient way using pattern-based web applications.

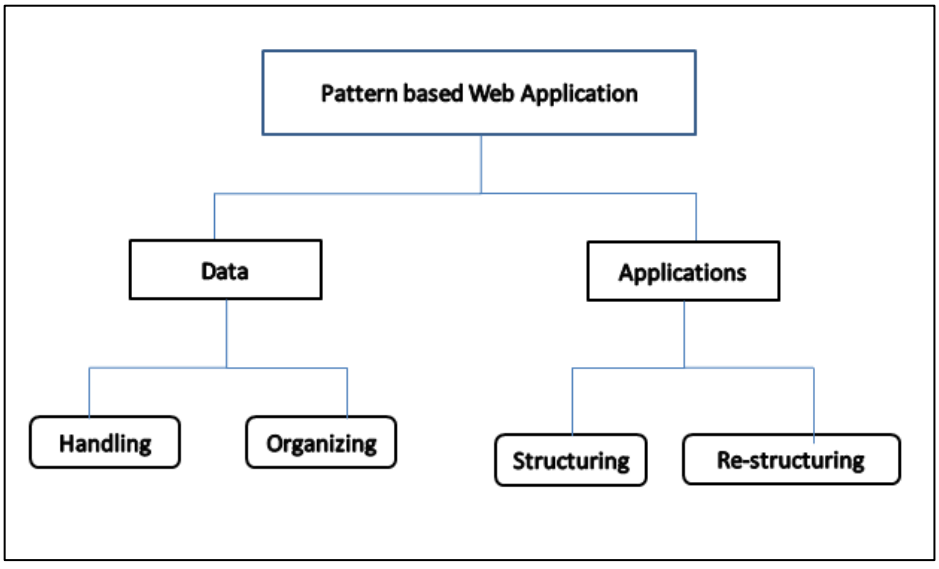


**Figure 1: Pattern Based Web Applications**

Design pattern has two main advantages which are ease the web system to be used and save time. There are large numbers of design pattern available to be reused; hence when a web system is using a standard design pattern, the user of the system will learn quickly since the design pattern is already used in other web system. Design pattern is about reuse the existing pattern to the web system application thus it will save time to design a web application as the developer can simply reuse the existing design pattern. The tendency of problem will arise is low as the standard design pattern is a stable pattern which the problems of the pattern has been resolved by the experts.

The author has identified user interface design pattern suitable to use for this project as summarize below;

- Password Strength Meter: It helps the user to choose a strong password for their accounts so that it is hardly to guess or break.
- Calendar picker: Ease the user to enter their birthdate or other related details that requires date.
- Navigation tabs: SEP system will consists of more than two sections in a system; hence the navigation tab will be used to categorize the sections accordingly.
- Table filter: table filter is use to filter large number of data to show in a page. It allows filtering the data in table according to the custom filter.

## 2.5 Existing system for Student Exchange Program

A few existing systems with similar functionalities has been discovered. These existing systems are belongs to other institutional throughout the globe. A technology comparative study has been conducted to compare the features of the each existing system by other institutional and UTP exchange program system. Griffith University,

University of Sydney and University of California (UCLA) were chosen to compare the application system process and functionalities. Each institution has different type of systems and process in receiving the application from the students, hence it is important to compare the application process of UTP and other institution in order to produce a good application system of SEP for UTP. Table 1 shows the features of each institutions selected by the author.

**Table 1: Student Application System of selected institutions**

| No | Institution | Features |
|---|---|---|
| 1 | Universiti Teknologi PETRONAS (UTP) | • UTP receive the application in hardcopy forms and process the application manually.<br>• Students need to collect the hardcopy application form from CSIMAL office and return back to CSIMAL. |
| 2 | Griffith University | • The university allow submission of applications through an online system by registering an account<br>• Once login to the system, the students need to fill the online form and submit with complete details. No supporting documents required<br>• All information of the programs offered can be viewed through the website publicly. |
| 3 | University of Sydney | • Students need to attend a briefing session called Information Sessions which explain the eligibility criteria, overview of partner institutions and etc.<br>• The submission of application is using Google Documents Form<br>• No supporting documents needed |
| 4 | University of California, Los Angeles (UCLA) | • No login feature; a valid student ID is required<br>• Students to fill in the online form created by |

| | | |
|---|---|---|
| | | Qualtrics<br>• Students need to write an essay to attach with the application form<br>• No supporting documents needed |
| 5 | University of Waterloo | • The university exchange program system focus more on knowledge based in communication and sharing any information on exchange programs matters.<br>• If the student is interested in applying for the programs the can contact the university administration to ask furthers more on requirement matters. Student can download the application forms and need to submit it to the administration office. |

Comparative study is conducted in this early stage of development to identify and compare the features of the existing systems. Table 2 shows the comparative study of student exchange program application system of the selected institutions.

| System features | Universiti Teknologi PETRONAS | Griffith University | University of Sydney | University of California, Los Angeles | University of Waterloo |
|---|---|---|---|---|---|
| Online application | X | / | / | / | X |
| Register an account | X | / | X | X | X |
| Exchange program information | X | / | / | / | / |
| List of partner institution | X | / | / | / | / |

| | | | | | |
|---|---|---|---|---|---|
| Edit application | X | / | X | X | X |
| Files attachment | X | X | X | / | X |
| Download the application | X | X | X | X | X |
| Frequently Asked Questions | X | / | / | / | X |

*Table 2: Comparative study of the existing SEP system*

# CHAPTER 3

# Methodology

## 3.1 Research Methodology

Research methodology involves the process in collecting information and data for the purpose of decision making. Qualitative research method is applied in order to gain deep understanding on the business process of the system to be developed. The most common sources of data collection in qualitative research method are interviews, focus group, observations, review documents and other data gathering methods. CSIMAL and UTP students are the two important stakeholders of this project.

Several meeting sessions have been conducted to interview personnel from CSIMAL including the manager, to collect information on business process of SEP. Other related documentations such as the process workflow, application form, list of partner institutions and statistics of students undergoing the exchange program, have been given for reference. An interview session with the students involved in the exchange program also conducted in order to gain better understanding of their experience when applying for the exchange program.


**Figure 2: Research Methodology**

### 3.2 Development Methodology

A development methodology is a framework that is used to structure, plan, and control the process of developing an information system. There several numbers of popular methodologies; Agile Software Development, Extreme Programming (XP), Joint Application Development (JAD), Rapid Application Development (RAD), Rational Unified Process (RUP), Spiral and the most traditional methodology is Waterfall. These methodologies form the framework for planning and controlling the creation of an information system.

RAD Model is chosen as the development methodology for this project and it consists of four main phase which are Analysis, Prototyping, Testing and Deployment. The benefit of using RAD model is it can reduce the development time and suitable for project small-to-medium scale and of short duration. The timeline for this project is 28 weeks, with the research phase included. The development period takes 14 weeks out of the entire project period. RAD model encourages customer feedback hence it can help to improve the quality or requirements and specifications of the project.

The most crucial phase is Prototype, it consists of three main activities which are Develop – Demonstrate – Refine. This is that one phase that allows the developer to demonstrate the prototype to the user to gather a feedback and make an improvement if needed. Any changes has to be made can be done within the prototype cycle. That is the most important strength of RAD as it provides the ability to rapidly change the system design as requested by the users. RAD is an iterative framework thus it allows the developer to change the design when there is a demand from the users.

RAD is a software development methodology which favors of rapid prototyping and use a minimal planning. A prototype is an early approximation of the final product which the function equivalent to the component of the final product. The main focus of RAD are gathering the requirements through focus groups or interviews, early testing of the prototypes using iterative concept, reuse the existing prototypes, nonstop integration and prompt delivery. Applying RAD will lessen the development time. Additionally, RAD has the advantage of increasing reusability of components. Diagram below shows the RAD Model lifecycle.

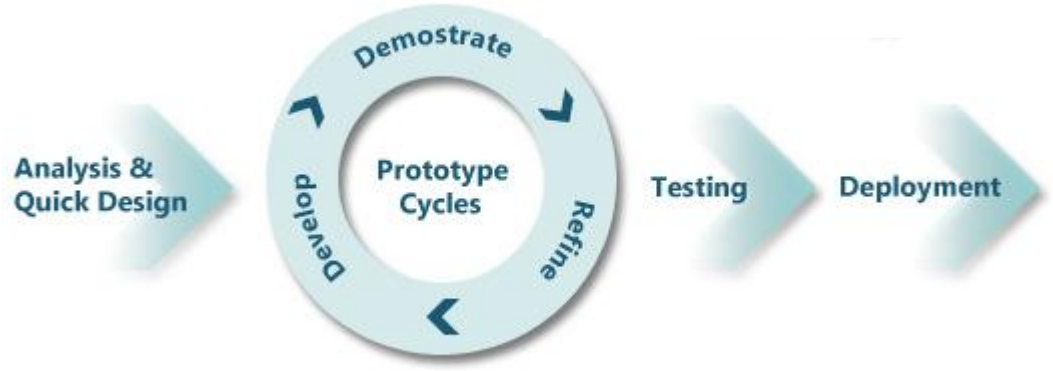


**Figure 3: Rapid Application Development Process**

Four main phases in RAD model is described below:

- Analysis and Quick design: the developer team analyzes the business needs, project scope, system requirements and constraints. The developer team will have a quick design of the system to reflect all the system requirements that has been identified.
- Prototype cycles: This phase includes three stages which are Refine, Develop and Demonstrate. The developer team will develop a prototype of the system and demonstrate to the stakeholders. This phase is a cycle because the prototype can be changed as requested by the stakeholders until they satisfied with the system.

- Testing: The system will be tested to the stakeholders, mainly the users of the system. This test is known as Acceptance test.
- Deployment: After the system has been successfully tested, the system will be deployed.

### 3.3 System Architecture

The conceptual and structural model of the system which includes the connection among the components is known as system architecture. For this project, the components include the database, the GUI and the network. Diagram below shows the system architecture of this project.

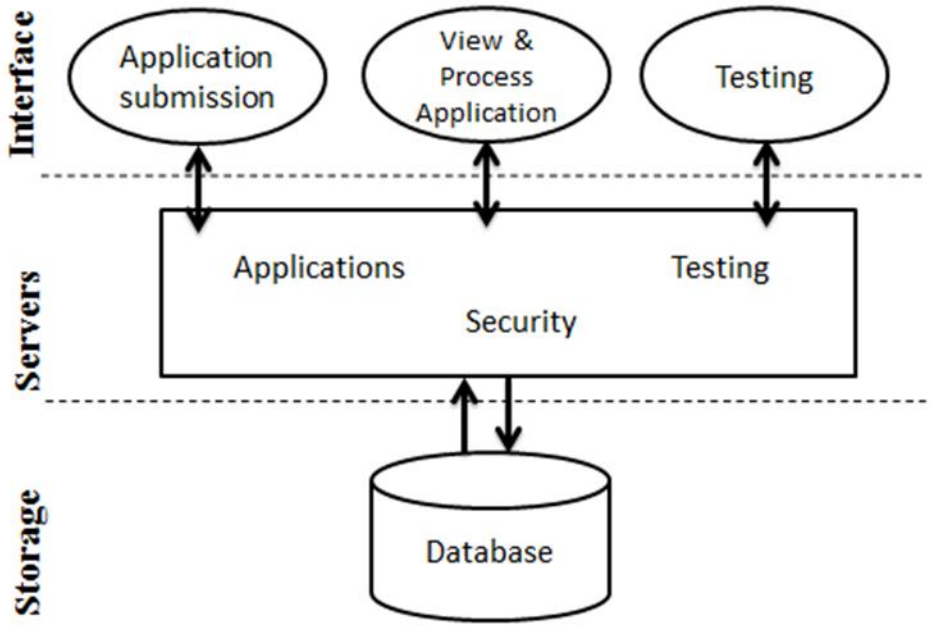


**Figure 4: System Architecture**

### 3.4 Development Tools

The tool used has been separated into two main parts as follows:

- Hardware
  i) Web Server
  ii) Computer for development

- Software
  i) Notepad++
  ii) Xampp
    - PHP 5.3.10
    - Apache 2.2.21
    - MySQL 5.5.20
    - phpMyAdmin 3.4.10.1
  iii) Adobe Photoshop CS5

### 3.5 Project Activities

#### 3.5.1 Gantt Chart and Key Milestones

Key Milestones marks the specific goals that have been achieved throughout the development of the project. By having key milestones, the author is able to keep track of the progress in the project. In order to achieve the goals of each task that has been planned, each task has its own objective. The objective is established to know where the current development progress is and the impact on the project for each task that has been carried out.

**Table 2: Gantt chart for Final Year Project 1**

| TASK/WEEK | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Planning and Analysis Phase** | | | | | | | | | | | | | | |
| Title Selection/Proposal | | | | | | | | | | | | | | |
| Identifying Problem | | | | | | | | | | | | | | |
| Project Planning | | | | | | | | | | | | | | |
| **Design Phase** | | | | | | | | | | | | | | |
| Literature Review | | | | | | | | | | | | | | |
| Methodology Analysis | | | | | | | | | | | | | | |
| Requirements Gathering | | | | | | | | | | | | | | |
| Results and Discussion | | | | | | | | | | | | | | |
| Submission of Interim Report | | | | | | | | | | | | | | |
| Proposal Defense | | | | | | | | | | | | | | |

**Table 3: Gantt chart for Final Year Project 2**

| TASK/WEEK | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Development Phase** | | | | | | | | | | | | | | |
| Design System | | | | | | | | | | | | | | |
| Approval of Design System | | | | | | | | | | | | | | |
| System Development | | | | | | | | | | | | | | |
| Database and Management System | | | | | | | | | | | | | | |
| Completion of Development and Implementation | | | | | | | | | | | | | | |
| **Testing Phase** | | | | | | | | | | | | | | |
| Testing | | | | | | | | | | | | | | |
| Documentation | | | | | | | | | | | | | | |
| Viva | | | | | | | | | | | | | | |

Gantt Chart  Key Milestones

# CHAPTER 4

# Results and Discussion

## 4.1 Requirements Gathering Results

### 4.1.1 Interview

CSIMAL found that an effective platform in applying for student exchange program is needed. The students also agree and support with the idea of developing a proper system in handling the student exchange program application. An automated application process could replace the current traditional process of the application.

The interview session is conducted between the author with CSIMAL manager, and the author with the students whom was undergoing the student exchange program. The objectives of the interviews conducted are to find out the main problem faced by the CSIMAL and students, and to gain CSIMAL opinion and expectation on the system. In addition, the interview also aimed to gain deep understanding on the business process of CSIMAL in handling the application of student exchange program. The interview session also discuss on how to improve the effectiveness and efficiency of the web-based system when compared to the current application process system.

There are several interview sessions conducted with CSIMAL manager. Below is the summary report of the interview session.

| | |
|---|---|
| Interviewer | Nur Ashiqin binti Suwarto |
| Date | 2nd February 2015 |
| Name of respondent | Mr. Azrul Hasyimi B. Zabidi, Manager; CSIMAL, UTP |

Purpose of the interview:

1) Identify the problem faced by the CSIMAL in handling the application and students when applying for exchange program

2) Understand the current business process of Student Exchange Program

3) Determine the purpose and functionality of the system

Summary of the interview:

- The main problem encounter by CSIMAL is manual application process is not efficient the application received is stored in a file. There is no systematic process to monitor all the student application.

- A web based application system need to be developed follows the business process of applying for student exchange program.

- CSIMAL needs a web-based system for students to apply the exchange program through the system and CSIMAL can be each application from the system. The system also must include all the student requirements of the exchange program, student exchange program information and the list of partner institutions.

### 4.1.2 Document analysis

There are several important documentations handed by CSIMAL for reference in developing the system. One of the documents given is a technical document which illustrates the student exchange application process flow. The document has been analysed to get a clear understanding on how CSIMAL conduct business operation on the application process of student exchange program. The document also helps to identify what is the application forms needed to migrate into the system.

Another documents provided are; list of partner institutions with UTP and statistics of students went for student exchange program together with their program details. The list of partner institutions can be added onto the system so that students know which institution they can choose.

As a conclusion from analysing the documentations, the author clearly understand the steps taken by the student to apply for student exchange program and the process conducted by the CSIMAL to approve or decline the application. The system features are identified from the documentation analysis such as the online form application, attachment of supporting documents and information regarding student exchange program.

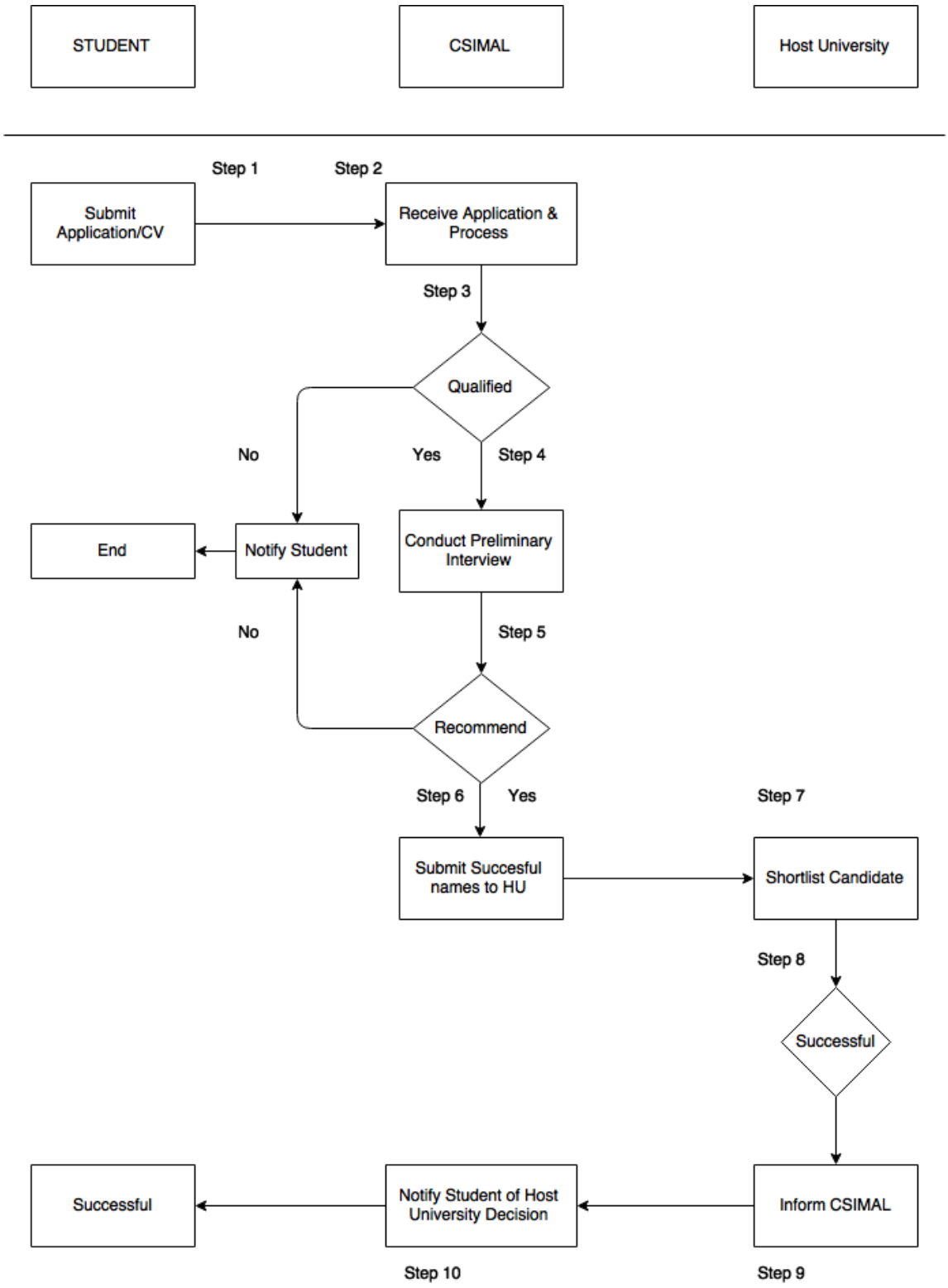


**Figure 5: CSIMAL current process workflow**

## 4.2 Functional Requirements

Functional requirement is always describing the system behaviour as it relates to the functionality of the system. The functional requirements of this system are the business process of CSIMAL for student exchange program application. Table below shows the functional requirements in different user level and the priority of each function. Table 4 shows the functional requirements of the system.

**Table 4: Functional requirements of SEP System**

| No | User Level | Functional Requirements |
|---|---|---|
| 1 | Student | Able to register an account |
| 2 | | Able to login to the system |
| 3 | | Able to view student exchange program information including the FAQ and contact lists of CSIMAL staffs |
| 5 | | Able to apply for student exchange program |
| 6 | | Able to view the application status |
| 7 | | Able to log out from the system |
| 8 | Staff | Able to login to the system |
| 9 | | Able to view application |
| 10 | | Able to download the application |
| 11 | | Able to print the application |
| 12 | | Able to update the application status |
| 13 | | Able to delete application |
| 14 | | Able to search for application |
| 15 | | Able to log out from the system |

### 4.3 Non-functional Requirements

Non-functional requirement elaborates the attributes or characteristics of the system. Table 5 shows the non-functional requirements for student exchange program application system.

**Table 5: Non-functional requirements of SEP System**

| No | Type | Non-functional Requirements |
|---|---|---|
| 1.0 | Availability | The web system must up 24 hours |
| 2.0 | Security | Students and staffs login with email and password |
| 3.0 | Performance | The system must able to response in real time |
| 4.0 | Accessibility | The system can be accessed from any platforms; personal computer or handheld device web browser. |
| 5.1 | Usability | The language of the system must be in English |
| 5.2 | | The system must allow keyboard shortcuts |
| 6.0 | Recovery | The data and code of the system must be back up every semester |

### 4.4 UML Diagram

UML Diagram is designed for a standard way to visualize the system requirements. Below are the diagrams chosen for this project which consists of Use Case Diagram, Activity Diagram and Sequence Diagram.

#### 4.4.1. Use case Diagram

Use case diagram always depict the interactions between the users and the system and clarify the requirements of the system. It also shows the set of actions the system should

behave whenever the user interacts with the system. Figure 6 shows the use case diagram of Student Exchange Program System.


**Figure 6: Use Case diagram for SEP System**

In the use case, it portrays those who will be using the Student Exchange Program System. The first actor is the Student who applies for the exchange program and mainly guest who will visit the system. The next actor portrays as the CSIMAL staffs who will be the one that manage the applications received through the system.

### 4.4.2 Activity Diagram

1) Student

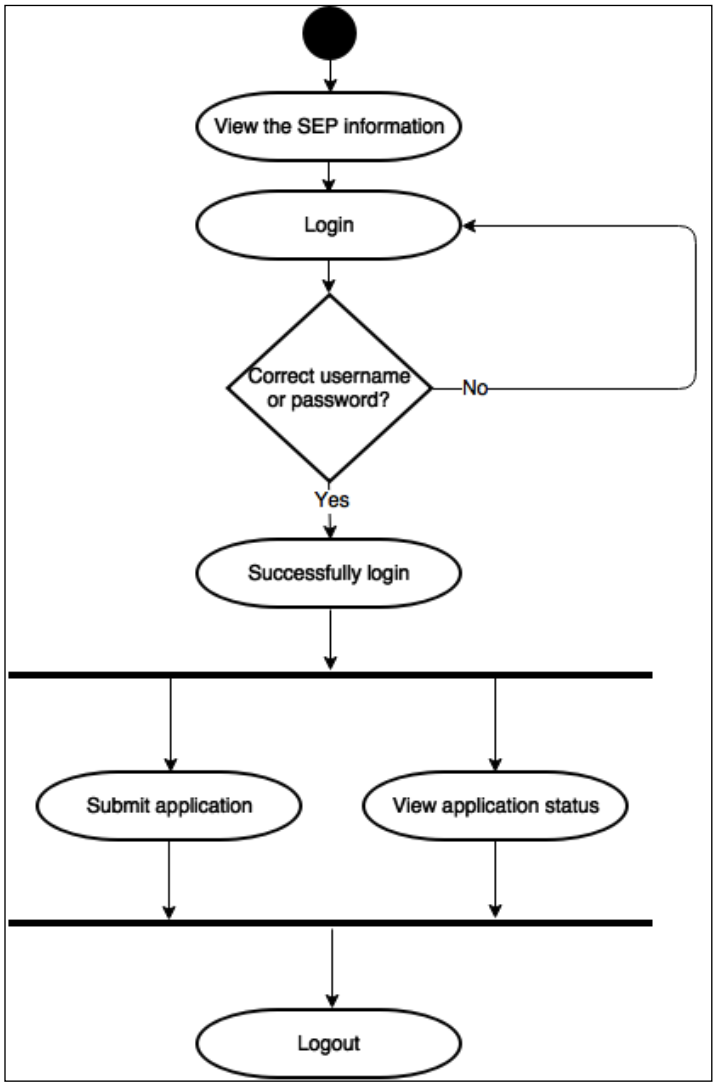


**Figure 7: Activity diagram for Student in SEP System**

2) Staff

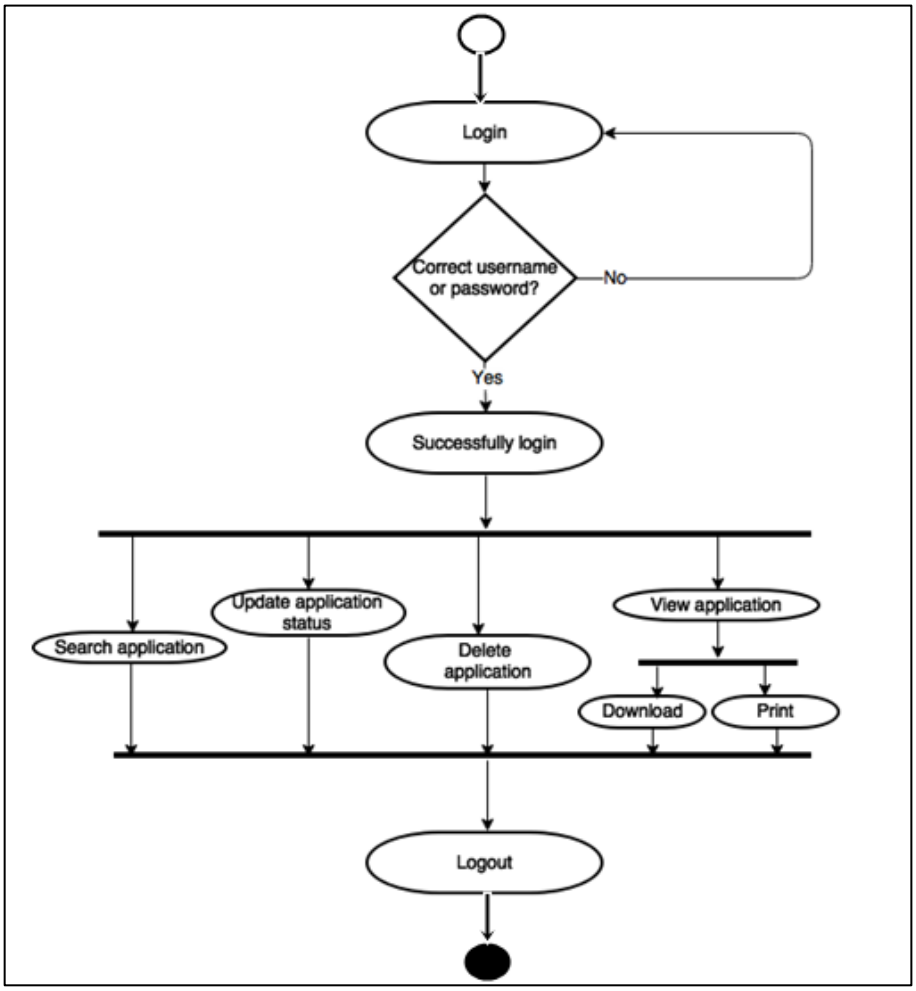


**Figure 8: Activity Diagram for Staff in SEP System**

### 4.4.3 Sequence Diagram

1) Student

Student need to login into the system in order to fill in the application form. Whenever the application is submitted, the application will be sent to the database as a record. Once the record is created in the database storage, an application received message will be shown in the homepage to notify the student that their application is now received and in process.

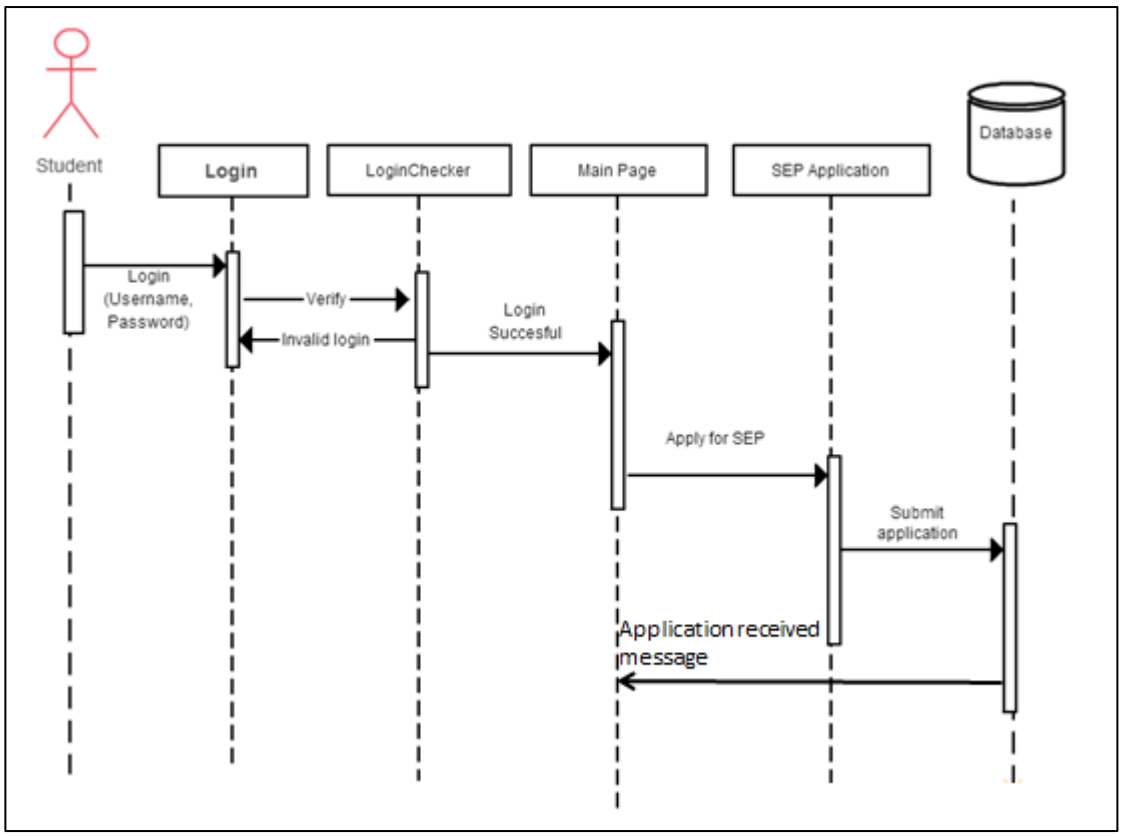


**Figure 9: Sequence diagram for students in applying the exchange program in SEP System**

2) Staff

Figure 9 shows the sequence diagram of updating application status by the staff. The staff will view the application in the home page of the system and click on the update status button to update the status of the application. When the application status is updated, the new status is being sent to the database to update the application record in the database storage. Once the record is updated, the status of the application in the homepage will be changed.

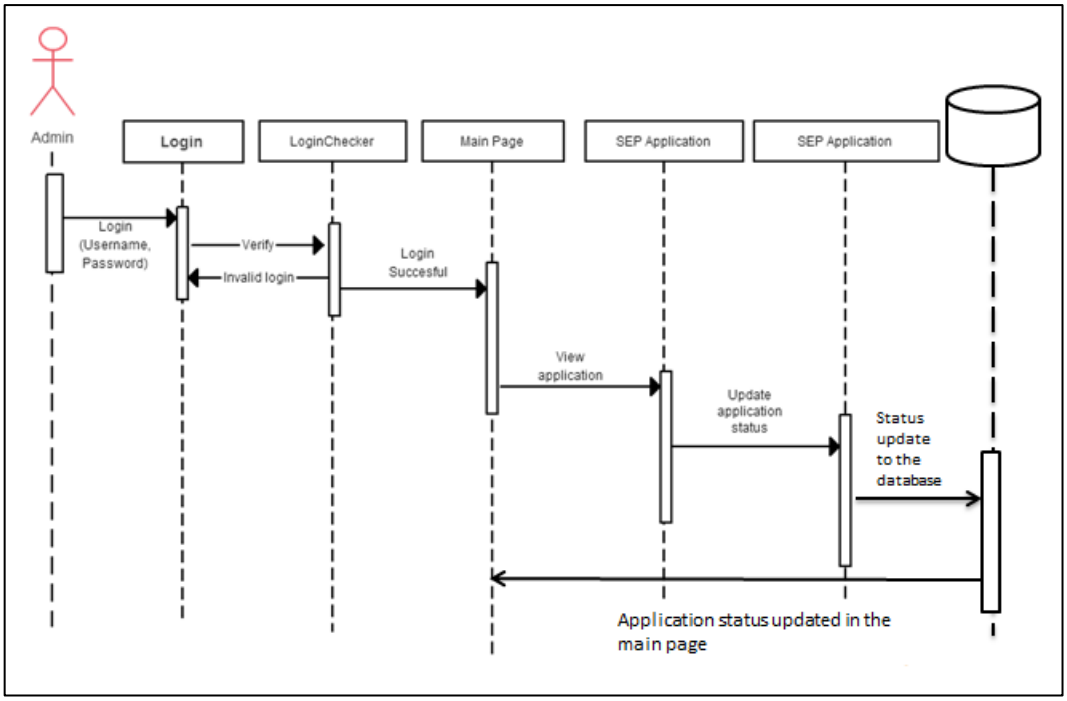


**Figure 10: Sequence diagram of Staff activity in updating the application status**

## 4.5 System Design

### 4.5.1 Main index page


**Figure 11: Main Index Page**

Figure 5 shows the main index page of the Student Exchange Program System. It is centralized for all level of user to connect to the system. This is the main webpage that can be browsed publicly to get information related to Student Mobility Program. The page contains five tabs:

1) Home

   This is the landing page or home page of this system. It has includes information on how to apply for any Student Mobility Program.

2) About

   A complete background of Student Mobility Program with various types of exchange programmes offered. The requirements to apply for any Student Mobility Program are posted in this tab section. On top of that, list of partners'

institution also listed in this tab with the hyperlink function that directed to the institution's official websites.

3) Apply Now

   Login page that allow student to access into the system to apply for the exchange program.

4) F.A.Q

   List of common questions that asked by the students provided with the answers.

5) Contact

   List of CSIMAL staffs contacts for any further enquiry.

### 4.5.3 Online form application


**Figure 12: Student Online Application Form**

This the online application forms. It is divided into four main sections. (i) Personal Details, capture personal data of the students, (ii) Academic and Co-curricular Activities, capture the information related to the academic and extra co-curricular activities, (iii) Program Request, student can choose types of program they prefer to

undergo and list out the transfer credit hours and lastly, (iv) Supporting Documents, to attach all the documents needed.

### 4.5.4 Homepage for Staff view

Once the staffs are successfully login into the system, the main homepage that will be seen is as shown in Figure 15. Staff will see the applications received in tabular form. Application can also be searched using the Student ID. CSIMAL staff can easily update the application status by click on the 'update' button. Further details of the student application can be viewed by clicking on the student name. Staffs are allowed to download the softcopy of the application or print out the application.


**Figure 13: Homepage of staff's view**

### 4.6 Testing

Testing is performed to ensure the application system that has been developed meet all the requirements in line with the objective of this project to develop a web based application system that follow the business process of CSIMAL in managing the student exchange program applications. This aim of this test is to validate and verify process to ensure that quality of the system is met during the development. The quality of the system can be defined whether the system fulfill the entire functional or non-functional requirement imposed to the system. Besides that, testing ensure that the system does not perform any unnecessary function intended in the system.

For the Student Exchange Program application system, functionality test was conducted for the system to test that the system execution of an operation or functionality of the system is functional between each function operation in system. User acceptance testing also was conducted with the users to gain their feedback and experience after using the system. The result attached in the Appendices.

**Table 6: System Test Log**

| No | Type of Test | Purpose | Status |
|---|---|---|---|
| 1 | System functionality | To ensure all the function and buttons in the system is performed as intended | Passed |
| 2 | Storing data into Database | To ensure all the data inserted through the system is stored by the database | Passed |
| 3 | Retrieve data from the database | To ensure all data is successfully retrieved from the database upon | Passed |

| | | | |
|---|---|---|---|
| | | being called | |
| 4 | Empty input error | To ensure the system will alert the user with error message for any empty application or empty field. | Passed |

# CHAPTER 5

## Conclusion and Recommendations

This report has focus discussed toward the explaining the significant of the project that includes the problem statement, objectives, and scope of the project, the results and discussion. The methodology being used is RAD model which suitable for a short time frame project. All the information and data related to the project was provided by CSIMAL and was analysed by the author in order to deliver the system with all requirements is fulfilled. Experience of UTP students in applying the exchange program is extracted and analysed to get a better understanding of the problems encountered by the students.

The aim of developing a web based application system for SEP is to minimize human work and time in applying for the program and processing the application received. It would increase the effectiveness and efficiency of the work process. The system will ease the work of the student as well as the CSIMAL staff. By having an online application system, the students can apply for exchange program anywhere and anytime as long as the Internet connection can be accessed. The CSIMAL staff also can process the application through the system easily.

There are a lot of research and analysis needs to be done to improve the system. A few recommendation is can be added onto the system. The recommendations as follows;

1. Auto-generate report

   An auto-generated report for the system would consists of the statistics students undergone the exchange program, total number of application received and being approved presented in graph format and many more. Report is needed by

CSIMAL in order to present to the top management in a meeting. It would minimize the CSIMAL staffs effort to produce a report.

2. Single sign-in

UTP has provided the students with Webmail ID that currently used only for authentication to access the Internet which managed by IT & Media Services Department (ITMS). It will minimize students' effort to sign in using the UTP Webmail ID instead of using their personal email and they no longer to register as the system already integrated with the ITMS.

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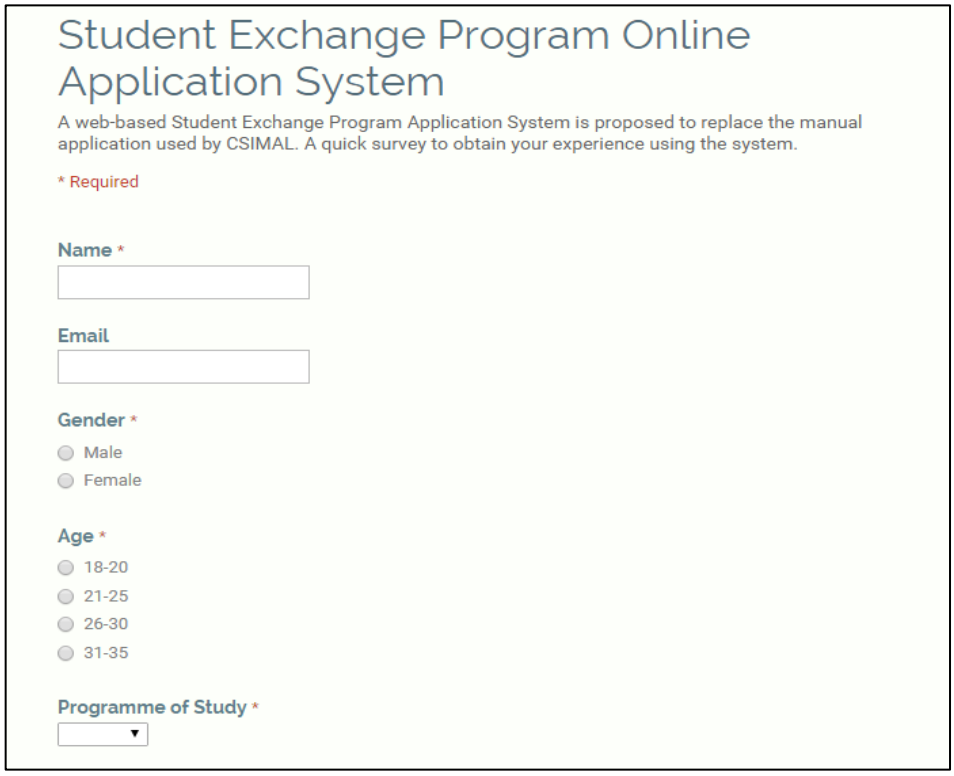
# Appendices



## Student Exchange Program Online Application System

A web-based Student Exchange Program Application System is proposed to replace the manual application used by CSIMAL. A quick survey to obtain your experience using the system.

* Required

**Name** *

**Email**

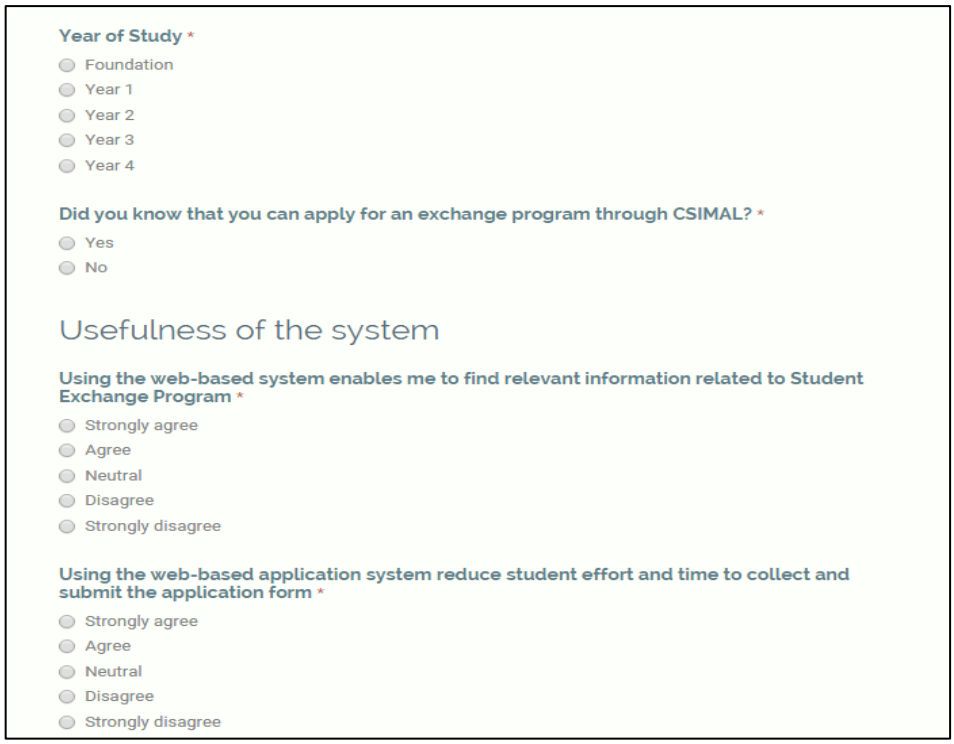
**Gender** *

- Male
- Female

**Age** *

- 18-20
- 21-25
- 26-30
- 31-35

**Programme of Study** *



**Year of Study** *

- Foundation
- Year 1
- Year 2
- Year 3
- Year 4

**Did you know that you can apply for an exchange program through CSIMAL?** *

- Yes
- No

### Usefulness of the system

**Using the web-based system enables me to find relevant information related to Student Exchange Program** *

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**Using the web-based application system reduce student effort and time to collect and submit the application form** *

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**Using the web-based system enables me to check my application status** *

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**Using the web-based system enhances the effectiveness to apply for an exchange program** *

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**Using the web-based system makes it easier to know the exchange program announcement** *

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

## Ease of Learning

**I would need assistance to use this system** *

- Strongly agree
- Agree

- Neutral
- Disagree
- Strongly disagree

**The system navigation is easy and helpful** *

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**I learned to use it quickly.** *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Difficult | ○ | ○ | ○ | ○ | ○ | Easy |

## Ease of Use

**It requires the fewest steps possible to fill in the form** *

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**It is easy to use** *

- Strongly agree
- Agree

Neutral
Disagree
Strongly disagree

**It is user friendly.** *

1 2 3 4 5

Difficult ○ ○ ○ ○ ○ Easy

**I can use it without written instructions.** *

1 2 3 4 5

Difficult ○ ○ ○ ○ ○ Easy

**I can recover from mistakes quickly and easily.** *

1 2 3 4 5

Difficult ○ ○ ○ ○ ○ Easy

**I can use it successfully every time.** *

1 2 3 4 5

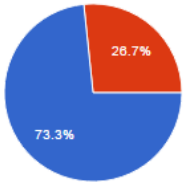
Difficult ○ ○ ○ ○ ○ Easy

**I don't notice any inconsistencies as I use it.** *

1 2 3 4 5

Difficult ○ ○ ○ ○ ○ Easy

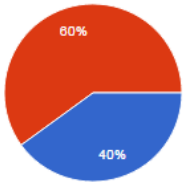
**Did you know that you can apply for an exchange program through CSIMAL?**




| | | |
|---|---|---|
| Yes | **11** | 73.3% |
| No | **4** | 26.7% |

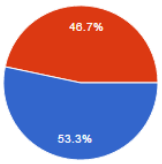
## Usefulness of the system

**Using the web-based system enables me to find relevant information related to Student Exchange Program**



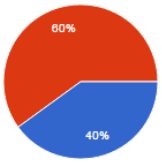

| | | |
|---|---|---|
| Strongly agree | **6** | 40% |
| Agree | **9** | 60% |
| Neutral | **0** | 0% |
| Disagree | **0** | 0% |
| Strongly disagree | **0** | 0% |

**Using the web-based application system reduce student effort and time to collect and submit the application form**



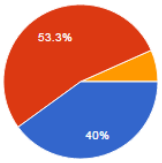

| | | |
|---|---|---|
| Strongly agree | 8 | 53.3% |
| Agree | 7 | 46.7% |
| Neutral | 0 | 0% |
| Disagree | 0 | 0% |
| Strongly disagree | 0 | 0% |

**Using the web-based system enables me to check my application status**



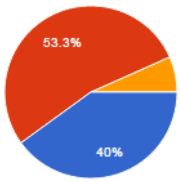

| | | |
|---|---|---|
| Strongly agree | 6 | 40% |
| Agree | 9 | 60% |
| Neutral | 0 | 0% |
| Disagree | 0 | 0% |
| Strongly disagree | 0 | 0% |

**Using the web-based system enhances the effectiveness to apply for an exchange program**




| | | |
|---|---|---|
| Strongly agree | 6 | 40% |
| Agree | 8 | 53.3% |
| Neutral | 1 | 6.7% |
| Disagree | 0 | 0% |
| Strongly disagree | 0 | 0% |

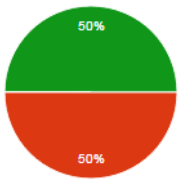
**Using the web-based system makes it easier to know the exchange program announcement**




| | | |
|---|---|---|
| Strongly agree | 6 | 40% |
| Agree | 8 | 53.3% |
| Neutral | 1 | 6.7% |
| Disagree | 0 | 0% |
| Strongly disagree | 0 | 0% |

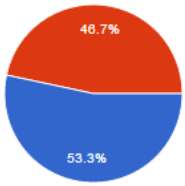
## Ease of Learning

**I would need assistance to use this system**



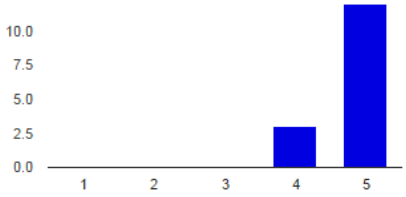

| | | |
|---|---|---|
| Strongly agree | 0 | 0% |
| Agree | 1 | 50% |
| Neutral | 0 | 0% |
| Disagree | 1 | 50% |
| Strongly disagree | 0 | 0% |

**The system navigation is easy and helpful**




| | | |
|---|---|---|
| Strongly agree | 8 | 53.3% |
| Agree | 7 | 46.7% |
| Neutral | 0 | 0% |
| Disagree | 0 | 0% |
| Strongly disagree | 0 | 0% |

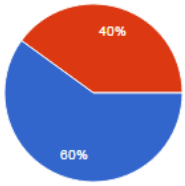
**I learned to use it quickly.**




| | | |
|---|---|---|
| Difficult: 1 | 0 | 0% |
| 2 | 0 | 0% |
| 3 | 0 | 0% |
| 4 | 3 | 20% |
| Easy: 5 | 12 | 80% |

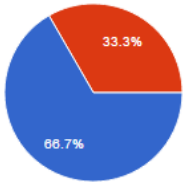
## Ease of Use

**It requires the fewest steps possible to fill in the form**



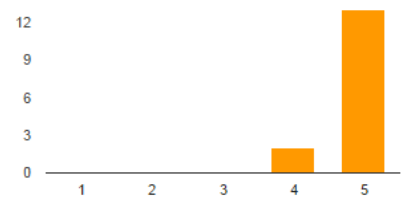

| | | |
|---|---|---|
| Strongly agree | 9 | 60% |
| Agree | 6 | 40% |
| Neutral | 0 | 0% |
| Disagree | 0 | 0% |
| Strongly disagree | 0 | 0% |

**It is easy to use**



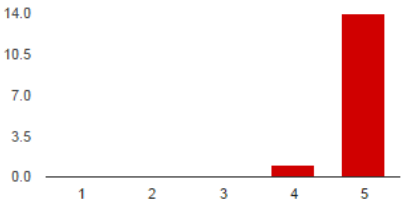

| | | |
|---|---|---|
| Strongly agree | 10 | 66.7% |
| Agree | 5 | 33.3% |
| Neutral | 0 | 0% |
| Disagree | 0 | 0% |
| Strongly disagree | 0 | 0% |

**It is user friendly.**



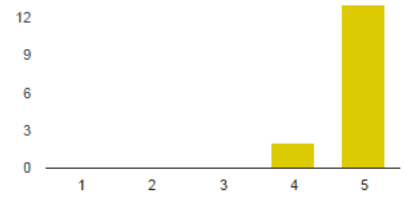

| | | | |
|---|---|---|---|
| Difficult : 1 | **0** | 0% |
| 2 | **0** | 0% |
| 3 | **0** | 0% |
| 4 | **2** | 13.3% |
| Easy: 5 | **13** | 86.7% |

**I can use it without written instructions.**



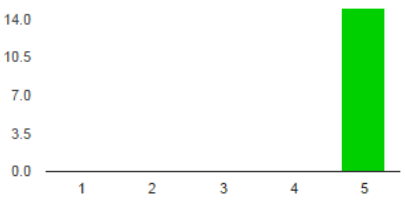

| | | | |
|---|---|---|---|
| Difficult : 1 | **0** | 0% |
| 2 | **0** | 0% |
| 3 | **0** | 0% |
| 4 | **1** | 6.7% |
| Easy: 5 | **14** | 93.3% |

**I can recover from mistakes quickly and easily.**



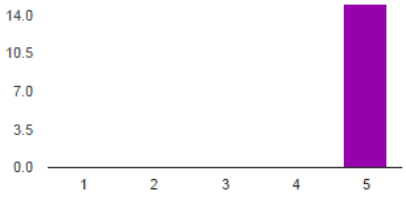

| | | | |
|---|---|---|---|
| Difficult : 1 | **0** | 0% |
| 2 | **0** | 0% |
| 3 | **0** | 0% |
| 4 | **2** | 13.3% |
| Easy: 5 | **13** | 86.7% |

**I can use it successfully every time.**




| | | | |
|---|---|---|---|
| Difficult : 1 | **0** | 0% |
| 2 | **0** | 0% |
| 3 | **0** | 0% |
| 4 | **0** | 0% |
| Easy: 5 | **15** | 100% |

**I don't notice any inconsistencies as I use it.**




| | | | |
|---|---|---|---|
| Difficult : | 1 | 0 | 0% |
| | 2 | 0 | 0% |
| | 3 | 0 | 0% |
| | 4 | 0 | 0% |
| Easy: | 5 | 15 | 100% |