PETRONAS Scholars I - Center

by

Nor Hafizah binti Idris
(12117)

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Supervisor: Dr. P.D.D Dominic

Universiti Teknologi PETRONAS
Bandar Seri Iskandar
31750 Tronoh
Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

Developing PETRONAS Scholars I - Center

in

UNIVERSITI TEKNOLOGI PETRONAS (UTP)

by

Nor Hafizah binti Idris

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Approved by,

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(Dr. P.D.D Dominic)

UNIVERSITI TEKNOLOGI PETRONAS

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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 acknowledgement, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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NOR HAFIZAH BINTI IDRIS

ABSTRACT

Aligning to the objective of the project, this report is produced for the purpose of designing the documentation of the project's development. At the end of this project course, a prototype of PETRONAS Scholars I – Center shall be the main goal to be achieved. For PETRONAS Scholarship program, current media used by PETRONAS Scholars and Sponsorship & Talent Sourcing (STS) unit in Universiti Teknologi PETRONAS (UTP) is not effective in several aspects such as difficulty faced by scholars in suiting time with STS staff to have a meeting for issues' clarification, lack of transparency or written documents defining processes and procedures related to scholarship program and no specific established medium used for communication among both parties. Reflected to that, this project is designed for PETRONAS Scholars and STS unit as an effective initiative to enhance communication and sharing medium among those parties that covers elements of scholarship's announcements and news, financial and claim information especially describing on process and procedures involve, STS contact details as well as feedback and discussion purposes. Using Rapid Application Development (RAD) as development methodology, the research conducted involves interview, survey and document analysis. Other than system testing conducted by developer, it requires user usability testing to measure users' acceptance towards the project. Results from this, it is concluded that the PETRONAS Scholars I - Center satisfies users' requirements and ready to be implemented.

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TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

ABBREVIATION AND NOMENCLATURES

CM	Consequence Management
CGPA	Cumulative Grade Point Average
HTML	Hyper Text Mark Up Language
ISO	International Organization for Standardization
IT	Information Technology
MySQL	My Structured Query Language
PHP	Perl Hypertext Preprocessor
RAD	Rapid Application Development
SMS	Short Messages System
STS	Sponsorship & Talent Sourcing

CHAPTER 1

INTRODUCTION

1. PROJECT BACKGROUND

1.1. Background of Study

Statistic on the World Internet Usage and Population produced on December 31, 2011 by http://www.internetworldstats.com shows that the growth of world internet from year 2000 to 2011 is about 500 percent increment. This provides explicit evidence which strengthen the fact that the world has transformed from industrial era to the information era. This transformation has shown a great influence of information and communication technology in various industries such as business-based and education sectors. According to Drucker (1993), developing the post-industrial and information society needs information and technology as a booster.

With the aids of technology, it is less difficult for conducting data and information handling within an organization and individual that leads to the better knowledge sharing and communication among the community. Using technology as a medium, process of acquiring and communicating the information and knowledge could be simplified in term of speed, easiness and capacity of contents. As example, in education sector, growth of internet and technology indicated by the increment figure of portal exists to support knowledge sharing and acquisition among the community. Almost all institution of higher learning nowadays has their own portal to represent university in virtual community. Using portal, webpage visitors can get access to people, process and information related to the respective institution.

In Universiti Teknologi PETRONAS (UTP) specifically, UTP Main Website and E-learning become integrated point for university community to access information regarding news, education and other specific events. For example, student knows update on class schedule and download materials available on E-learning to assist their study.

Realizing the role of portal in the higher learning community, PETRONAS Scholars I - Center is developed as a communication and sharing medium among PETRONAS Scholars in Universiti Teknologi PETRONAS and Sponsorship & Talent Sourcing (STS) unit.

1.1.1. PETRONAS Scholars I-Center

PETRONAS Scholars I-Center is a web based portal developed as an information center for PETRONAS scholars in getting access and acquiring information related to the PETRONAS scholarship program.

This portal is designed as an initiative to serve PETRONAS Scholars and STS unit in UTP which covers aspects of announcement and updated news, process and procedures of scholarship program, finance and claims, STS contact details as well as feedback and discussion.

This portal is expected to support the conveyance of knowledge and communication among PETRONAS Scholars and STS which involves two-ways flow of information consists of information conveyed from STS to PETRONAS scholars and feedback from PETRONAS scholars to the STS management and administration.

1.2. Problem Statement

Communication between PETRONAS Scholars and STS unit is important in acquiring information regarding scholarship program especially in getting new update on scholarship policy for scholars' reference to act accordingly. For example,

scholars would want to know whether the policy for minimum Cumulative Grade Point Average (CGPA) of 2.75 is still become a passing point for Consequence Management (CM) action or new policy has been implemented.

This is important for the scholars, as they might used this in consideration to put how much effort in their study so that the result produced is at least passing the minimum point and avoiding them from CM. How could they get the information and clarification on this issue?

1.2.1. Problem Identification

Currently, any announcements, update, news and communication related to PETRONAS scholarship program is conveyed using several media including face-to-face meeting, personal email, UTP E-learning, social media networks and phone. Practically, the channels used have caused some limitation and barriers as shown in Table 1 below.

TABLE 1: Problem Identification(s) of Current Media Used

Problem(s)	Current system & practice	Explanation
Problem in suiting time among scholars and STS staff	- Scholar needs to fit her/his free time with the staff time to have a meeting for clarification on inquiries - Phone call to STS can only be done during office hour; scholars might have full day class while STS staff might not be in office for attending meeting	- Problems/enquiries become late to be solved or responded
Lack of	- Lack of documented	- Need to meet staff to

transparency in process & procedures related to scholarship programme	process on finance/claim available - Claim forms only available in hardcopy in STS office and need 'by hand' submission by scholars	clarify the flow of the process involve (such as claim) - Collect/submit the claim forms from/to STS office manually
No specific established medium for updated news, events and program	- Use of UTP E-learning system to update on news/events - News from words of mouth of other scholars who lack of credibility	- Scholarship communication mix up with other UTP announcements - No STS verification on news spread by words of mouth

1.3. Objective(s) and Scope of Study

1.3.1. Objectives of Study

- To design the documentation of PETRONAS Scholars I – Center
- To develop a prototype of PETRONAS Scholars I – Center portal

1.3.2. Scope of Study

Scope of this study focuses on enhancing communication between targeted users, who are PETRONAS scholars and STS unit, using better developed medium to enable sharing of information on PETRONAS Scholarship program which covers scope of:

- Announcement and news
- Process and procedures related to scholarship program

- Financial and claims
- STS contact details
- Feedback and discussion

1.4. The Relevancy of the Project

This project is relevant as an initiative in boosting communication among PETRONAS scholars and STS unit to assist smooth knowledge sharing and acquisition among both parties. The relevancy of this project should be measured by taking the strength and weakness of current medium used into account. Thus, the developed system developed should be an enhancement of current channels as to be a better initiative to be implemented.

1.5. Feasibility of Project within the Scope and Time Frame

Project feasibility is analyzed to measure the ability in accomplishing the project. Feasibility result provides clearer view on the value of the project; whether it is valuable to proceed or should it be discontinued due to high risk involve. The feasibility analysis should include key elements covering several areas which are:

1.5.1. Technical Feasibility

Can we build it? – This question can be answered by conducting technical feasibility as it is applicable to measure the capability in developing system considering several aspects includes:

- *Medium Risk on Familiarity with Technology*

Face-to-face meeting is among current channels used in communication and handling issue or business for PETRONAS scholarship program, which considered as conventional method. The purpose of the developed system is intended to change this method to the use of technology for a better issue handling.

Developer has use Joomla! as developing tool which includes Hyper Text Mark Up Language (HTML), Perl Hypertext Preprocessor (PHP) and My Structured Query Language (MySQL). For developer, it is a new tool to be learnt and familiarize as it has been used throughout the development phases. However, from research and opinion of experience people, this tool is neither too difficult nor too complex to be familiar with as large community has used this system. Thus, this tool is mature enough to be used. Plus, developer has adequate time for the learning on this tool from reading from Internet, books as well as participating in the forum. This caused medium risk to the developer side.

The developed system is developed through Rapid Application Development (RAD) methodology, which is iterative methodology. Applying this methodology along the development stage, developer has organized meeting with the potential user during initial stage for the purpose of gathering requirements and specifications according to user's viewpoint. During development process, several meetings have been conducted to present the progress of prototype until no more requirements to be added by user. This is to make sure the developed system satisfies user's requirement. As result, the final prototype produced is closely similar to the user's requirement. From this, user become comfortable with the developed system and technology used which not causing high risk for the user to be familiar with the technology.

- *Low Risk on Project Size*

Development of the developed system has involved a developer and few users within time frame of about four to five months. This shows that this project is small in size which leads to low risk on the project itself.

- *High Compatibility of System Implementation*

As pre-implementation, system testing and usability testing has been conducted, developer has analysed that the developed system is compatible enough to replace the current conventional system. In addition, the developed system implementation is predicted will enhance the communication and information sharing among the PETRONAS scholars and STS unit to be smoother and more effective.

Current conventional system involves manual way in handling business. For example, it involves face-to-face meeting between scholars and STS staff for issue clarification and used of hardcopy claim form taken from STS office which need 'by hand' submission. Implementation of the developed system is expected to provide better initiative which enables user's requirements stated using web based portal where user can get access to the information, STS unit staff and process related to the scholarship program in anytime and from anywhere. This will provide high compatibility to the users.

1.5.2. Operational Feasibility

How good the system is? – The operational feasibility is analysed to know to what extent the developed system capable to overcome the difficulties of current implementation and how the developed system does satisfies user's requirements identified.

- *High User Acceptability*

Results from the survey conducted among targeted users indicates that half of the respondents has strongly agreed on the need of specific portal to be developed as an established communication and sharing medium to be used among scholars and STS unit. This represents good users' acceptance towards the developed system as users expected to experience better improved medium as compared to the current conventional system used.

However, it is expected to face some resistance from the users towards the changing to new implementation as this group of users already familiar with the current conventional system used. Thus, for smooth system transformation, the developed system will be used simultaneously with the current system during introductory or initial stage of implementation. Using this way, it is expected to provide users with some time interval to be familiar and get used with new system implementation.

- *High Score on System Usability Testing*

Referring to http://webwisewording.com as issued by International Organization for Standardization (ISO) on ISO 9241-11 (1998) Guidance on Usability, the web site or portal usability testing is performed to measure on the effectiveness, efficiency and satisfaction with which users can achieve their goal on a web site. In response to this, system usability testing has been conducted among targeted users to analyse the users' feedback on the elements stated.

Based on the result, it shows that high score has been recorded on the system usability testing performed. This indicates that users are able to achieve their aim in effective, efficient way with the assistance of the developed system which draws their satisfaction towards the developed system implementation.

1.5.3. Economic Feasibility

- *Cost-Benefit Analysis*

Developed as in-house development, the developed system is expected to support PETRONAS scholarship program in UTP. Users are anticipated to experience few advantages through the system in term of ease of information sharing and acquisition regarding scholarship program as well as time consuming in handling issue or scholarship business. Other than that, users

should be able to extend their discussion and feedback using this developed system as an established specific medium for PETRONAS scholarship matter. Based on this, the outcome of the developed system is foreseen to exceed the development cost of the system in term of time and effort. As result, development of the developed system is feasible for further implementation. (Refer Appendix 1 for Cost-Benefit Analysis details)

CHAPTER 2

LITERATURE REVIEW

2. LITERATURE REVIEW

According to the Statistic on the Web Internet Usage and Population produced on 31st December 2011, the growth of world internet has recorded to be about 500 percent increases from year 2000 to 2011. This has influenced the use of information technology especially web based technology, such as portal in various industries including education. Implementation of information technology in education sector especially in tertiary education level is represented by the increment number of portal used by the university community. What is considered as portal and how does growth of information technology has influenced the rises of portal?

According to Cambridge University Press (2003), portal is defined as "a page on the Internet used by people in searching the World Wide Web and accessing information like news, weather and travel, or company that provides these pages". Referring to Eisler (2000), definition of campus portal is "a single integrated point for useful and comprehensive access to information, people and processes". Winston Dictionary defines portal as "a gate, door, or entrance; especially one that is stately and imposing, as of cathedral" (as cited in Katz, 2002). Portal is "a web technology implementation of a distributed system" (Fox, 2000).

In short, portal can be recognized as a web page medium used by people to access information on Internet. In education context, university portal acts as an interface between university community that offer new method in organizing university and

creating learners' community (Eisler, 2000). How was the idea of portal started and progressed in institutional level?

Based on the research and experiences in portal project linkage the Associated Students of Santa Clara University (ASSCU) provost and TLT Group in new learning environment, Eisler (2000) discuss on the portal's progress as a gateway for access information and learning communities in the Syllabus Magazine of Weber State University. Findings show that portal acts as an interface among colleges and constituent groups and create new method in organizing campuses.

According to him, the portal's concept started with search engine and interfaces which is horizontal portals that focus on broad subjects and personalized by users. After that, it progressed to the vertical portal which contains information on single subject that directed for specific group of users. These two approaches are combined to create campus portal. This research discusses on the function of campus portal in application for admission, scholarships and financial aids, virtual orientation and register for class. The users can be students, faculties/staffs or alumni/guests. The portal's features may include gateway, security, pushed information etc. Ways in creating portals have been pointed in this research. He also discuss on type of portals which include learning portal and course and program portals.

Allmen, Deans and Bartosiewicz (2001) in their research conducted have supported findings from Katz (2000) on the definition of portal. The paper presents on the adaptation and interest of portal as campus-wide information and service delivery system in Higher Education institutions in Australia and New Zealand. They have conducted an electronic questionnaire survey in two weeks time from 51 members of the Council of the Australian University Directors of Information Technology and getting total of 23 responses (45 percent) on the questionnaire that covers three parts which are on discovery of respondent's level of portal involvement, features, functionality and related issues in portal as well as opinion on future developments

of portal. Based on the survey, they concluded that interest in portal technology among the Higher Education institutions in Australia and New Zealand keep growing as portal gives benefits to the way Higher Education institution manage and deliver services and their changing perception of several successfully developed portal in Australian universities and libraries.

Factors for slow rate of adoption could be confusion surrounding portal technology, potential advantages, unavailability of funding and low priority on development. They preferred on adopting commercial solution instead of custom-build due to lack of time and technical expertise. The survey shows not many institutions allow access of visitors to their portal that contribute to unfamiliar with interface and functionality of various systems and compare solutions before starting on this project. Besides, the project's developmental information is unavailable to the public. Authors discuss the different of portal and home pages as portal has been designed with flexibility that promotes customization and personalization. The major attributes of portal should include personalization, search, collaboration or communication, information/document management, administration and authorization and security.

Portal is identified as a medium that provide access towards information, people and process. How does this possible?

According to Microsoft, web portals can be used in recording and sharing grades with students electronically, creating online communities for students, faculty, administrators and alumni to collaborate, enabling access of institution's resources during anytime and from anywhere, posting contents and materials which highlight on documents libraries and sharing the information among community members. How does this portal help? Implementation of web portal in higher learning can increase student engagement for education purpose as this provides easy way in connecting with lecturers and colleagues. Other than that, portal facilitates student anytime and anywhere learning by becoming a virtual campus which has 24 hours

operating hours and can be accessed from anywhere using internet. As information is readily available on portal, student makes better decision making with the aid of available information. Besides, portal can be a good medium where university community can get connected to each other and build strong relationship among the learning community.

As a proof, Microsoft has come up with a case study about University of Tennessee on how this university brings it students' social networking convenience with campus web portal. This case study discuss on the university students who wanted their university website to act as one single point to access university information and application. Using Microsoft technologies, the new university portal became a one-stop portal which give the university community a single sign-on access to all integrated services including from settling account to the class registration without leaving the portal. As result, students praise the streamlined processes implemented by university.

Portal is used as a single point that integrates various information and services offered by university. The portal implementation not only benefits at the university level but also spread to the district or state level. How does portal benefits district or state level?

Referring to the Daytona Times in the article entitled Web Portal Empowers Students to Make Informed Decision, it discuss on portal as a new tool developed by Florida Department of Education is valuable in assisting students making smart decision on postsecondary options. Using new tool known as Smart College Choices web portal information regarding graduation rates, employment statistics and earnings data for graduates of the 28 Florida College System institution and Florida Public School District Career Centers can be viewed by potential and current students. Accessing to this information, students will be able to know how much they can expect to earn from a degree or certificate program, percentage of graduates

who secured jobs in Florida and how many students have completed the program. By using this available information in making smart decision on college, it also contributes in reducing population of students who fail on loans or who are troubled by student loan debt. Other than that, student will be able to see connection between higher education and job placement through implementation of this web portal. As the data and information on this portal is supported by Florida Education and Training Placement Information Program, the outcome of this portal is anticipated to help in matching job market demands with the supply of skilled employees.

One of popular portal application in university level is electronic learning which known as e- learning. What is the e-Learning concept and what does it offers?

Marlia Puteh (2008) has discussed e-Learning concept in her writing on e-Learning Concepts and Literature Review. According to her, e-Learning is a concept which relates learning with the application of new technologies to the learning process, known as internet, intranet, email, satellite broadcast, audio or video tape or Compact Disc Read Only Memory (CD-ROM). This concept discuss on e-Learning continuum which divided to no online learning from left side of graph to the fully online learning when moving to the right-hand side of the graph. Moving towards fully online learning, the learning process has transformed from conventional way which is face-to-face classroom teaching to the virtual learning using e –Learning as a medium as shown in FIGURE1.

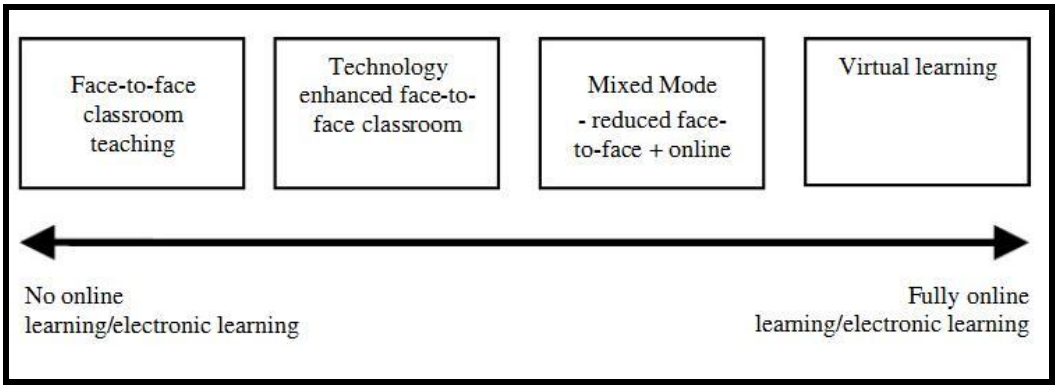


FIGURE 1: E-Learning Continuum

Based on the research, several example of technologically-enhanced initiative through e-Learning has been highlighted such as a course web page built by lecturer with links to other sites on the internet for extra and relevant sources. Other than that, use of e-Learning enable lecturer to upload class material especial presentation slide for students' reference and downloading purposes. Besides, students be able to participate in online discussion using e-Learning. In addition, Marlia has identified a several benefits of e-Learning which includes 24 hour access to the information, updated content materials, customized courses and cost-effective. Based on this concept, e-Learning is recognized as one of the portal application which has high growth of adoption in the university level.

For the benefits to take place, the developed portal should have a few features that can support the functional and non-functional of the system. This is essential as the portal should combine several functionalities in order to support the access, information and interactivity. According to Eisler (2000), an effective portal should consist of many features that include:

- Gateway: Approved users will be identified through a single sign-on procedure by the system
- Security: Information that can be seen and changed by users is allowed to be accessed and changed by them and denies the access of information to those who should not see or alter the information.
- Channel information: Configure channel in providing information from internal and external sources
- Interaction: Portal acts as interface to chat, email, threaded discussion, bulletin board posting on related subjects

Most of the existing portals have included these features as their basic function. This assists in terms of to ease the use of portal and provides a user-friendly knowledge sharing medium from user point of view. However, the other features can be implemented to provide value added portal such as include sharing materials in terms

of images and videos. Is there any implementation of portal as medium used in scholarship programme? What are the features involve?

Referring to ("PETRONAS Student Advisor Office: Australia & New Zealand," 2010), the feature used in this website consist categories of basic information such as Home, Office, Announcement, Finance, Students' Handbook, Gallery, Quotes, Links and Feedback. For feature, this page enables registration for new visitor and log in for existing one. This page includes the highlight news related to the Australian Higher Education, linking to sponsor's pages or websites and sponsor's clubs. It also provides the recent feedback from visitor. Visitors can refer the contact details of sponsor's management under Office category. Announcement consists of updated and collection of previous announcements. Under Finance, visitors can refer what types of allowances covered by sponsor and how the process been conducted and the claim form available to be submitted. For clarification on the scholarship programme especially for new sponsorship holders or new visitors, they can refer to Students' Handbook category. The Gallery tab of this page consists of sponsor's corporate video and award achieved by selected sponsorship holders. The Feedback tab shows the collection of visitors' feedback towards the website. This website provides feedback page for scholars to comment on the webpage implemented.

CHAPTER 3

METHODOLOGY

3 METHDOOLOGY

3.1 Research Methodology

Research methodology is an approach to analytically solve the research problem. Conducting research methodology is required in identifying problems, investigating and analysing the data collection process.

3.1.1 Method and Technique of Research

Data collection and gathering is conducted through several ways which are:

- *Survey*

Questionnaire has been distributed to the focus group of PETRONAS scholars as they will be the target users for the developed system. This pre-survey is performed with the purpose to analyse their response towards the current system as well as their expectation and acceptance on the developed system from users' point of view.

- *Interview*

Interview with identified personnel who are the user from STS unit has been done to analyse user's requirement from STS administration viewpoint. This session is required to get clarification on the information and process flow related to the scholarship program such as procedure for scholar's financial

claim. This is important for the documentation of information to be included in the developed system.

Other than that, an interview with selected scholar is conducted in getting scholar's insight and experience on the current system used. This response has been used in planning the area of improvement needed.

- *Analysis on Documents*

Any related documents regarding scholarship program have been viewed in order to identify the scope of information and any procedure involve between scholars and STS unit. Taking scholar's financial claim as example, hardcopy forms related to the claim have been viewed and analyse before proceeding to the documentation part to be included in the developed system.

3.1.2 Sample Design

- *Definition of Population*

The study of this project focuses on PETRONAS scholars who are currently in first year, second year, third year and final year of undergraduate study and STS unit as the main users of the developed system. Scholars cluster consists of group of local and international scholars.

- *Sample Size*

In UTP, current number of PETRONAS scholars is about 800 to 1200. From this figure, 40 of them are classified as respondents of this project representing total population of the targeted group. This number is adequate due to some restriction from aspect of time and cost.

3.1.3 Method of Sampling

Research and data collection has been conducted by using Simple Random Sampling (SRS) as more preferable way. It has been commonly used in

simple experiments that needs a single sample to be taken from a given population or representative sample frame. In this project context, this sampling has been used because people in the sample frame, who are group of PETRONAS scholars, are easily accessible and available.

How does this method been conducted? The sample has been created by random selection from the sample or population. In this case, random numbers of sample have been generated by using computer. Other than that, a paper consists of random members list could be used for the same purpose.

SRS has basic principle which is similar like taking out the name out of a hat and based on mathematical property, a truly random sample has became a representative of the target population. This result produced is free from bias influence because of the equal probability or chance of each unit been selected. Plus, selection of each unit has not affect the selection of other which shows this as independent method.

3.1.4 Design Questionnaire as Data Collection Tool

Questionnaire distributed for the pre-survey are consist of close-ended question and rating questions. For close-end questions, options for the answers have been provided. As for rating questions, respondents need to select the intended rate starting from negative rate on the left-hand side to the positive rate on the right-hand side. These types of questions have been used in consideration of time consuming for the respondents to response on the questions and keeping the answers within the scope.

3.1.5 Data Presentation and Interpretation Method

Data gathered which include qualitative and quantitative data have been presented in graphical figure. The qualitative data are obtained through the interview with identified individuals, while quantitative data have been collected from the questionnaire distributed.

3.1.6 Results/Discussion on Questionnaire Distributed

An electronic questionnaire is distributed to the 30 respondents who are group of undergraduates' students of UTP through email. The questionnaire has 13 questions which are specially designed to record the response of PETRONAS scholars towards current communication and sharing media used for the purpose of getting and sharing information related to the scholarship programme in UTP. This questionnaire has been constructed to represent the response of users' acceptance on developed system as a new medium of communication and sharing among PETRONAS scholars and STS unit that serve mentioned purposes. The responses has been collected within 10 days starting 26 March 2012 until 3 April 2012.

Based on the responses, 80 percent of the respondents are PETRONAS scholars who are mostly communicate with the sponsor. The three critical issues recorded as most referred issues are matter related to the financial and claims, clarification on process and procedures and inquiries regarding announcements or news. Most of respondents are getting scholarship information from email, face-to-face communication or conversation and phone calls besides using these media for communication among scholars and STS unit. As most of the recorded respondents indicate that the current media used are having average convenient, they strongly agree to have specific portal for scholarship programme where they can get critical information especially on process and procedures, announcements, financial and claim related to the scholarship program. This indicates higher acceptance of targeted users towards the development of this project.

3.2 System Methodology

Rapid Application Development (RAD) has been applied throughout the project development. Having this iterative methodology as framework type, user has spotted few improvements on the feature of the system based on imaginary system as

compared to the use of paper design. Implementing this methodology, develop has conducted initial meeting with the user for the purpose of obtaining user's requirements and information before proceeding to the preliminary stage of prototype development. Then, this prototype has been introduced to the user for any additional or changes to the early requirements to be included in the system. Based on user's responses and comments, developer has made several amendments to be a new prototype. Presentation of this new prototype has been conducted to see response from the user. This process has been repeated and discontinued due to no new requirements added by the user. Repeated process has included selected phases which are analysis phase, design and develop phase as well as testing and early implementation phase.

3.2.1 System Testing

Testing of the system has been done with the aim to detect any defect associate with the developed system. System testing conducted should have covered from the aspect functional and non-functional of the developed system as stated as below:

- *Unit Testing*

This testing has been performed by developer to check the functional correctness and completeness of unit program for program implementation. For example, after installation of the Discussion plug in extension, this module has been tested first before connecting to the other module. This has been done to identify whether the module alone has function properly or cause any defect. This enable developer to solve occurrence of the failure in a quickly manner as particular module that cause the defect has been identified.

- *Integration Testing*

Integration testing has been conducted for the purpose of testing the integration of several unit programs. In this case, integration of Homepage has been tested to

integrate the articles posted on that page itself, registration extension module, web link extension module as well as Homepage's menus. This testing enable developer to examine whether the Homepage works accordingly or need any correction in integrating all modules assigned on that page.

- *System Testing*

The entire system has been analysed by performing system testing. Based on this testing, the functionality and non-functionality of the system have been checked before proceed to the approval of system validation. As example, all extension module and plug in associated with the system, menus and system consistency have been examined to support the proper working of the developed system.

3.2.2 Strength of Methodology Used

Performing this research and system methodology, the system has been developed in a structured manner and provides advantages from the aspects of less time, money and effort used. Other than that, this methodology enables developer to focus on important of system elements form the user viewpoint. As result, specification of the developed system has been produced to be closely similar to the user's requirements.

(Refer APPENDIX 2 for Research and System Methodology Used)

3.3 System Use Case Diagram

Use case diagram has been produced to give clearer view on the PETRONAS Scholars I- Center model.

Referring to the APPENDIX 3 of System Use Case Diagram attached at Appendices, the subject of the use case can be seen at the top of the system boundary which is the name of this system itself, PETRONAS Scholars I – Center. The actors of this system are consists of Administrator, User (Registered), User (Guest), Authentication is considered as Service which is functional component which have been included at the right-hand side and left-hand side of the system boundary.

In the diagram, Administrator and Registered User actors need to register and log in to be able to access the system. Top level use cases are Register, Log In, View Information, Update Information, Upload Documents, Post Discussion, Post Comment and Download Documents. Use case Update Information is used by Administrator if Administrator wants to update or add information on the system. For uploading documents or files, Administrator may use Upload Documents use case. As Administrator, use case of Post Discussion could be used to post topic or thread on the Forum page. However, for Registered User, Post Discussion may be used to post new thread on the topic provided by Administrator.

For general user, User (Guest) may apply View Information use case for viewing information available on the system, Post Comment use case for the purpose of commenting on particular article and Download Documents use case to download files or documents available on the system. These there use cases can be accessed by the Administrator and Registered User actors.

Check Out use case is included use case which is not available by itself but as a part of Log In.

View Information use case is extended by numerous optional use cases. Users may search for information, browse the articles and view latest articles or news published. All these use cases are extending use cases as they provide several optional functions that allow users to find them as shown in FIGURE 2.

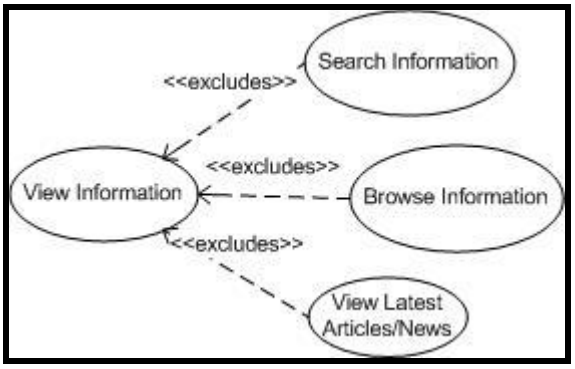


FIGURE 2: Extended Use Case

User Authentication use case is included in Post Discussion because when user post any topic or thread on the Forum page, it requires user to be authenticated whether she/he is a registered user or not as shown in FIGURE 3 below.

FIGURE 3: Included Use Case

Check Out use case includes few required use cases. Web user should be authenticated. This could be done via User Log In pop-up or user authentication cookie ("Remember Me") as shown in FIGURE 4 below.

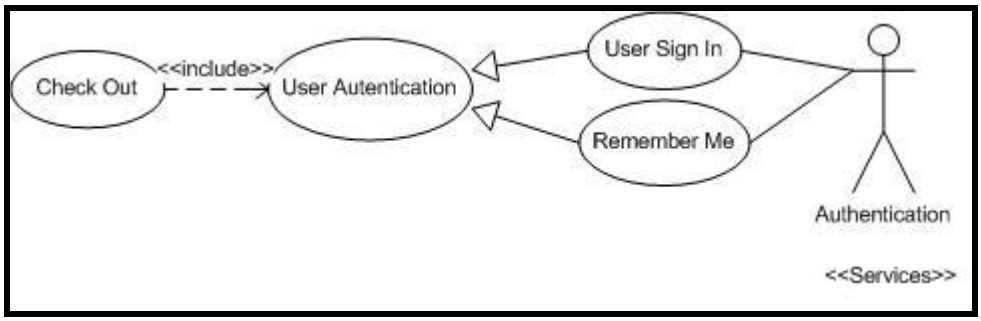


FIGURE 4: Check Out Use Case

3.4 Project Activities

Project Activities consists of task and the timeline for each task that covers research and development phase of the developed system. It also states the deliverable for respective task. Refer to the APPENDIX 4 and 5 for detail Project Activities.

3.5 Key Milestone

Key milestone represents important task and deliverable for the project course. Refer to the APPENDIX 4 and 5 for Key Milestone covered.

3.6 Gantt Chart

Gantt chart indicates the progress and time line as stated by course coordinator. Refer to the APPENDIX 6 and 7 for Gantt chart.

3.7 Tools

TABLE 2 below shows the tools that have been used for developed system which covers equipment, hardware and software:

TABLE 2: Tools Used for Developed System

Equipment/Hardware/Software	Description
Computer/Laptop	The main tool for project purpose.
Joomla!	This open source web tool has been used in creating and designing the web application.

What is Joomla!? Joomla! is a software that enable the ease in building and updating of web pages by bringing together three elements which are:

- Content: Contents of the developed system are mainly stored in database
- Template: Template used for this system controls the design and presentation of content (for example, colours, fonts and layout)
- Joomla!: Jommla version 1.7 has been used as software that bring the content and template together in building the web pages.

Joomla! is composed of platform and extension. There are various types of extension with particular tasks have been implemented to add more features in the system. Developer own computer has been used as server or localhost. By using computer as localhost, it needs other technical requirements such as Apache (XAMPP), PHP, and MySQL on local machine.

CHAPTER 4

RESULT AND DISCUSSION

4 RESULT AND DISCUSSION

4.1 Data Gathering/ Data Analysis

4.1.1 Interview (Qualitative Method)

- *Preparation of the interview*

At the stage of data gathering and data analysis, interview sessions with the potential targeted users have been conducted. The interviewees selected are from the scholars group and STS unit. The interview has been carried with the objectives of:

- To know how the current system works
- To identify problems associated with the current system
- To gather any related document for analysis
- To collect information for enhancement of proposed system

Preparation for the interview has been performed which includes identification of particular individual such as background details of the interviewees. This information is required to recognize whether those individuals are relevant to be interviewed or not based on the roles and participation in the PETRONAS scholarship program.

From logistic aspect, the venue and appointment of the time slot have been booked. The session has been conducted at interviewees' workplaces for about half an hour.

Other than that, the interview outline has been constructed which consists of several questions focusing on scholarship program such as familiarity in dealing with scholarship issue, process and procedures involving claim and etcetera. Details regarding interview could be referred to the APPENDIX 8 of Interview Outline attached at the Appendices section.

- *Summary of the interview*

Based on the interview, several data has been conducted for analysis purpose on how does the current system works. Response from interviewees shows that two biggest problems related to the current system have been identified which are:

- User (PETRONAS scholars) having problem in term of time constraints when trying to suit time with STS staff for getting information and communicating using current media (referring to face-to-face meeting).
- User (PETRONAS scholar) confuses with some process and procedures involve in the scholarship program.

Details on the summary of interview could be referred to APPENDIX of Interview Report.

- *Analysis from the Summary of Interview*

Developer has come up with an analysis by referring to the responses. Based on the first problem related to the time constraints, it indicates that the enhancement on the developed system should be focus on the availability of the system throughout longer period, most probably 24 hour, seven days per weeks. By having the system that always available could provide high convenience for the user to be able to access the information online at anytime and anywhere when needed.

Regarding the second problem, it shows that explicit information or written documents which clearly describe the processes and procedures involve should be made transparent and available on the developed system. From this, user (referring to scholars) could have clearer view on how the process of particular issue should be done. This will be a good guidance for them in conducting business related to the claim process for example.

4.1.2 Survey (Quantitative Method)

Survey has been done as one of the data collection method for development of the developed system. Focusing on PETRONAS scholars as the target group, this survey has been distributed to undergraduates' students of UTP via email link. From overall population, 40 students have been selected as respondents of this survey for the project purpose.

The objective of this survey is to record the response of scholars towards current communication and sharing media used in acquiring and sharing information regarding scholarship program. The 13 close-ended questions have been prepared for this purpose. Details on the survey questions could be referred to APPENDIX 10 of Interview Question Form attached at the Appendices section.

- *Finding of the Survey*

Few relevant questions have been selected from the survey questions to be discussed further due to relevancy for the project purposes.

From 40 students who are respondents of the distributed questions, more than 30 students are PETRONAS scholars which represent about 75 percent of total respondents as shown in the FIGURE 5 below.

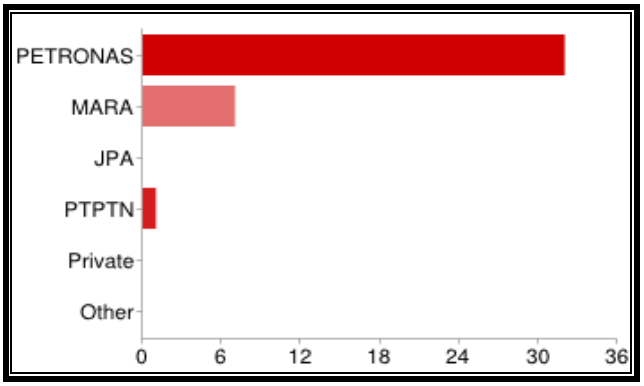


FIGURE 5: Response on Question 3 - Type of Scholarship Programme or Financial Aids Received by Respondents

Most of the respondents which represented by 24 respondents are referring to their sponsors regarding the scholarship program as shown in FIGURE 6.

This involve getting further information that related to the scholarship provided such as allowance covered, clarification on issues, update on current procedures as well as financial issue which mostly highlighted on how to request for financial claim.

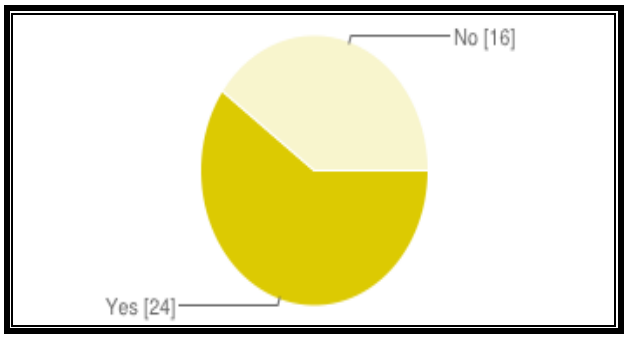


FIGURE 6: Response on Question 4 – Whether Respondents Refer to Their Sponsor or Not

From several issues stated, issue related to the financial and claim has been identified as prominent issue referred by respondent to the sponsor as shown in figure below.

This issue covers the procedures of claim, clarification on requirements or documents needed to be attached together with claim request form, how does the claim been handled and what item or purchasing is subjected to claim.

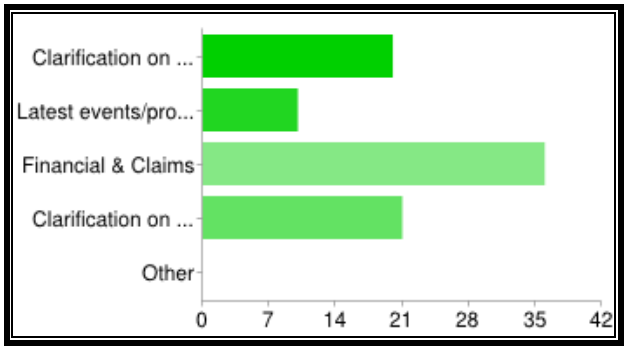


FIGURE 7: Response on Question 5 – Issues Respondents Always Refer to Their Sponsors

Several media have been used for communication among scholars and scholarship management such as face-to-face meeting, phone call, personal email and social network media. Based on the response, most of respondents mainly use email, phone call and face-to-face meeting as method of communicating with scholarship management as stated in figure below.

Email has been popular among respondents as they do not have to set up specific time to sending the email with the hope that it will be responded as quickly as possible. Other than that, using of email does not have any time limit such as office time besides it can be accessed from anywhere where the internet is accessible.

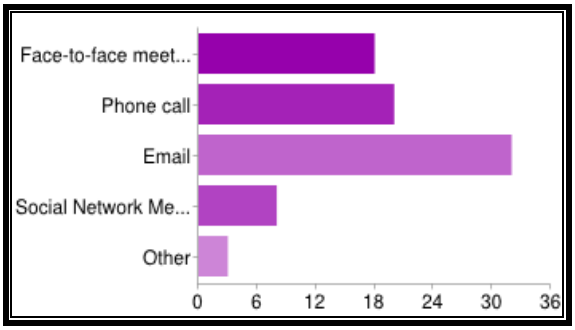


FIGURE 8: Response on Question 6 – Channel(s) Used by Respondents to Communicate Among Scholars and Scholarship Management

On the other hand, respondents' information and update regarding scholarship program mostly are collected from words of mouth, portal/website (e-Learning) and email as displayed in the FIGURE 9. Other ways of acquiring information related to the scholarship program are through phone calls and social network media.

However, problem arises while using words of mouth as a source because some information might be different from the original source as it has been spread out by many parties. On the other hand, use of e-learning in publishing the announcement and update on the scholarship program has caused some difficulties. This is because the announcement published is often mixed up with other UTP announcements. Thus, scholars need to sort it out to be able to access to the available information.

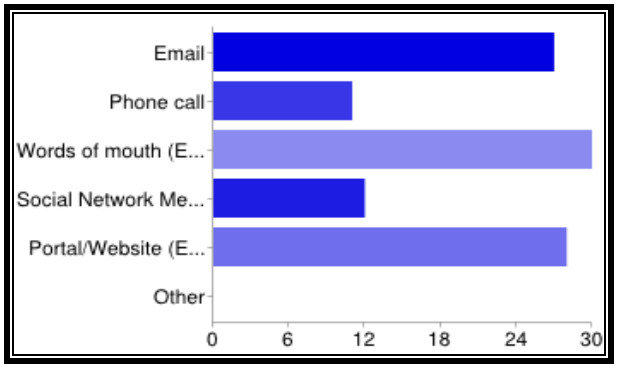


FIGURE 9: Response on Question 7 – Channel(s) Used by Respondents in Getting Information or Update on Scholarship Programme

In addition, the information and update of the program is gained from many sources. Based on the response, most of the respondents, specifically 35 of them are getting information and update form friends as shown in figure below. However, it shows high number of respondents who are acquiring information and update from scholarship management. Other than that, some of them refer to the alumni or experienced scholars in gaining information.

Scholars often refer to friends as source of information because there are lacks of explicit or written information available.

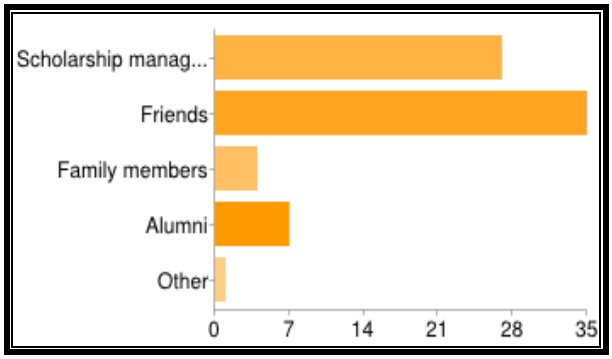


FIGURE 10: Response on Question 8 – From Whom Respondents Getting Information or Update on Scholarship Programme

This survey also includes the response of scholars towards current media used. Referring to their response, most of them are feeling it is least convenient to convenient in using the current system available which represented by 34 of the respondents as shown in the FIGURE 11 below.

They are not feeling convenient with the current media as the current system used might be less effective and not efficient in achieving their goal in gaining information on scholarship program. The current system used might require longer time for scholars in searching for the information needed.

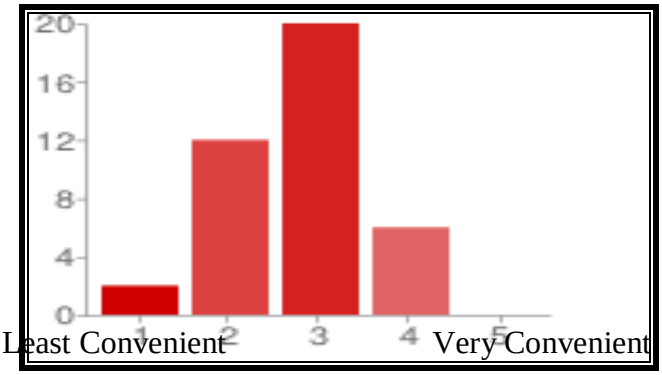


FIGURE 11: Response on Question 9 – Ranking on Convenient of the Current Channel(s) Used

As stated in figure below, high numbers of respondents have rated the current medium as very slow to slow responsive time.

This response possibly refer to the feedback gained from the issue forwarded using the current system. Slow feedback could influence scholars' decision in making respective action towards particular issue. For example, in booking home flight ticket, scholars need high response from the sponsor, who in charge for the booking ticket on the availability of ticket's date. This is to make sure that it is not clashing with other academic calendar such as final examination period.

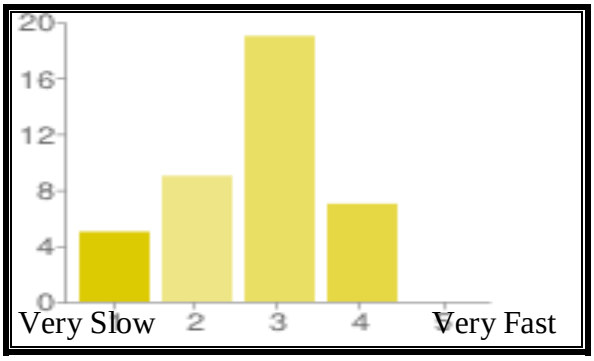


FIGURE 12: Response on Question 10 – Rating on Responsive Time of the Current Channel(s) Used

Besides, more than half of respondents have agreed on the need of more effective medium for communication should be used to support the scholarship program.

This intended medium should be able to serve them effectively and satisfies their requirements in enhancing the communication and sharing among scholars and STS unit.

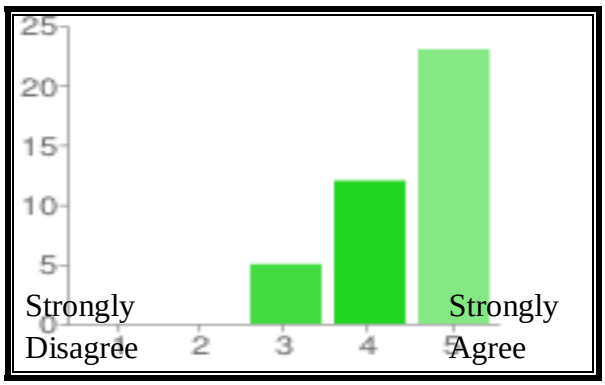


FIGURE 13: Response on Question 11 – Respondents Opinion on Need of More Effective Medium for Communication to Support Scholarship Programme

Related to the previous response, a number of 20 respondents have strongly agreed that it is a need to develop specific portal for scholarship program as shown in the figure below.

The developed portal should be able to include all related information required about the scholarship where it will be a main reference by scholars in acquiring desired information. This portal should be able to satisfies scholars' requirements and become a better medium for sharing and communication among scholars and STS unit as compared to the current medium used.

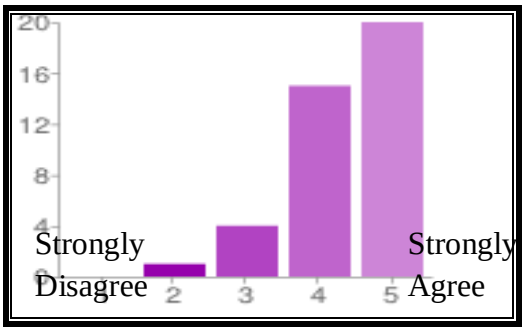


FIGURE 14: Response on Question 12 – Respondents Opinion on Development of Specific Portal for Scholarship Programme

Referring to the respondents, announcement & news, process & procedures and financial & claim have been selected as the main scope to be included in the portal as shown in the figure below.

This is because this portal enables explicit information related to these scopes. This is important for scholars to have clearer view on the information that can assist them in solving issue or inquiries regarding scholarship program. This portal will become a center of information for scholars as a reference and searching for required information.

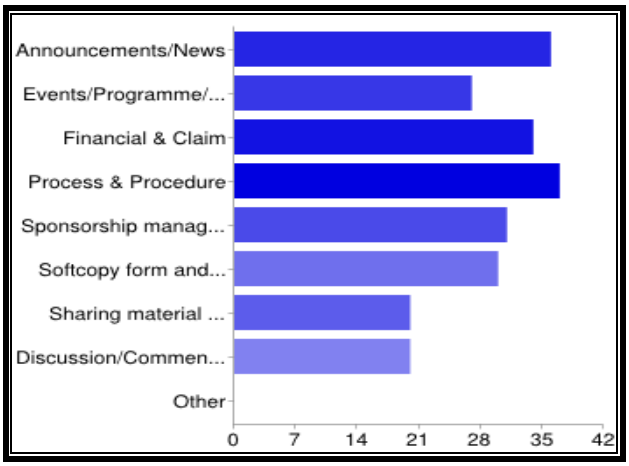


FIGURE 15: Response on Question 13 – Respondents Opinion on Information Needed in Scholarship Portal

4.2 Findings

4.2.1 System Architecture

System architecture form the developed system involves three users who are administrator, user (registered) and user (guest). Besides, it consists of three mechanisms which are PETRONAS Scholars I – Center as developed system itself, server and database.

Admin and registered user will be able to login to the system. The login request will be sent by the system to the server. The login will be checked in the database

and the confirmation will be sent to the system for authentication. Both admin and registered user are allowed to post on the forum of the system which then been forwarded to the server and stored in the database. Admin has authority to update the information and upload file in the system that been stored in the database.

All users may perform basic action which includes searching or browsing of information and downloading files from the system. This could be possible through request sent by the system to the server and checking process in the database to determine the result which then been forwarded to the server and system before reaching user. The illustration of the system architecture is as shown as below.

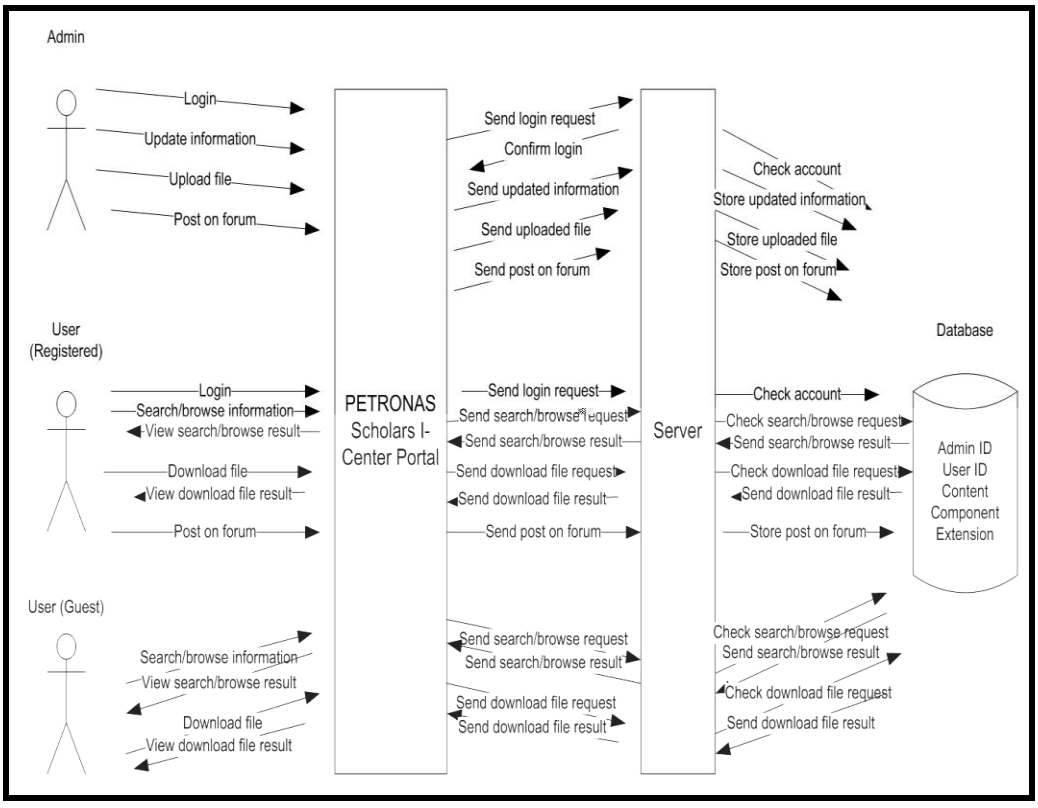


FIGURE 16: System Architecture

4.2.2 System Development Flowchart

System development flowchart is refereed during the development phase to help in carried out tasks involve in that particular stage. This flowchart provides a big picture on the steps of developing the system as shown in APPENDIX 11.

- *Determine Audience*

Target audiences for this web based system are the group of PETRONAS scholars and STS unit. For technology issue, this developed system is developed using localhost as server.

- *Content*

Major goal of the system is to provide communication and sharing medium among the users with covers topic of scholarship program. Anticipated question from user might be how to find form related to financial claim. Thorough research has been performed from the current system analysis and data gathering such as survey and interview.

- *Classification and Categorization*

Relationship between all scopes and information has been recognized before proceeding with the grouping and subgroup of the information. This system, nine main topics which each of them may have subtopics link from the main topic. For example, Finance is a main topic consists of Allowance, Claim, Refund and Forms as subtopics.

- *Navigation*

Navigational requirements have been included in the system such as menus to navigate form one page to others. For user convenience, menus have been positioned on the top level of the page which is consistent for all pages and additional side menus have been constructed on the left-hand side of the Homepage to ease user's navigation from Homepage to the whole system.

- *Layout*

In designing the system layout, other web sites with similar goals or functions have been used as reference. Standard template has been used as it provides consistent layout between sites pages. Consistency of the layout includes use of similar layout, consistent navigation as navigation aids are kept in the same place on each page with same menu style, use of similar colour scheme and background and page elements such as titles, text and graphic. By applying template, the designing of the layout does not have to be started from scratch. This contributes to the time consuming in the development phase of the system.

- *Division of Work*

Development tasks of the system have been distributed to several context which are content, functionality and graphic.

- *Prototype*

System testing has been done to check on the integration of system's functional and non-functional components. In examine the effectiveness, efficiency and user's response or feedback towards the system; system usability testing has been performed.

- *Publishing*

For publishing, all information and files uploaded have been checked to make sure that the published items are the correct one. Special folders for publication have been created to organize all information and items for publishing.

- *Maintenance and Update*

Update on the information should be done frequently from time to time.

4.2.3 Conceptual Design

According to the system conceptual design on the APPENDIX 12, the developed system consists of 9 main pages and several subpages connected to the main page. The main pages consists of Homepage as home, About Us, Finance, Program, Article, Handbook, SI, Repository and Forum. These pages could be navigated from the other pages without go through Home.

About Us has linked to the subpage of Contact Us. Finance page has been connected to the other subpages of Allowance, Claim, Refund and Forms which have been grouped under same group. Main page of Program is associated with the Sponsorship Program, Development Program, Internship Program and Student Exchange Program page as part of Program cluster. From Handbook main page, user may navigate to the other subpages of New Student, Existing Student and Post-Completion Student which represented as element of Handbook.

4.2.4 System Usability Testing

At the point of testing stage before moving to the system deployment phase, user usability testing has been performed with the objective to determine the extent of the developed system. Besides, usability testing has been conducted to measure how interface of the developed system facilitates user in getting desired information and performing communication task among target users.

This test has been performed among few numbers of potential users on the test administrator's laptop for the duration of about 1 hour. It consists of sample questions of close-ended only as shown in APPENDIX 13.

- *System Usability Scale*

System Usability Scale (SUS) is developed as the measurement method of analyzing the System Usability Testing questions answered by the user as tester. Based on this system, a statement has been made and the user as respondent will

need to indicate the degree of agreement or disagreement on the statement using the scale of 5.

The calculation is performed by sum up the score contribution from each item which range from 0 to 4. As example, if user gives a rating of 5 for first question, the score contribution for that question would be 4 (scale position minus 1). Then the sum of the scores will be multiply by 1.25 to attain the overall value of SU. SUS scores have a range of 0 to 100.

Below is the calculation of SUS:

1. This portal is easy to navigate

					Score
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

2. The font and size is easy to be read

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

3. The colour attractive and pleasing

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

4. The homepage is attractive

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	3

5. The overall site is attractive

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	3

6. The site's structure is pleasing

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	3

7. This portal is well organized

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

8. Information is written in a style that suits user

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

9. User can get to information quickly

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

10. The information is relevant to user's needs

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

11. The site has characteristics that make it especially appealing

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	3

12. The site is well-suited to first-time visitors

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

13. The site is well-suited to repeat visitors

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

14. The site has a clear purpose

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

15. User will use this portal frequently

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

16. The system is not complex

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

17. User would no need the support of a technical person to be able to use this system

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

18. This system has no or less inconsistency

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

19. The system is not cumbersome to be used

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

20. User no need to learn a lot of things before could get going with this system

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	4

Total Score = 76

SUS Score = 76/80 * 100 = 95

Based on the SUS Score, it indicates that the interface of the system facilitates user in getting desired information and performing communication task among target user.

4.3 Experimentation/Modelling/Prototype/Project Deliverables

In the development phase, designing page's layout and positioning the information on the portal have been among the initial stage of this phase. Planning on number of pages, structuring contents of each pages and link or connection between pages have been considered while doing designing process. The real portal development started with Homepage development.

As main page, Homepage consists of main articles which cover announcements/news on sponsorship programme. Importantly, it includes menus on the top side of Homepage to enable users' navigation to other pages such as Contact Us, About Us, Finance, Programs pages while left-side menu is included to promote users comfortably after scrolling down and decided on moving to the next page. Search function help to ease user searching for desired information based on keyword entered by user. Articles Categories (by month, latest articles) categorizes information based on monthly-based review and latest article review. User can review brief information on PETRONAS Sponsorship programme and will be navigated to the article page for further reading, which also can be printed out or emailed to friends. External Links are functioning as linkage of PETRONAS Scholars I-Center portal to the other sites such as PETRONAS and UTP sites.

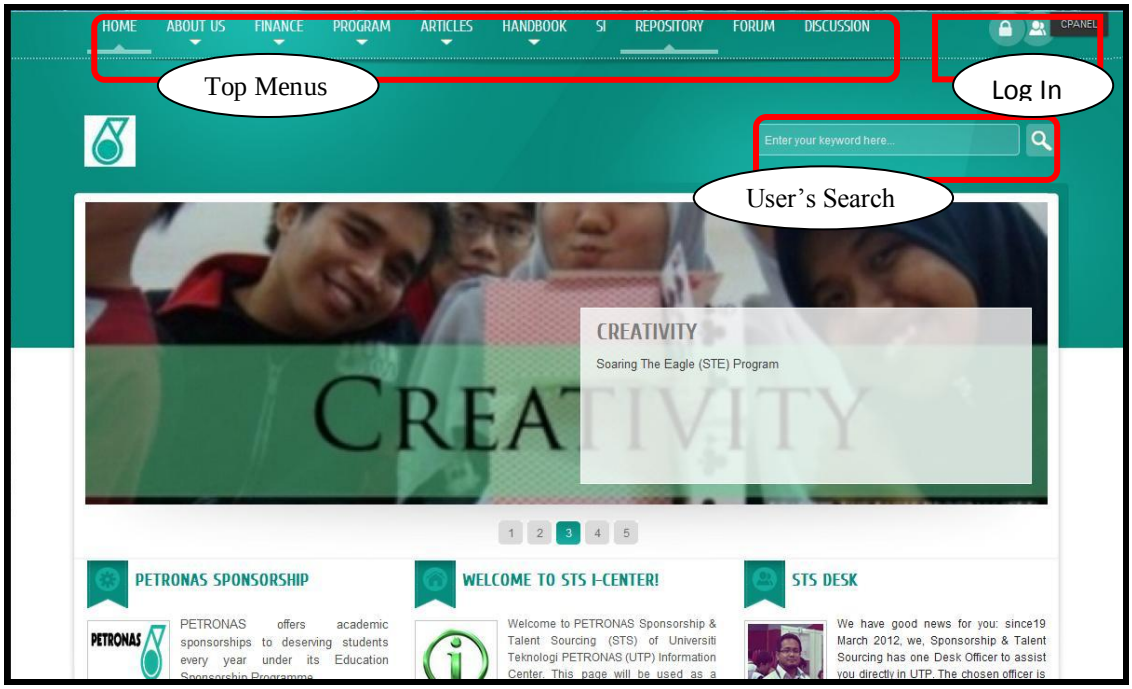


FIGURE 17: Homepage (Top & Upper Division)

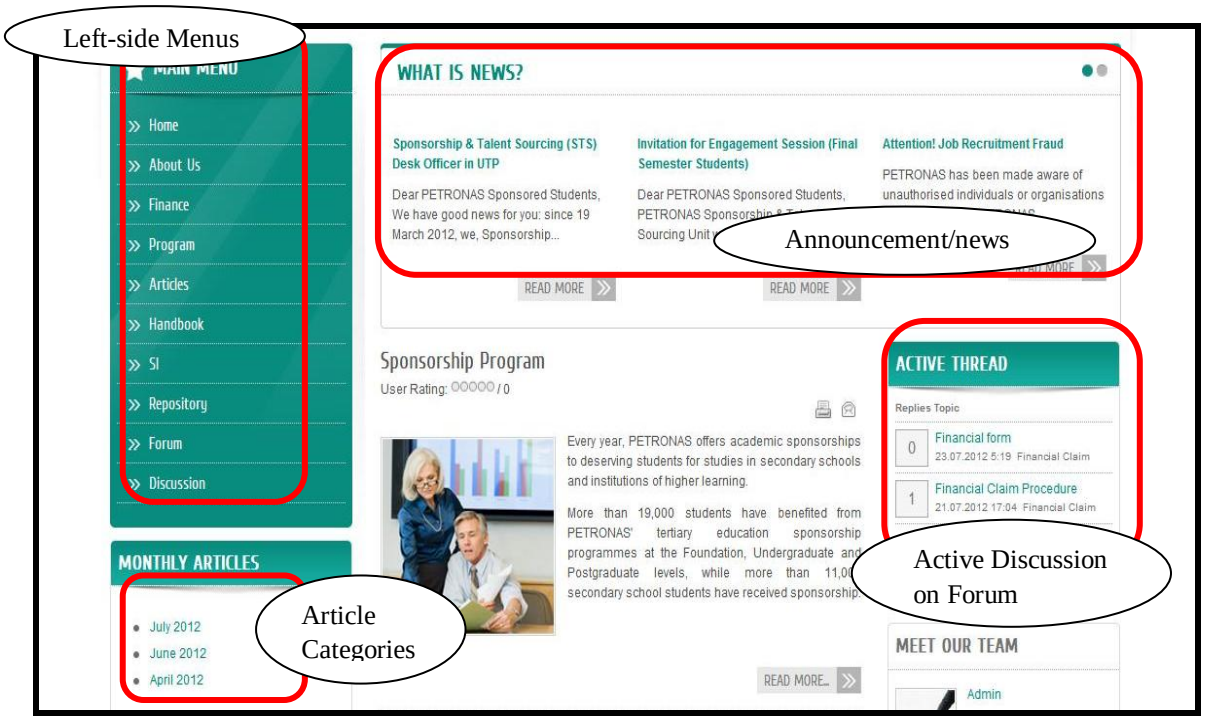


FIGURE 18: Homepage (Middle Division)

FIGURE 19: Homepage (Lower & Footer Division)

Announcement & News sites are available on the Homepage. User should be able to navigate to the announcement page by clicking Read More button or on the title of the Announcement as shown below. From this, user can know the updated news on the scholarship program.

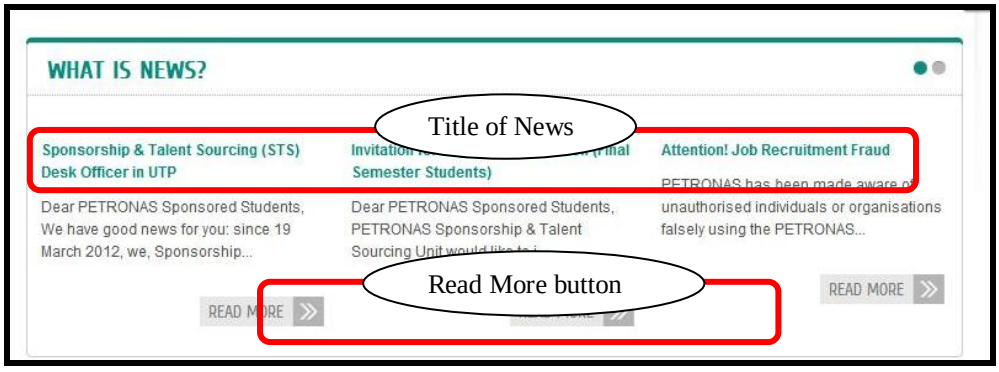


FIGURE 20: Announcement & News page

User can get the detail of the STS unit's staff from Contact Us page. information regarding person in charge, phone number, email and address are available on the page.

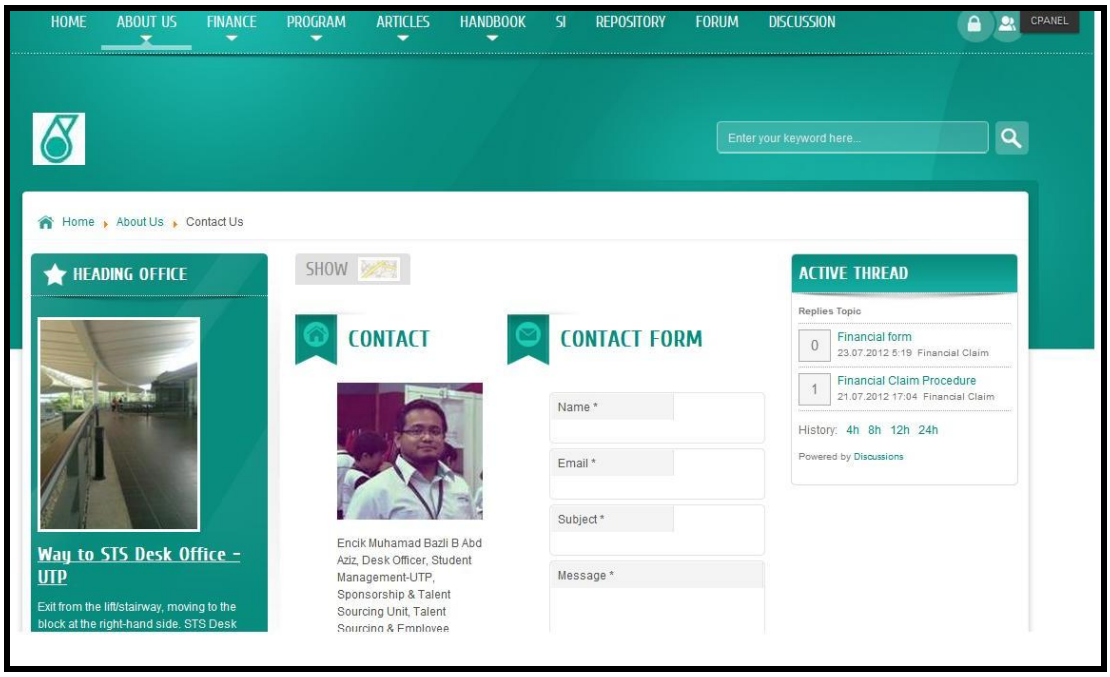


FIGURE 21: Contact Us Page

Financial & Claim page enable user to gain information on allowance covered, refund, process and procedures for claim and claim forms.

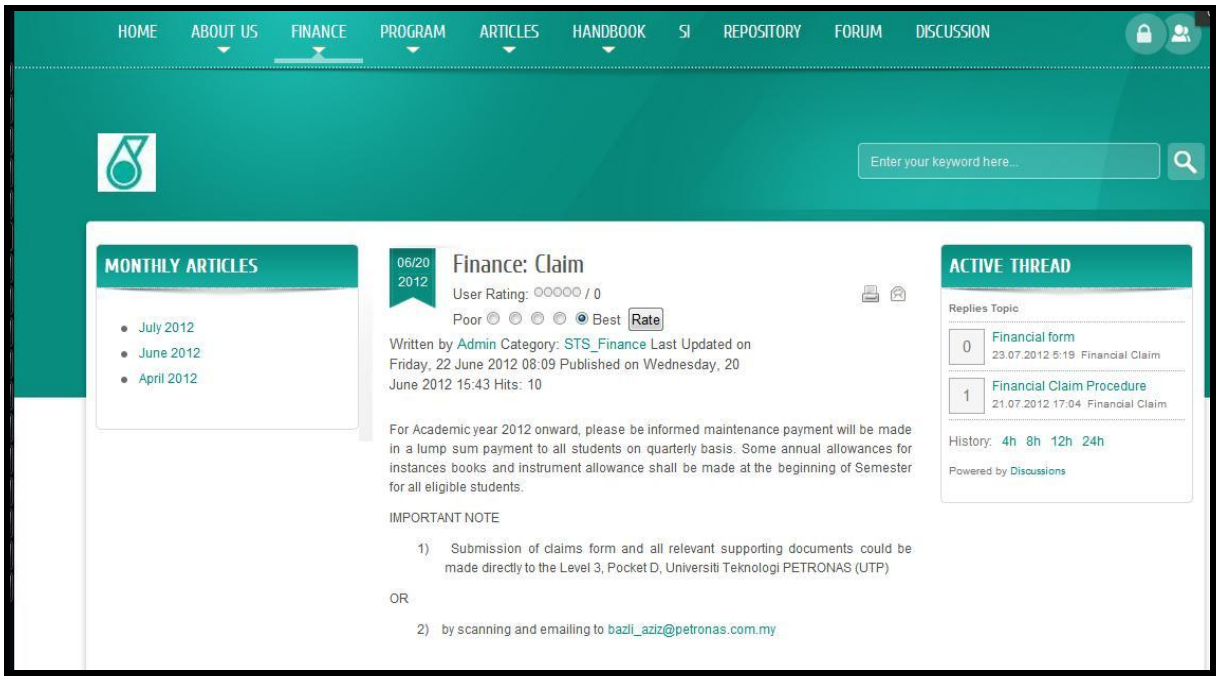
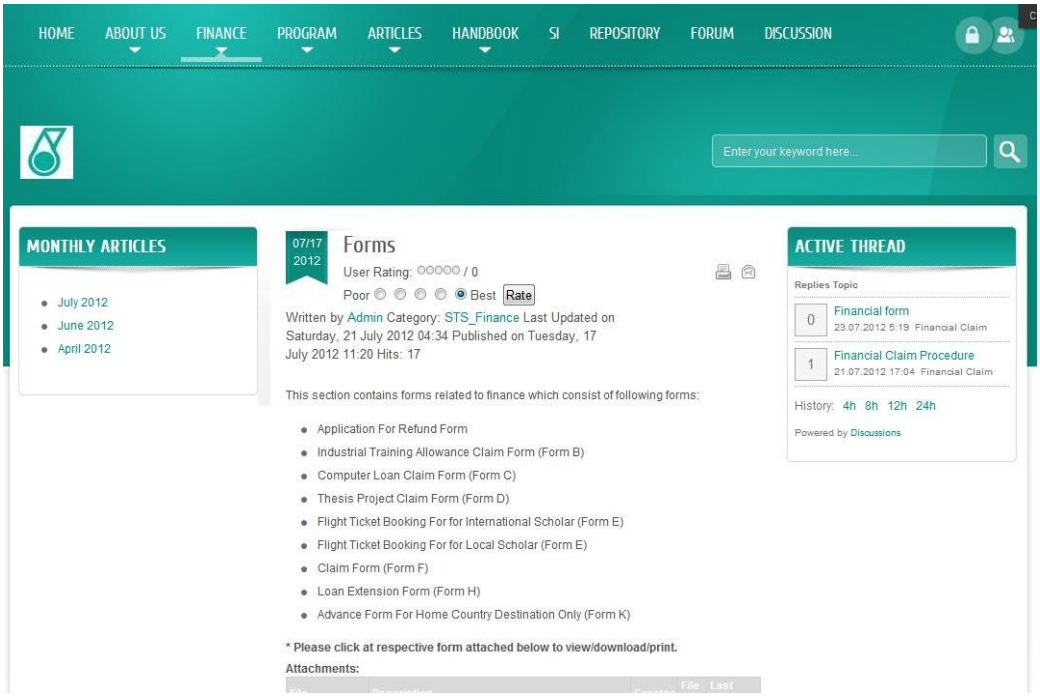
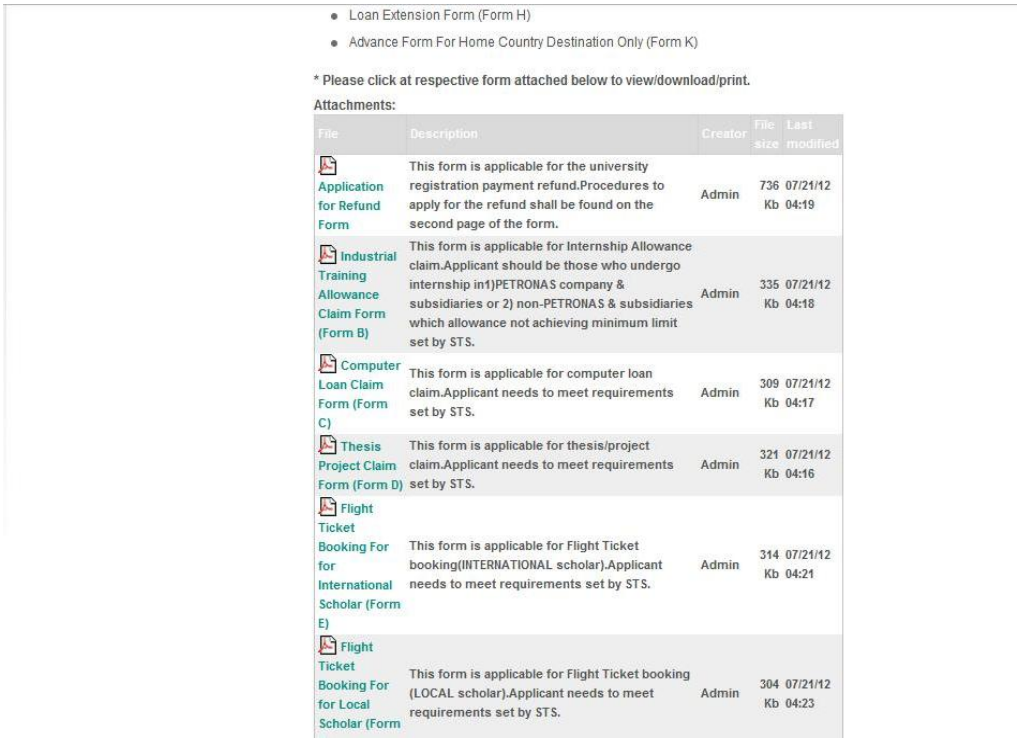


FIGURE 22: Financial & Claim Page





- Loan Extension Form (Form H)
- Advance Form For Home Country Destination Only (Form K)

*** Please click at respective form attached below to view/download/print.**

Attachments:

File	Description	Creator	File size	Last modified
Application for Refund Form	This form is applicable for the university registration payment refund.Procedures to apply for the refund shall be found on the second page of the form.	Admin	736 Kb	07/21/12 04:19
Industrial Training Allowance Claim Form (Form B)	This form is applicable for Internship Allowance claim.Applicant should be those who undergo internship in1)PETRONAS company & subsidiaries or 2) non-PETRONAS & subsidiaries which allowance not achieving minimum limit set by STS.	Admin	335 Kb	07/21/12 04:18
Computer Loan Claim Form (Form C)	This form is applicable for computer loan claim.Applicant needs to meet requirements set by STS.	Admin	309 Kb	07/21/12 04:17
Thesis Project Claim Form (Form D)	This form is applicable for thesis/project claim.Applicant needs to meet requirements set by STS.	Admin	321 Kb	07/21/12 04:16
Flight Ticket Booking For for International Scholar (Form E)	This form is applicable for Flight Ticket booking(INTERNATIONAL scholar).Applicant needs to meet requirements set by STS.	Admin	314 Kb	07/21/12 04:21
Flight Ticket Booking For for Local Scholar (Form	This form is applicable for Flight Ticket booking (LOCAL scholar).Applicant needs to meet requirements set by STS.	Admin	304 Kb	07/21/12 04:23

FIGURE 23: Claim Forms Page

Beside, user will be able to interact and have discussion using forum provided on the system.

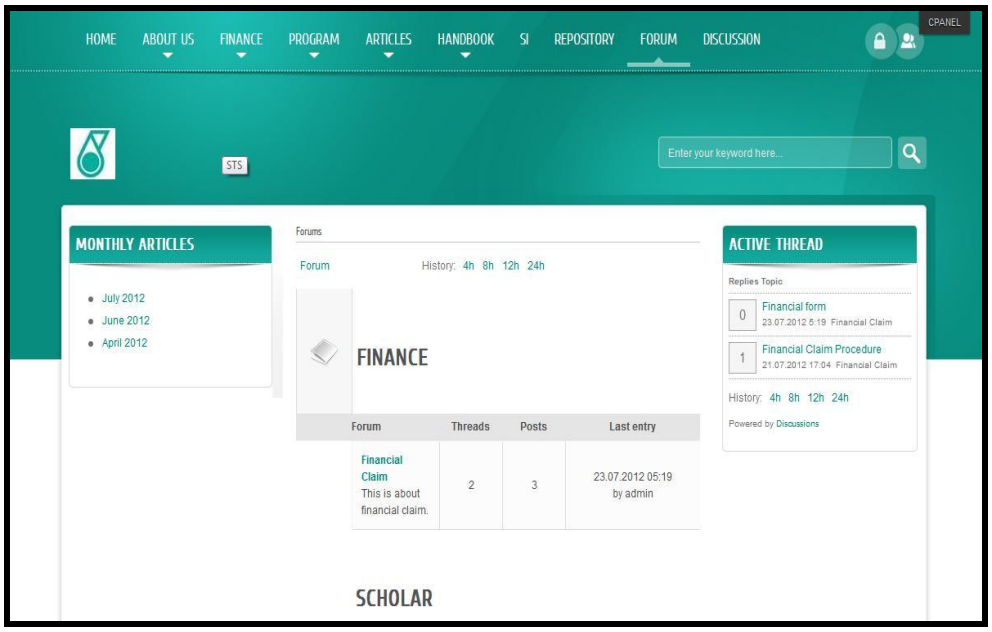


FIGURE 24: Forum Page

User will be able to comment on the article provided by posting the comment using comment form.

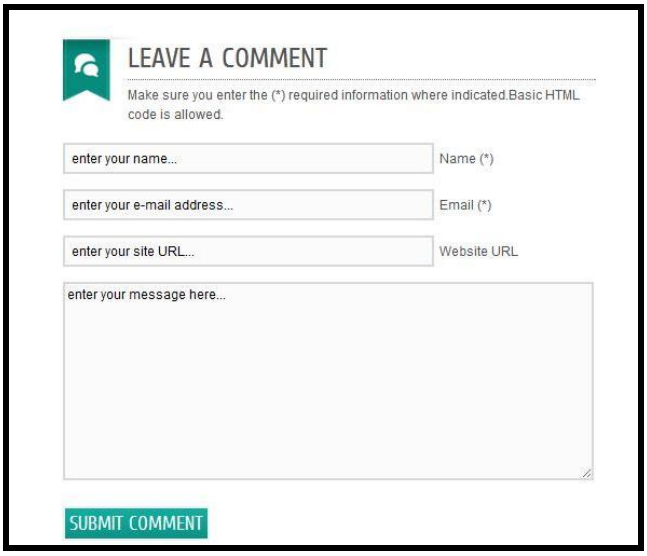


FIGURE 25: Comment Form

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5 CONSLUSION AND RECOMMENDATION

5.1 Relevancy to the Objectives

This project is relevant as throughout the project, the research and data gathering will be conducted to identify the problems with the current media used and objectives for the developed system The research and data collected has been documented for reference to recognize the relevancy of this project before proceeding with the development of the proposed system. The data collected is needed to assist and support the next step which is prototype development of proposed system.

Based on the problems identified, this developed system is expected to provide an established medium as better alternative for the potential users as compared to the current media. Other than that, the response and acceptance of potential users on the current system and developed system has been collected from survey and data gathering processes of this project to know the relevant of this project to be proceeded.

The proper investigation on the information required as PETRONAS scholars is conducted to identify which information is relevant to be included in the proposed system. In data collection process, information related to the scholarship programme as well as process and procedures involve in PETRONAS Scholarship Programme have been clarified by authorized party such as STS before continuing with the

classification of information that needed to be in the proposed system. From the research, it can be concluded that the progress and development of the developed system is relevant to satisfies user's requirements.

5.2 Suggested Future Work for Expansion and Continuation

For next step, the future work should be focus on the implementation of the system to be utilized by users. The developed system should be maintained and improved from time to time in term of information available on the system and features to be added due to any change from the user to be compatible with future needs.

In future, the work for expansion could be in term of broadens the scope for the users of the system. The current scope involves PETRONAS Scholars in UTP and STS management. It is good to widen the scope to the other PETRONAS Scholarship holders in other universities in Malaysia. The contents of the portal might be a little bit different and not specify to the users in UTP.

Besides, the scope of the information or contents included in the portal could be extended to the information on career and job opportunity for scholarship holders in Sponsor Company. Thus, the portal is not limited on the students' sponsorship programme only but also involves the future opportunity and career for scholarship holders. As for example, sponsor could reveal the selection process of scholarship holders for employment in Sponsor Company such as how many stage of interviews, what are tests involve and how the interviews' process are been conducted. Thus, the expansion of these scopes is good to serve potential users in broader range and extent the information or contents that have been classified to be included in the portal.

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APPENDICES

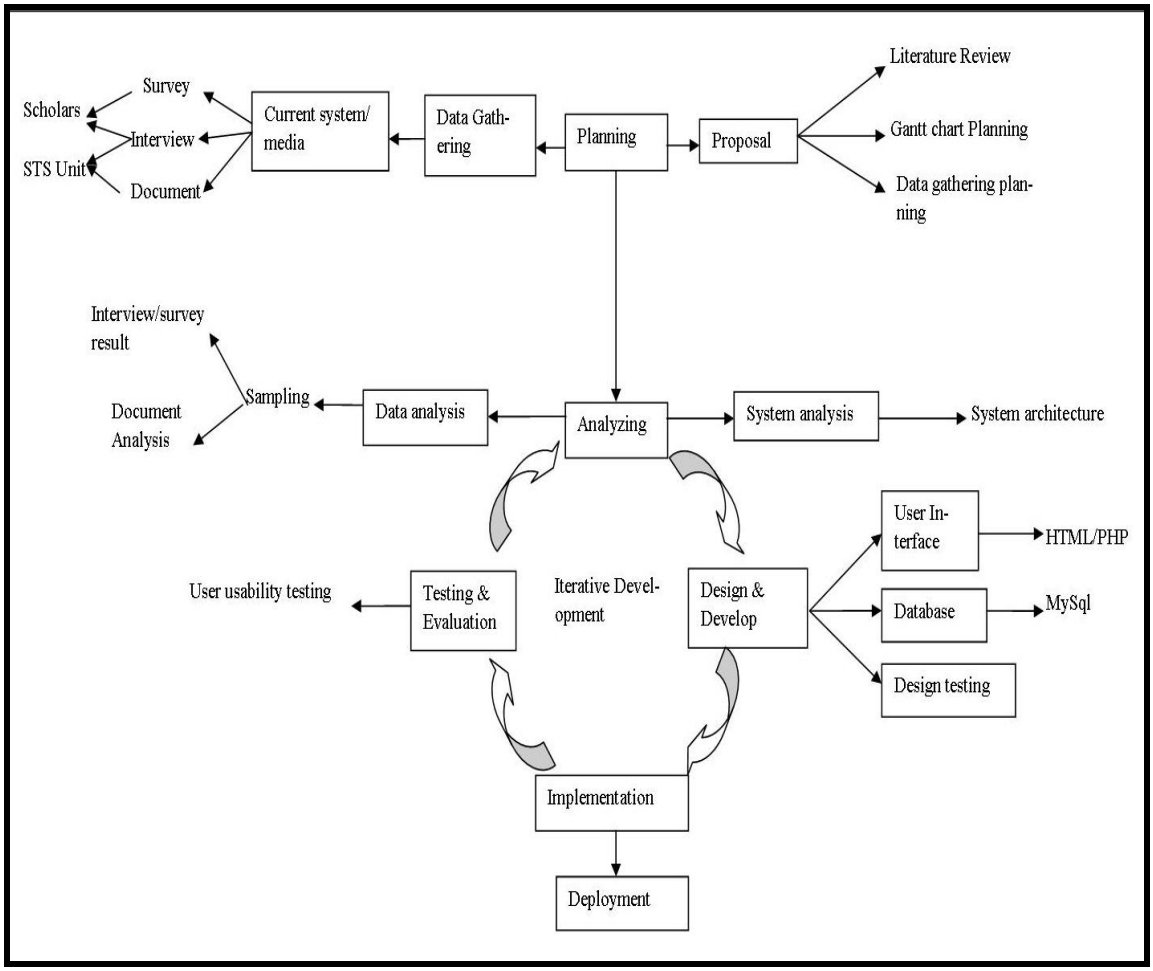
APPENDIX 1: Cost and Benefits Analysis for PETRONAS Scholars I - Center

Cost and Benefits for PETRONAS Scholars I-Center

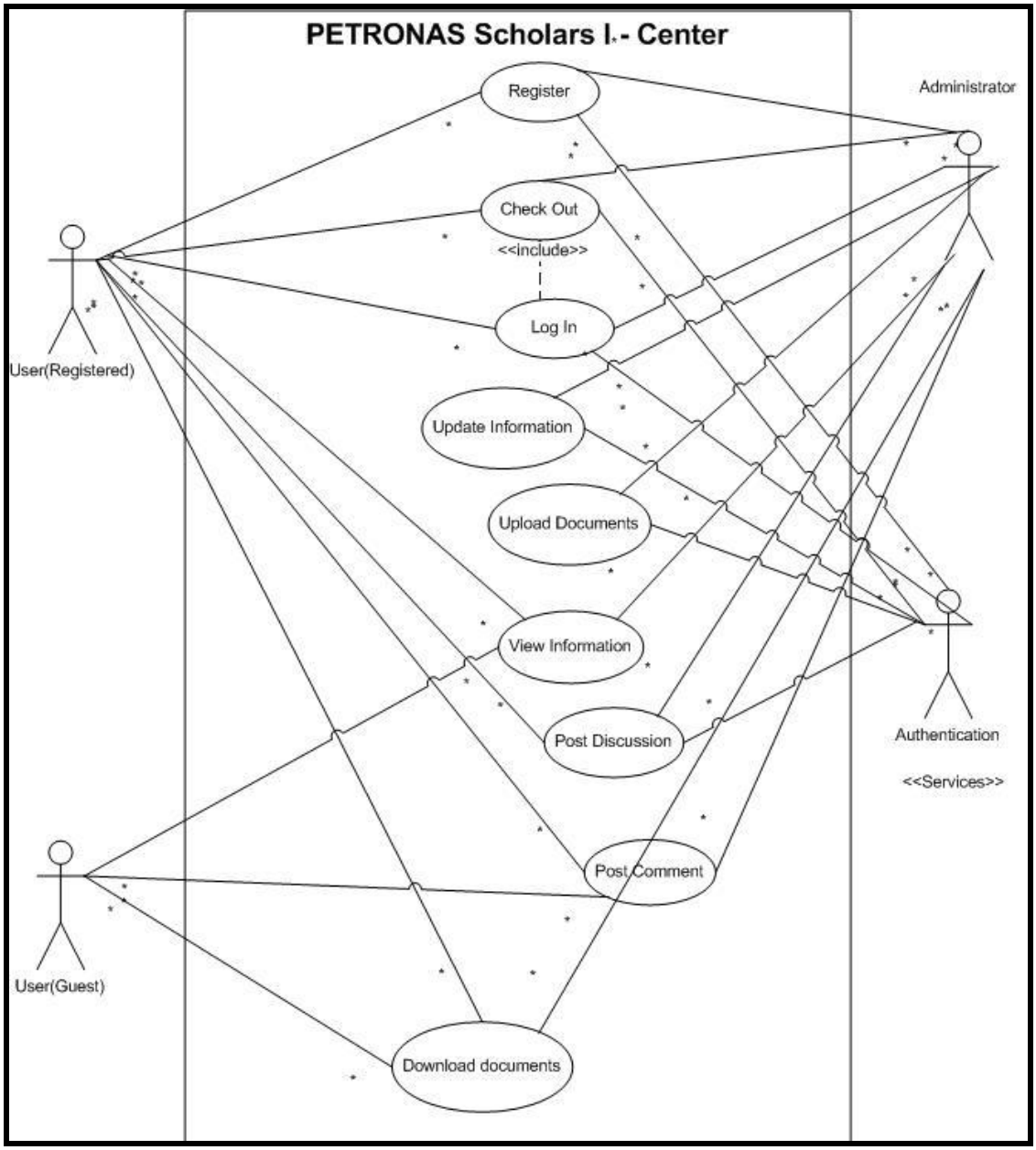
Costs	RM	Notes
Hardware	$ -	Developer uses own laptop
Software	$ -	Free, Open sources software will be used
User acceptances process	$ 10.00	User can accept system in shorter time
Training	$ 10.00	Simple system. No intensive training needed.
Potential risks	$ 10.00	Low risk as system is developed using RAD - user is referred regularly
Development Time	$ 50.00	Development will take about 4 months to be completed.
Total Costs	$ 80.00	
Benefits		
Decrease responsive time	$ 30.00	User's enquiries will be responded in shorter time
Simplify process and procedures	$ 50.00	Enable user to download/submit form online
Increase management effectiveness	$ 70.00	Updated information can be spread online, high richness to the recipients
Decrease access time to information	$ 70.00	Information can be accessed online
Increase in information correctness	$ 50.00	Verified announcement available online
Total Benefits	$270.00	

Cost Benefit Analysis	
Total Benefits	$ 270.00
Total Costs	$ 80.00
NET BENEFIT	**190.00**

APPENDIX 2: Research and System Methodology Used



APPENDIX 3: System Use Case Diagram



APPENDIX 4: Project Activities & Key Milestone for Research Phase (Final Year Project I)

			Week/Date											
			1	2	3	4	5	6	7	8	9	10	11	12
No.	Tasks/Activities	Duration	26-29 Jan	30Jan 5Feb	6-12 Feb	13-19 Feb	20-26Feb	27Feb - 4Mar	5-11 Mar	12-18 Mar	19-25 Mar	26Mar 1Apr	2-8Apr	9-15 Apr
1	Research on project topic areas and possible supervisor	2 weeks												
	1.1 Meet lecturer for supervisor request	N/A												
2	Project topic selection and finalize	2 weeks												
	2.1 Confirm topic with supervisor (SV)	N/A												
3	Attend brifing on Final Year Project (FYP)	N/A												
4	Drafting FYP workpan and tasks	2 weeks												
5	Research continue on selected topic area	2 weeks												
	5.1 Find related information for project proposal preparation (Title,Problem statement, Objective,background of project,tools)	2 weeks												
6	Attend class for FYP (What is FYP all about?)	N/A												
7	Gathering and collecting sources on the topic	2 weeks												
8	Initiate the project proposal	1 week												
9	Submit project proposal to research cluster	N/A												
10	Check on approval status of proposed topic	N/A												
11	Attend class for FYP(report writing)	N/A												
12	Thoroughly research work and Literature review	3 weeks												
13	Preparing for Extended Proposal	2 weeks												
	13.1 Project Background	2 weeks												
	13.2Literature Review	2 weeks												
	13.3 Methodology	2 weeks												
14	Submit draft of extended proposal	N/A												
15	Amendment based on SV's feedback	1 week												
16	Submit extended proposal	N/A						*						
17	Attenf FYP class(Data collection,method,sampling)	N/A												
18	Attend FYP class (E-resources)	N/A												
19	Preparing for proposal defense and progress evaluation	3 weeks												
20	Attend FYP class(Bibliography management)	N/A												
21	Proposal defense and progress evaluation	1 week												
22	Designing question for interview and questionnaire	3 weeks												
	22.1 Distribute questionnaire to the respondents	2 weeks												
	22.2 Conduct interview with identified individuals	2 weeks												
23	Gethering user requirement and data	3 weeks												
	23.1 Analyse data gathered	3 weeks												
	23.2 Prepare graphical data presntation	3 weeks												
24	Draft system diagram design	2 weeks												
25	Compile data and diagram	1 week												
26	Preparing for interim draft report	2 weeks												
	26.1 Submit interim draft report1	N/A												*
	26.2 Amendment on interim report based on SV's feedback	2 weeks												
27	Submit interim report	N/A												*

Note: (*) represents the deliverables for the course.

APPENDIX 5: Project Activities & Key Milestone for Development Phase (Final Year Project II)

No.	Task	Week/Date													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		21-27 May	28May-3 Jun	4 -10 Jun	11-16 Jun	18-24 Jun	25Jun-1 Jul	2 - 8 Jul	9 - 15 Jul	16 - 22 Jul	23-29 Jul	30 Jul 5 Aug	6 - 12 Aug	13-19 Aug	20-26 Aug
1.0	**Planning Phase**														
1.1	Analyse project feasibility w ithin scope and time														
	1.2.1 Identify program, tools and skills needed														
	1.2.2 Installation of program to be used														
1.2	Develop w orkplan for the project														
1.3	Information Gathering														
	1.3.1 Homepage:														
	1.3.2 Contact Us/About US														
	1.3.3 Finance														
	1.3.4 Programmes														
	1.3.5 Industrial Training														
	1.3.6 Student Exchange Program														
	1.3.6 Handbook														
	1.3.7 Structured Interview														
2.0	**Analysing Phase**														
2.1	Analyse the current system used														
	2.1.1 Study on how current system w ork														
	2.1.2 Define problem and constraints of the current system														
	2.1.3 Identify any improvement needed														
2.2	Gathering user requirements for to-be system														
	2.2.3 Determine functional and non-functional requirements														
	2.2.4 Verify,change and prioritize the requirements														
2.3	Define scope and boundaries of to-be system														
	2.3.1 Define problems that might occur for to-be system based on requirements														
	2.3.2 Find alternative/solution														
3.0	**Development Phase**														
3.1	Homepage														
	3.1.1 Logo ("PETRONAS Scholars I-Center")														
	3.1.2 Menu														
	3.1.3 Search label and button														
	3.1.4 Slideshow pictures														
	3.1.5 Announcement														
	3.1.6 Upcoming event														
	3.1.7 Follow STS														
	3.1.8 My University														
	3.1.9 Newsletter/subscription: user entering name,email														
	3.1.10 Contact Us: Address STS UTP, phone,fax														
	3.1.11 About This Site: Sitemap, Sign Up,Log In (Pop up)														
	3.1.12 Directory (at footer, direct user to Top Page, home & other menus)														
	3.1.13 Footer														
3.2	Contact Us/About Us Page														
	3.2.1 Create article for About Us														
	3.2.2 Link About Us menu from Homepage to the About Us page														
3.3	Finance Page														
	3.3.1 Create article for Allowance info														
	3.3.2 Create page for form														
	* 3.3.3 Submission of form														
3.4	Program Page														
	3.4.1 Create article for development programme														
	3.4.3 Student Exchange Program														
3.5	Handbook Page														
	3.5.1 Create article for New Students information														
	3.5.2 Create article for Existing Students information														
	3.5.3 Create article for Post-Completion Students information														
3.6	Search														
	3.9.1 Enable user to search for info using term inserted														
3.7	Linkage and Editing														
	3.10.1 Link all pages, module, content and application														
	3.10.2 Edit and finalize														
4.0	**Implementation Phase**														
4.1	Test the website (frequently)														
4.2	Fine - tune the website														
	4.2.1 Implement the website														
4.3	Evaluate the website and its application programs														

APPENDIX 6: Gantt Chart for Research Phase (Final Year Project I)

No.	Detail/ Week	1	2	3	4	5	6	7		8	9	10	11	12
1	Research for Project Topic								Mid-semester break					
2	Selection of Project Topic													
3	Preparation for Project Proposal													
4	Sources Gathering and Collection													
5	Submission of Project Topic Proposal to Research Cluster													
6	Approval of Project Topic													
7	Preliminary Research Work and Literature Review													
8	Preparation for Extended Proposal - Project Background - Literature Review - Methodology													
9	Submission of Extended Proposal Draft													
10	Submission of Extended Proposal						*							
11	Viva: Proposal Defence and Progress Evaluation													
12	User Requirements and Data Gathering													
13	Data Analysis													
14	Systen Diagram Design Draft													
15	Data and Diagram Compilation													
16	Preparation of Interim Draft Report													
17	Submission of Interim Draft Report													*
18	Amendment on Interim Report													
19	Submission of Interim Report													*

Note: (*) represents the deliverables for the course.

APPENDIX 7: Gantt Chart for Development Phase (Final Year Project II)

No.	Task Details	Week/Date														
		1	2	3	4	5	6	7		8	9	10	11	12	13	14	15
		21-27 May	28May-3 Jun	4 -10 Jun	11-16 Jun	18-24 Jun	25Jun-1 Jul	2 - 8 Jul		9 - 15 Jul	16 - 22 Jul	23-29 Jul	30 Jul 5 Aug	6 - 12 Aug	13-19 Aug	20-26 Aug	27Aug 2 Sep
1	Project Work Continues								Mid-Semester Break								
2	Submission of Progress Report							*									
3	Project Work Continues																
4	Pre-EDX											*					
5	Submission of Draft Report																
6	Submission of Dissertataion (Soft Bound)														*		
7	Submission of Technical Paper														*		
8	Oral Presentation														*		
9	Submission of Project Disertation (Hard Bound)															*	

Note: (*****) represents the deliverables for the course.

APPENDIX 8: Interview Outline

Interview Outline

Interviewer: Interviewee:
Nor Hafizah binti Idris

Appointment Details

Date:
Start time: End time:
Venue:

Objectives & Reminders

- To know how the current system works
- To identify the problems associated with the current system
- To gather any documents to be reviewed
- To gather information for proposed system enhancement

Agenda & Estimated Time

Introduction	2 min
Background on the project research objectives	5 min
Background on the proposed new method	5 min
• Topic 1: Questions on user	6 min
• Topic 2: Questions on existing system and challenges faced	7 min
General question:	5 min

General Observations:
Questions:

1) Are you familiar with PETRONAS Sponsor & Talent Sourcing management (STS)?
2) Are you always referring to them regarding scholarship programme?
3) What media do you use to communicate and getting information from STS?
4) Do you know to whom to refer to regarding scholarship programme?
5) What issue do you refer to?
6) Have you ever involve in requesting claim from STS?
7) How does the process and procedures been conducted?
8) How long the time taken to solve a claim issue?
9) Do you face any difficulties in the process?
10) Are there any forms that are related to the scholarship programme (claim form/requisition form)?
11) Have you ever cross any portal for the PETRONAS Scholarship Programme?
12) What are the challenges you faced using the existing medium?
13) If the purposed system is going to be developed, what do you hope it would do to reduce the challenges you faced and assist you better in getting information and communicate with STS?

Relevant questions/Unresolved issues:

APPENDIX 9: Interview Report

Interview Notes Approved by: Nor Hafizah binti Idris

Person Interviewed: Nur Syazwani binti Mokhtar

User for Current System and Potential User for Proposed System

Interviewer: Nor Hafizah binti Idris

Purpose of Interview:

- Understand the current system and problem associated with it
- Determine information requirements for future system

Summary of Interview:

- The interview outline is attached to this report.
- Two biggest problems with the current system are:
    1. User having problem in term of time constraints to get information and communicate with Sponsorship & Talent Sourcing management using current media
    2. User confuses with the process and procedures involve in the scholarship programme.

Open Items:

- Verify interview time for particular interviewee.
- Record the interview session.

APPENDIX 10: Interview Questions Form

Scholars I-Center Questionnaire

The objective of this survey is to look for the response of scholarship holders towards current communication and sharing media used in getting and sharing information related to the scholarship programme. This will find out the acceptance of scholarship portal as new communication and sharing medium among scholarship holders and management in Universiti Teknologi PETRONAS. The proposed system will be developed to assist scholarship holders in getting information regarding the latest news, activities, financial and claim as well as process and procedures related to the scholarship. The response of this survey will be kept private and confidential as it is only be used for the purpose of final year project. Your cooperation is highly appreciated. Thank You! (* Required)

1) Please select your gender. *

- Male
- Female

2) Please select your year of study. *

- Foundation
- First Year
- Second Year
- Third Year
- Final Year

3) Please select your scholarship programme or any financial aid received. *

- PETRONAS
- MARA
- JPA
- PTPTN
- Private
- Other:

4) Do you communicate or refer to your sponsor? *

- Yes
- No

5) Please select on what issue(s) do you always refer. *(Process & Procedure: How to make claim and form or documents needed form claim. E.g.: Home Leave Passage, Computer Loan)

- Clarification on Announcements/News
- Latest events/programme/activities
- Financial & Claims
- Clarification on Process & Procedure
- Other:

6) Please select what channel(s) do you use to communicate among scholars and scholarship management. *

- Face-to-face meeting/conversation
- Phone call
- Email
- Social Network Media (e.g.Facebook, Google+, Twitter etc.)
- Other:

7) Please select what channel(s) do you use to get information or update on your scholarship programme. *

- Email
- Phone call
- Words of mouth (E.g.:conversation with friends/management)
- Social Network Media (E.g.:Facebook,Google+,Twitter etc.)
- Portal/Website (E.g.: E-Learning)
- Other:

8) Please select from whom do you get information or update on scholarship programme. *

- [ ] Scholarship management (E.g.: Sponsorship & Talent Sourcing Unit)
- [ ] Friends
- [ ] Family members
- [ ] Alumni
- [ ] Other:

9) Please rank how convenient is the current channel(s) used. *

	1	2	3	4	5	
Least Convenient	○	○	○	○	○	Very Convenient

10) Please rate the response time for the issue raised using current channel(s). *

	1	2	3	4	5	
Very Slow	○	○	○	○	○	Very Fast

11) Do you agree that more effective medium of communication is needed to support scholarship programme? *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

12) Do you agree that the development of specific portal for scholarship programme can assist scholars? *

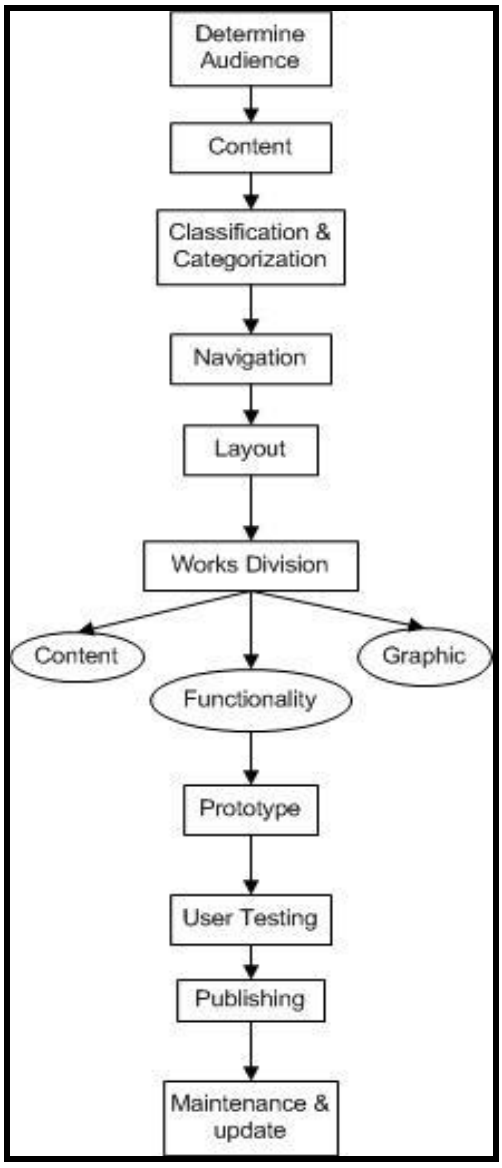
	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

13) What information do you need to be in scholarship portal? *

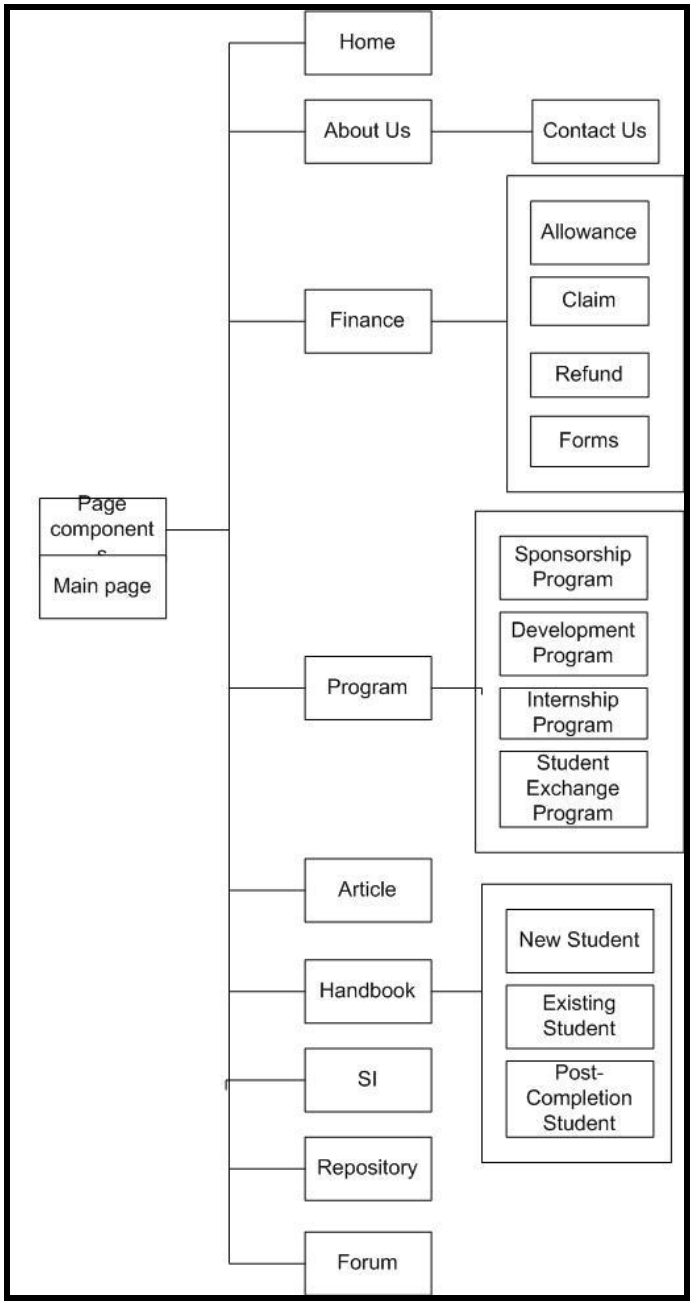
- ☐ Announcements/News
- ☐ Events/Programme/Engagement
- ☐ Financial & Claim
- ☐ Process & Procedure
- ☐ Sponsorship management contact details
- ☐ Softcopy form and submission form online (E.g.: Claim for Laptop Loan)
- ☐ Sharing material (E.g. Video of successful scholars)
- ☐ Discussion/Comment/Feedback
- ☐ Other: [ ]

Submit

APPENDIX 11: System Development Flowchart



APPENDIX 12: System Conceptual Design



APPENDIX 13: System Usability Testing Question Sample

System Usability Test - PETRONAS Scholars I-Center

Date: Location:

Description: PETRONAS Scholars I-Center serves as a portal for communication and sharing knowledge among PETRONAS Scholars in Universiti Teknologi PETRONAS (UTP) and management of Sponsorship & Talent Sourcing (STS). It provides information regarding announcement & news, financial & claim, process and procedures and feedback/discussion.

The PETRONAS Scholars I-Center usability test is intended to determine the extent this system and its interface facilitates user in getting desired information and performing communication task among target users. This test is conducted with potential user on the test administrator's laptop. This session will take about 1 hour. Test administrator will explain on the system and user needs to fill up the following questions:

User's Background Questions

1. Occupation

STS Staff	Student

2. Year of study (If Student)

Foundation	First Year	Second Year	Third Year	Final Year

3. Year(s) of Experience in STS Unit (If STS Staff)

Less than 1 year	1-5 Years	5-10 Years	More than 10 Years

4. Nationality

Malaysian	Non-Malaysian

Look and Feel

1. This portal is easy to navigate

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2. The font and size is easy to be read

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3. The colour attractive and pleasing

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

4. The homepage is attractive

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

5. The overall site is attractive

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

6. The site's structure is pleasing

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

7. This portal is well organized

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

8. Information is written in a style that suits user

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

9. User can get to information quickly

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

10. The information is relevant to user's needs

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

11. The site has characteristics that make it especially appealing

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

12. The site is well-suited to first-time visitors

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

13. The site is well-suited to repeat visitors

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

14. The site has a clear purpose

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

15. User will use this portal frequently

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

16. The system is not complex

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

17. User would no need the support of a technical person to be able to use this system

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

18. This system has no or less inconsistency

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

19. The system is not cumbersome to be used

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

20. User no need to learn a lot of things before could get going with this system

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree