

# **Online Document Tracking System**

By

Mohamad Nor Ai'man Jalaludin

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A project dissertation submitted in partial fulfilment of

the requirement for the

Bachelor of Technology (Hons)

Business Information System

SEPTEMBER 2014

Universiti Teknologi PETRONAS

Bandar Seri Iskandar,

31750 Tronoh

Perak Darul Ridzuan.

# **CERTIFICATION OF APPROVAL**

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Approved by,

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(DR. SHUIB BIN BASRI)

UNIVERSITI TEKNOLOGI PETRONAS  
TRONOH, PERAK  
SEPTEMBER 2014

## **CERTIFICATION OF ORIGINALITY**

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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(MOHAMAD NOR AI'MAN JALALUDIN)

## **ABSTRACT**

Online Document Tracking System (ODTS) is a web based system that enables student from UTP to retrieve and view all previous final year projects of CIS department. The system is developed in accordance to the Rapid Application Development (RAD) method over the course of 14 weeks. Through the use of this website, student could access the FYP documents anywhere regardless location.

Currently, the management archival of the final year projects are done by manual means that involves physical storage. With the development of this web based application, the department could take advantage of the automated system and saves a substantial amount of time in archiving those documents.

The output of this project would to an extent, help and improve the business process of storing and retrieving the final year projects documents, hence maximizing productivity.

## **ACKNOWLEDGMENT**

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Last but certainly not the least, the writer wish to thank all who helped in developing the prototype, those who participated in the prototype testing and also for completing the usability survey and also to those who supported the idea and development of this application.

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# CHAPTER 1

## Project Background

### 1.1 Introduction

“When it comes to an effective and smooth running office environment, there are certain elements that must be implemented, despite the industry you are in. First and foremost, your files are the key to your operation and learning how to properly maintain a sufficient paper trail can make a world of difference when it comes to your daily operations.”

This project is aimed to develop an Online Document Tracking System (ODTS) through the web for the CIS Department of Universiti Teknologi Petronas, UTP. To do this, a thorough investigation on the flaws of the existing system has to be done and be addressed throughout the development process. This project is crucial to ensure that the university is able to efficiently deliver, maintain and manage documents hence bettering service quality

The current condition for the document management of the Final Year Project is managed manually by the administrator or the coordinator of respective departments. The role of the new document tracking system is to logically register, preserve and retrieve each documents at high speed. Thus, effectively performing an office work, reducing the volume of consumed paper and minimizing a work space in a office.

This project explores the scope and importance of DTS in detail and illustrates how it expands our view of information management.

### **1.1.1 What is ODTS?**

Online Document Tracking System is a web based application that manages all the files used by every department in UTP that relates to final year project which in this case is the students' thesis and technical report. Basically the core function of this system revolves around data capturing, storage and retrieval. In each department, there will be an administrator assigned with the responsibility of managing the FYP documents of their respective department. Typically students are required to submit the softcopies of their thesis and reports to their respective supervisors. The administrator responsible will act as an entity that systematically uploads these documents in the new online system in PDF format. Other than that, the administrator will also have the ability to add another user (Administrative Staff) with the same kind of system privilege. Once the documents have been successfully uploaded in the system, every person authenticated as community of UTP will have the ability to download or print any desired documents for their usage. The online tracking system has a very powerful search form to locate a file within the system. When the "search" button is pressed it will open a window where you will have a list of possible results. The system is also intended to have a reporting mechanism where useful statistics will be shown. Example of such statistic is the frequency of different type of documents (ex.software engineering, artificial intelligence) being searched or being uploaded. Thus students would have a better understanding on the current trend or pattern, hence helping them to make firm decision. In using this system, only administrators will have the ability to manipulate the archive database. This is done to avoid inconsistency and errors in data entry.

### **Benefits of ODTS**

- Files management effectiveness
- Easy File Tracking
- Online fast and secure file management
- Staff improvement
- Organizational efficiency improvement
- Paper cost reduce

- Less energy used
- Time spent reduce
- Eliminates duplication of files

## **1.2 Problem Statement**

- Inefficient control of documents

Universiti Teknologi Petronas manages its FYP documents by a physical standard way for making decisions, requests or any reports. When a file is needed, it can only be obtained in a physical form. This an disadvantage as it can only be used by one user at a time.

- Unnecessary energy and time consumption

When a file or documents are stored by physical mean, it is more likely to be exposed to threat (modification). The university has to equip the storage area with sensors and anti-theft alarm that are expensive in cost. Other than that, when someone need to get the documents, he or she has to be ohsyically present at the storage location to personally take it. This consumes time that can be otherwise channeled to other beneficial activities.

- Difficulties in allocating FYP supervisors

Another problem is the difficulties in allocating supervisors to the FYP candidates. It really important for students to be assigned with the right person, that has solid knowledge in what the project is all about. Thus, a statistical information of the most explored areas would definitely help in planning and coordinating the final year project.

### **1.3 Objective**

The objectives of this project are :

1. To investigate the most usable navigation style for a web-based application
2. To develop an online document tracking system (ODTS) that captures, stores and retrieves documents related to UTP Final Year Project  
To verify and validate the developed ODTS to ensure it is usable and meets up the standard defined prior to development

### **1.4 Scope of Study**

Study the most effective ways of building an online resources web site for UTP by examining the existing system and determining the requirements.

A prototype system called ‘Online Document Management System’ will be developed based on the current practice and demand of the parties in charge of the students final year thesis and technical report.

## **CHAPTER 2**

### **Literature Review**

#### **2.1 Electronic Document Management System (EDMS)**

An EDMS is well documented to be known for its use to electronically track and store electronic images and documents that obtained from its physical form. Typically, an EDMS involves the usage of a number programs or systems. When being put in use, the technological application of it benefits organisations by saving up papers, speeding up the communication process and directly heighten the productivity of the business, In a bigger perspective, EDMS drives the expansion the paper-based documents in the area of information management .

In ensuring the safety and smooth flow of electronic and paper-based documents when needed by authorized parties, the system acts as a mechanism that assists facilitation and coordination for that purpose. That flow is comprised of document storage, processing, routing, distribution and retrieval.

A well-implemented EDMS encourages an efficient finding and sharing of information. Aside from that, it also maximizes the management of knowledge and data mining.

#### **2.2 Web Based system**

A web based system is define by Eid (2008) as web site that acts as a multi sources or single source for all information on a specific domain it offers the user a broad array of information, arranged in a way that is most convenient for the user to access. Here web portal can be a medium point for the students and teachers to retrieve and store various information and resources. Where stated by Norfadilah and Dismas, 2006 a web based or automated system can help provide a more efficient in any data processing especially for a system that involves a lot of data collection and retrievals.

### **2.3 Web site Usability**

It is obvious that nowadays web applications have an extraordinary rising worldwide. On personal computers, the most popular application for accessing any content and any applications on the web, is the web browser. In mobile devices, the majority of web content is consumed via custom built native web apps. The world wide web has evolved from a document sharing systems to a massively popular general purpose applications or in the other words the most powerful information distribution environment in the history of humankind. In developing a web-based document management system that best suits an organization, a huge consideration has to be put on several aspects. This literature review is meant to explain about the particular aspect of usability of an affective website development.

Usability is the most traditional concept of study in human–computer interaction (HCI) research (Olson and Olson, 2003; Karat, 2003). Usability has been defined as a “the measure of the quality of a user’s experience when interacting with a product or system – whether a Web site, a software application, mobile technology, or any user operated device” (Anonymous, 2006). The importance of HCI and usability has become increasingly important with the development of the WWW and its role in organizations activities. In fact, Jakob Nielsen, a noted usability expert, suggests that organizations should spend 10 per cent of the development budget on usability. Nielsen, in a study of 42 organizations who redesigned their web site with usability as a primary concern, concluded that the sales conversion rates increased by 135 per cent and that traffic on the web site increased by 150 per cent. These findings provide support as to the importance of developing web sites that have high usability.

Web usability can be defined as making the design simple enough so that customers, who by nature tend to be goal-driven, can accomplish their task as quickly and painlessly as possible. Shneiderman (2005) suggests that usability can be a balancing act as inadequate functionality will render the application useless while complexity that make an interface difficult to use. Nielsen (2003a, b) states that it is more important for design to meet the needs of the customer rather than be attractive and fun. If the customer finds the site too difficult to use, there will not be a purchase or return visit.

In their research on web customer satisfaction, McKinney et al. (2002) state that a web site will be abandoned if the consumer has difficulty searching or retrieving their needed information, even if the web site provides the information necessary to complete the intended task. They state that the web site must compensate for lack of physical contact experienced by online users and at the same time make the users experience easy and enjoyable. The user's impression of the web site's usability impacts the user's impression of the products or information available at the site.

Although the HCI literature has examined several aspects of web site usability (Turban and Gehrke, 2000; McKinney et al., 2002; Torkzadeh and Dhillon, 2002), it has only been recently that information systems literature has focused on web site usability thoroughly. Two studies, Palmer (2002) and Agarwal and Venkatesh (2002), investigated the underlying dimensions of web site usability. Palmer defined usability based on five dimensions derived from usability and media richness literature (download delay, navigability, content, interactivity, and responsiveness), while Agarwal and Venkatesh utilized the Microsoft Usability Guidelines to define web site usability through five different dimensions (ease of use, made for the medium, emotion, content). Each study resulted in an instrument that, it was suggested, could be used to assess a web site's usability.

Green and Pearson (2006, 2007) found that while both instruments (Agarwal and Venkatesh, 2002; Palmer, 2002) provided some degree of reliability and robustness in measuring web site usability, a modified instrument consisting of navigation, customization and personalization, download speed, accessibility, and ease of use provided a more valid and more robust measure of web site usability. Interestingly, in their study, content was not a statistically significant predictor of web site satisfaction or intent to return to the web site. They concluded that content was not a necessary component of web site usability – that users considered content to be part of usefulness. This differs from most previous research in this area, but intuitively makes sense. Based on previous work on web usability (Turban and Gehrke, 2000; Agarwal and Venkatesh, 2002; McKinney et al., 2002; Palmer, 2002) and the findings of Green and Pearson (2007), this study seeks to determine the relative importance of these five dimensions (navigation, customization and personalization, download speed, accessibility, and ease of use) in an individual's assessment of web site usability

### **2.3.1 Navigation**

Navigation has always been well documented to be a problem in website development. Based on a comparison studies on organized and disorganized screen design, shneiderman (1987) discovers that beginner users had to think longer and made more navigation errors as they are using an unorganized screen. Turban and Gehrke (2000) stated in their literature review of web usability that degree of control in navigation were significant in web sites development. They claim that users are more inclined to favour web sites that have better efficiency. In addition to that, Tarafdar and Zhang (2005) support the notion of the influence of navigability on web sites usability. According to them, users have a tendency to suffer from cognitive overload without proper navigation system.

Nielsen (2003a, b) emphasizes on the vitality of putting the end user in consideration when a web site navigation is being designed. A comparison was made by Nielsen between two models of navigation schemes which are the one built upon most users' characteristics and the one closely constructed based on an organization's internal thinking. The collected results suggest the most preferable navigation model to be used is the one based on the mental model of users. Statistically, the mental model was used about nine times more often than the navigation scheme built upon the internal thinking of an organization. In addition to that, Nielsen claimed that no matter what the web site designers are expecting, user will always do things differently. For example, the act of skipping web site home page when browsing the web. In aiding users in achieving what they desire and improving the probability of return visits, it is important to have a navigation structure that is minimalistic, well-organized, user-driven, and flexible.





Figure 1: UTP Webpage Navigation Tab

### 2.3.2 Personalization and Customization

Research conducted have found that customization and personalization play a role in appropriating the content of a site to the users' needs and are essential in ensuring the usability success of a web (Agarwal and Venkatesh, 2002; Palmer, 2002). Based on recent discovery, Liang et al. (2006-2007) found that personalization holds the ability of increasing the users' fulfilment through the use of high-interactivity web site. However, it also specified by them that there a tendency to overdo the web site personalization. Unnecessary personalization increases user dissatisfaction substantially and causes information overload. In a research that involves distinctive web sites of several different industries, Agarwal and Venkatesh (2002) suggests that personalization, also known as "made-for-the-medium", was fundamental for those web sites that are purely built for the purpose of establishing a continuous and lasting relationship with the users. The capacity to provide control to the amount of information being pushed to the users are made possible by the means of customization and personalization, but it is frequently unused in web sites as stated by Huang (2003) in his comprehensive research of 50 web sites held by huge global organizations. Although there is an availability of a tremendously large volume of information on these sites, surprisingly only a small percentage of the corporate web sites implemented customization and personalization capability.

### **2.3.3 Download Speed**

Download speed is largely depending on the telecommunication infrastructure. That being said, download speed is something beyond the control of most research conducted. To put this in perspective, the speed of a download is dependable on various number aspects starting from the server to the browser such as the connection to the Internet. This implies that a web site heavy content that comprises images, clips of videos and audio has an effect on the overall download performance from the initial access of a site and in following request of pages within the site. Research has proven that download delay is a significant factor influencing web site usability in the viewpoint of users (Palmer, 2002). Turban and Gehrke (2000) shows through statistical figures that it has always been users' preference to use simple web sites that deliver service and content rather than sites that have heavy flashing banner ads, revolving images, and an excessive multimedia effects that consequently slows the download speed. Tarafdar and Zhang (2005) discover that the prolonged time taken to access online information could induce anxiety in users as well as loss of interest with the site. Additional usability studies have suggested that the maximum time the web users will wait for a page to be downloaded is a just a few before they get inconvenienced.

### **2.3.4 Accessibility**

Accessibility is imperative in any great developments. It is particularly important in ensuring the usability of a web site in as it is not possible for users to complete transactions if they are incapable of using the site effectively. Accessibility, when referring to a web site, means that probable users of the web sites including those with sight and hearing disabilities are given the ability to use the information made available without hassles or difficulties. Recent studies have shown that numerous web sites, be it public or private, do not offer an sufficient degree of accessibility (Stowers, 2002; Hackett et al., 2005; Parmanto and Zeng, 2005). According to Hackett et al. (2005), many web developers tend to incorporate unnecessary complex features in a web site, which in turn reduces the accessibility of the web site. Nielsen (2000) said that a huge amount of development time might be needed if one is to follow every proven accessibility guideline. Despite that, it was suggested by him that no matter what, developing a fully accessible web site should be prioritized for in

order it to perform well. One way to achieve this is by conducting several test with text-only browsers. Web designers have to take the effort to make sure that at the very minimum, all required information is being displayed properly. This ease of use of the site would obviously increase users' satisfaction, which will consequently result to an improved number of return visits.

### **2.3.5 Ease of Use**

Ease of use along with perceived usefulness has been shown to be important predictors of technology acceptance (Venkatesh et al., 2003). Other studies have suggested that ease of use is an important component in web site usage (Lee, 2004; Muthitacharoen et al., 2006). In their study, Agarwal and Venkatesh (2002) found ease of use to be an important variable in determining web usability.

## **2.4 Web Site Navigation Style**

This study will is primarily to investigate the effective web sites navigability design. An important aspect in web design is the navigation style which can significantly influence how easily information is found and how satisfied users are with the web interaction. Thus it is important that sites be structured so that information lookup is easy and that the site be intuitively navigable. However, which screen layout and menu arrangement are preferable to users is not yet well investigated.

Thus, the study will narrow down the focus on the menus to determine how the placement of the navigation links on the screen relate to user satisfaction and ease of use as rated by the users themselves. In a real-world application, other factors than placement and style may affect satisfaction; for example, site structure, organization and content, colour, and images (size, placement), text metrics, and multimedia, scripting, or coding.

This study examines various navigation styles focusing on placement and the general type of the menus, showing results in regards to ease of learning and ease of use of the different styles. This study will explore six commonly seen navigational style and test the theory that certain navigational styles are better for usability than others. The existing literature raises the expectation that the preferred navigation styles are left-

hand menus. The study will try to prove whether the existing preference is consistent here in UTP.

The study explores the most commonly seen or used navigational styles which can be grouped into six categories:

### 2.4.1 Tabbed

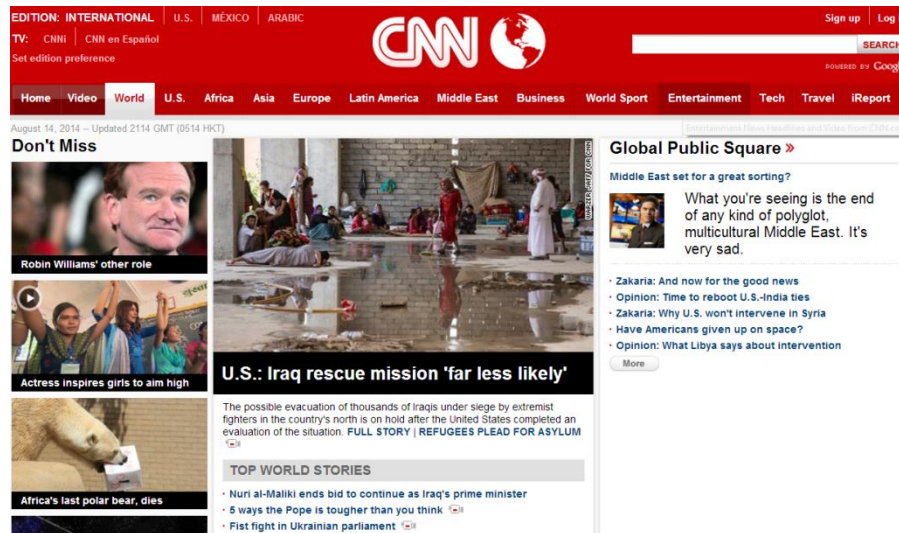


Figure 2: Tabbed

The figure above shows Tabbed style image at the top of a page. Browsing and navigation is based on the idea of the “folder tab” used in paper file folders in filing cabinets to locate the desired information by subject and, thus, should be intuitive. Each tab designates a page or a category/section of the web site. This style was made popular on screen media by Amazon.com and is now used on many commercial web sites like Canadiantire.ca and Expedia.com. New versions of Mozilla software, including Netscape and Firefox, use tabs to open new pages of content. Tabbed also may be designed to look like the “tab” style dialog box in Microsoft Windows. Tabbed style appears to become more popular and be incorporated into applications as well as on the Internet.

### 2.4.2 Left Navigation Bar

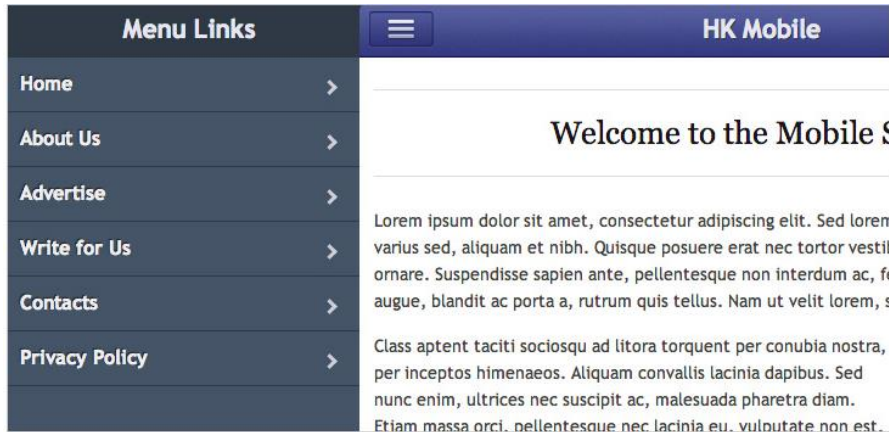


Figure 3: Left Bar

The navigation style above uses a single column of links at the left-hand side of the screen. The idea is that in English and other left-to-right languages, the eye naturally scans the screen starting at the left-hand side and, thus, should be intuitive. This navigation style was the most commonly used in the past, especially at the beginning of graphical web navigation and throughout the 1990's.

### 2.4.3 Top Navigation Bar

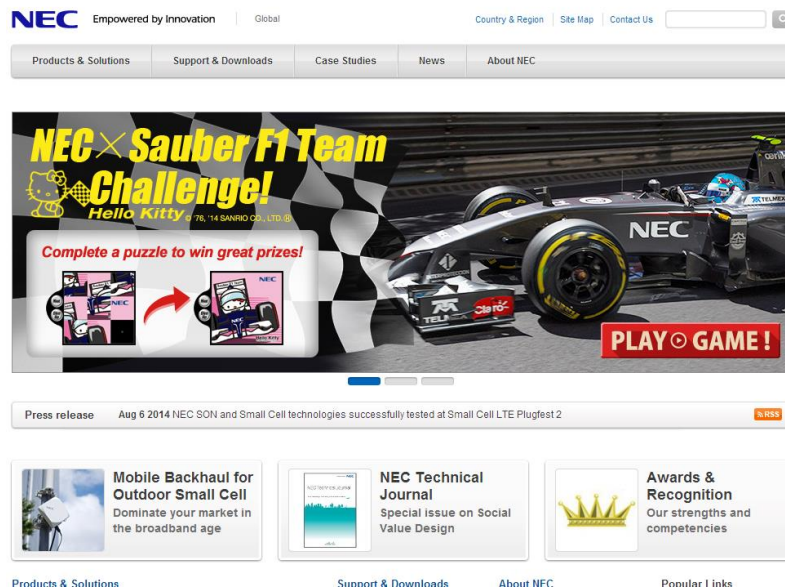


Figure 4: Top Bar

The above figure shows Top Navigation Bar that uses one row or several rows of links at or near the top of the page. This style is similar to the Tabbed style, except

that it is not visually based on file-folder-like organization. Furthermore, a top navigation bar may have general-purpose links (like "sign-in", "log out", "contact us") that are not related to content groups. The idea is that people tend to process information at the top of the screen first, especially if the page content is longer than the height of the screen (so that users have to scroll).

#### **2.4.4 Combination Top and Bottom Bar**

This kind of navigation style provides the main navigational links along the top of the web page, and secondary links at the bottom. This style would be used if some links were more critical to navigation than others, and they could logically be divided into two groups. This style of navigation is becoming common, especially on large corporate or educational institution web sites. Secondary links normally consist of contact information, links to disclaimers or feedback forms, and other seemingly unimportant areas.

#### **2.5.5 Combination Top and Left Bar**

Two logical groupings are used, both viewed as primary. One navigation bar runs at the top of the page, and the second is placed at the left of the screen. This style is used on sites of very large institutions or companies because it permits organizing large of amounts of content. Often the top of the screen is used for "main level" links, such as links to a home page and corporate information or other areas of the site, and the left side is reserved for more immediate areas, such as departmental or category-specific content. A potential downside is that it may confuse some users, especially new web users.

#### **2.5.6 Combination Top and Right Bar**

This navigation style is quite the same as the combination of top and right bar style, except that second group is placed on the right instead of the left of the web site.

# CHAPTER 3

## METHODOLOGY

### 3.1 Introduction

In this chapter, the methodology being used is further discussed. There are two main groups of methodologies, which are the system development life cycle (SDLC) methodology and the research methodology. The SDLC methodology that has been chosen is the Rapid Application Development (RAD) methodology followed by a qualitative research methodology for research.

### 3.2 Project Flow Chart

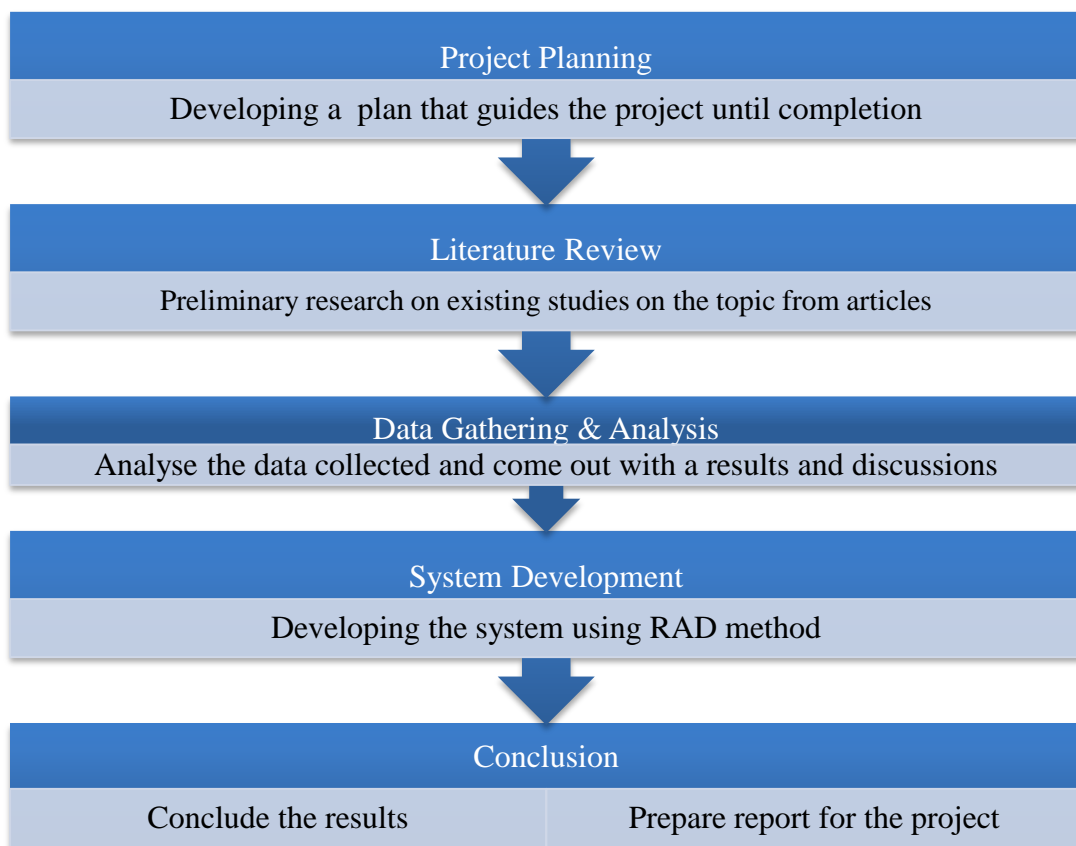


Figure 5: Flowchart

### 3.3 System Development Methodology

The main methodology that will be used is Rapid Application Development (RAD) method. This methodology is chosen due to time constrain of this project, that is approximately less than 10 months, which is very short. This project requires a rapid prototyping which will involves methods like iterative development and software prototyping. The benefits of using this methodology is that it allows any modifications to be made during the development phase if there is a need to review and recheck at any other phase of project development. This is important as it provides flexibility throughout completing the project such as debugging process. Under this methodology, the whole project will be divided into four main phase such as below:

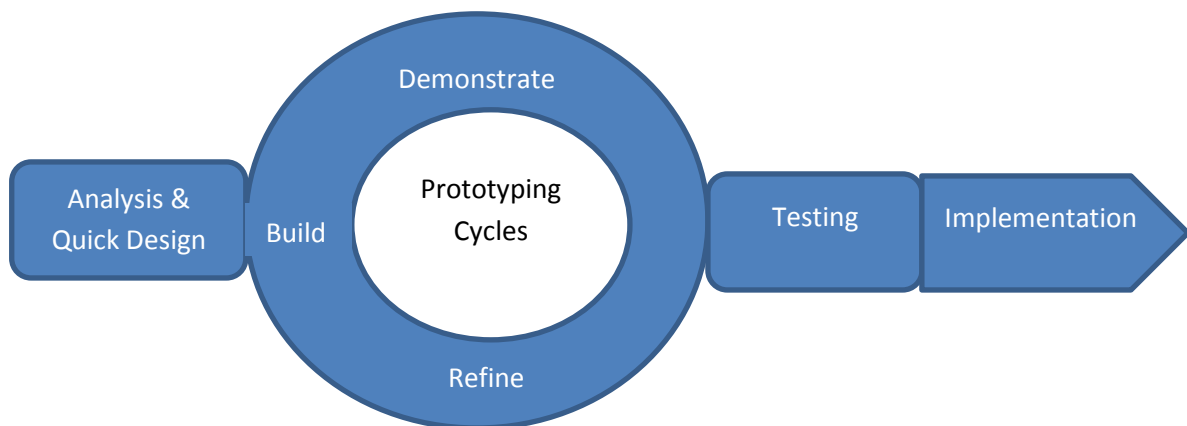


Figure 6: Rapid Application Development (RAD) structure

- Analysis and Quick Design Phase
- Prototyping Cycles (Building, Refining, and Demonstrating process)
- Testing Phase



In RAD model, the development is done concurrently for prototype and are integrated to make the complete product for faster product delivery. Since there is no detailed preplanning, it makes it easier to incorporate the changes within the development process. The activities of the project can be grouped into 4 main phases which is requirement gathering, prototyping, testing and deployment of the system.

### 3.3.1 Requirement Planning

The submission of project title with the endorsement of supervisor took place in week 2 of FYP 1. This is followed by a planning of schedule done by producing a Gantt chart and key milestones. The purpose of these deliverables are to ensure time is managed efficiently to complete the project. The Gantt chart and key milestone is shown in Table 3.1 and Table 3.2 respectively below.

#### 3.3.1.1 Gantt Chart and Key Milestone

No	Activities / Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>FYP 1</b>															
1	Requirement Planning Phase														
2	Identification of Problem	■	■												
3	Define Objective of the Project			■											
4	Defining Scope			■	■										
5	Preliminary Research					■	■	■	■						
6	Literature Review							■	■	■	■	■			
7	Selection of Tools											■			
8	Interim Report Submission												■	■	1
9	Proposal defense													■	■
<b>FYP 2</b>															
9	Prototyping Phase														
10	Define Functional Requirement	■	■												
11	Design Prototype			■	■										
12	Build Website				■	■	■	■	■	■	2				
13	Testing														
14	Field Testing								■	■	■				
15	Prototype Improvement									■	■	■	■	■	3
16	Deployment														
17	Viva														■



Process



Suggested Milestone

1	Key Milestone 1: Completed studies on navigation style
2	Key Milestone 2: Completed application development
3	Key Milestone 3: Completed development validation and verification

Table 1:Key Milestone

### 3.3.2 Prototyping Phase

Prototyping is becoming very popular as a software development model, as it enables to understand customer requirements at an early stage of development. It helps get valuable feedback from the customer to be used by developers in the development. The first step would involve understanding the very basics user requirements especially in terms of user interface. The more intricate details of the internal design and external aspects like performance and security will be ignored at this stage.

The initial prototype will then be developed in this stage, where the very basic requirements collected will be showcased along with user interfaces the user interface. These features may not exactly work in the same manner internally in the actual web site developed and the workarounds are used to give the same look and feel to the customer in the prototype developed

### 3.3.3 Testing Phase

In this phase, a field test will be conducted in Universiti Teknologi Petronas itself. Two identified main users of the web site which are the FYP coordinator and the students will be involved. They will be testing and evaluating the usability of the prototype and provide a direct feedback on the drawbacks and the improvement that can be done to enhance the device.

### 3.3.4 Deployment Phase

This is the final stage after conducting the usability testing, followed by corrective actions taken to improvise the prototype done, based on feedback received. The Online Document Management System will be ready to be made available for users.




### 3.4 Research Methodology

The research methodology that has been implemented is the qualitative research method which is effective for data collection purposes. Understanding the reason for each human action can be researched through qualitative method Englander (2012).

### 3.5 Development Tools

In this part, the tool used has been separated into two main parts which are hardware and software

Table 2 : Description of Software

Software	Description
Adobe Dreamweaver CS6 	<ul style="list-style-type: none"><li>• Acts as a platform to code/build the web site</li><li>• ColdFusion mark-up language, html, php</li></ul>
Adobe Photoshop CS6 	<ul style="list-style-type: none"><li>• Enables editing of pictures or images used in the development layout</li></ul>
Xampp 	<ul style="list-style-type: none"><li>• Creating database to be incorporated in the development.</li><li>• Allows manipulation of queries</li></ul>

## **Hardware**

The hardwares used to develop this project are:

- Server.
- Computers.
- Internet Connection.
- Printer

### **3.5 Data Collection**

This approach is used to gather information related to the study. Several methods were used for the collection of information, which includes interviews with the students and the meet-up with coordinator as well as some read-ups on existing studies. Data is collected in order to be further analysed to come up with the results of the research.

#### **3.6.1 Data Analysis**

Interviewing the students of Universiti Teknologi Petronas allows information gathering of the subject matter. Interviewing is one of the most widely used method as a source of information gathering when it comes to human scientific and behaviour research (Gill, Stewart, Treasure & Chadwick, 2008). Therefore, this method is chosen and used to analyse the web site-related problems commonly faced by students followed by interpretation of the data.

In order to gain information on which web site navigation styles deemed usable by students, data analysis phase takes place. This is done to interpret the received information systematically. The data recorded will be charted to obtain information of pattern or trend of the subject matter..

## CHAPTER 4

### RESULTS AND DISCUSSION

#### 4.1 Introduction

In this chapter, further discussion on the outcome of the research is done, including surveys and interviews.

#### 4.2 Interview

A total of 8 participants or students were assigned to all six web sites with different navigation styles. The participants were then asked to navigate through all six website to get an understanding of how those sites work. They were then given a set of navigation-related questionnaire that they were required to answer. Each participants were required to supply an answer by rating each website on a scale of 1 to 5 for respective criteria stated in the questions.

Here are samples of the rating questions:

1. Basic rating level ?
2. Satisfaction level ?
3. Basic motivation level?
4. Screen layouts helpful ?
5. Easiness in learning to operate the navigation?

In this survey, the summation of all ratings for all participants will be done and averaged. This is made possible by combining all questions and giving it equal weight. Then, the results per navigation style were statistically evaluated over all test persons. The output will be a calculation of mean total score for every navigation style and finished by the calculated construction of graphs of navigation style against question total score graph

## Mean Score of Navigation Styles

Table 3: Mean Score

Navigation Style	Mean Score
Tabbed	23.8
Top and Left	20.7
Top	19.2
Left	16.5
Top and Bottom	7
Top and Right	6.5

From the above table, it is clearly indicated that there is a substantial amount of preference over Tab navigation. Some of the participants said that are used to this kind of style as it is widely used. The second most preferred style is the combination of top and left bar, making the Top navigation bar in the third place. With a mean score of 16.5, left navigation style is more preferred than the combination of top and bottom. Participants stated that it was unnoticeable when the bar is located at the bottom of the page. The least preferred style is the combination of top and right style. This is intuitively because people are more used to the movement of left to right. The opposite of this would create a degree of awkwardness when navigating through the web site. Thus, tabbed style is used in the system

### Question 1

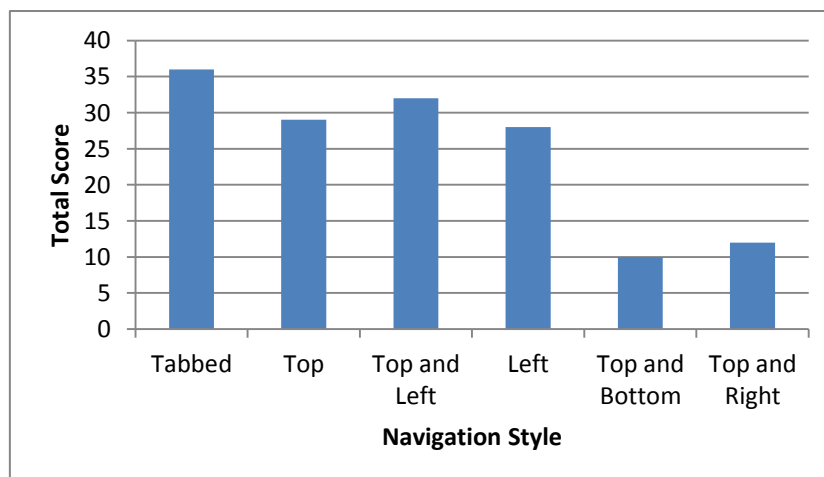


Figure 7: Motivation

Question 2

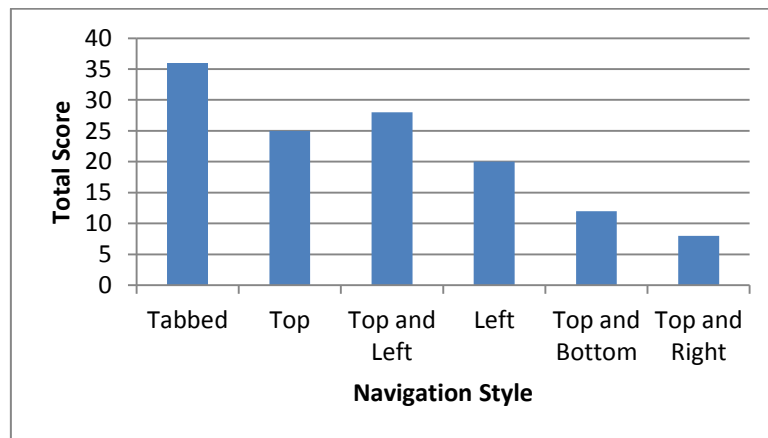


Figure 8: Learning

Question 3

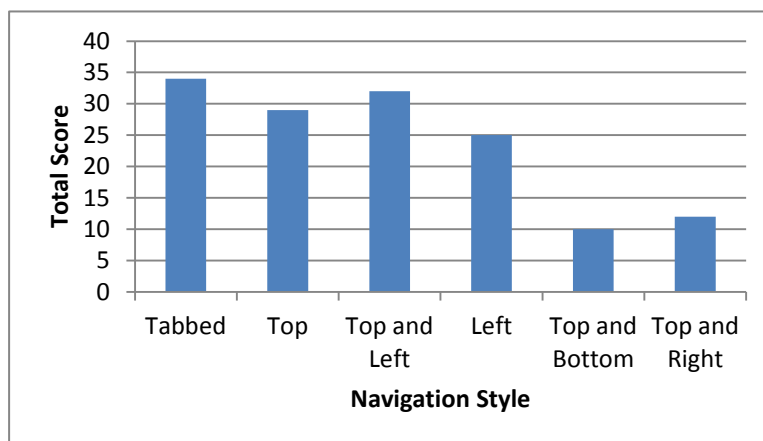
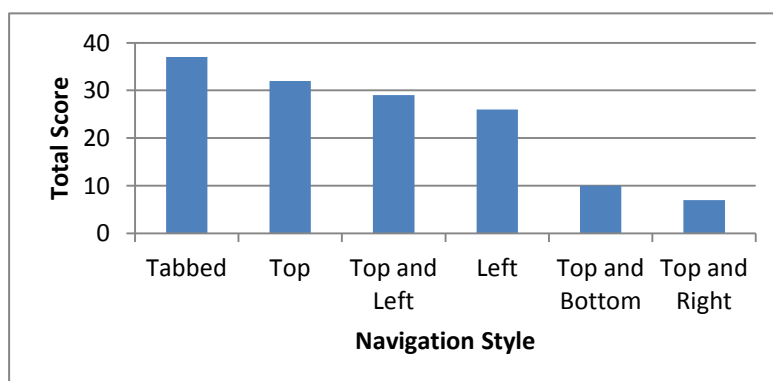


Figure 9: Screen Layout

Question 4



## Figure 10: Satisfaction

Finally, the question indicates statistically significant difference across navigational styles for each class. The results are presented in Figure 6, Figure 7 Figure8, Figure 9 and Figure 10. The results illustrate how the Tabbed style is at the highest rank in all distinctive criteria. Its superiority can be seen clearly when it comes to learning and applying but not so much when it comes to motivation. The Tabbed navigation style is most likely liked because it is more common, thus making it easily understood and learned. When it comes to the combination of top and bottom style, it can be seen that participants like it less in every criteria. The left bar on the other hand to certain extent lack in motivation and screen layout as opposed to Top Bar which is rated higher.

Top and Left Bar seems to be scoring quite well in a lot of criteria but it requires a little more effort to be used to compared to the Tabbed navigation style. So evidently, tabbed navigation is generally accepted as the navigation style with the highest degree of usability at the time being.



## 4.3 System Design

### 4.3.1 Architectural Design

#### Flowchart (Student)

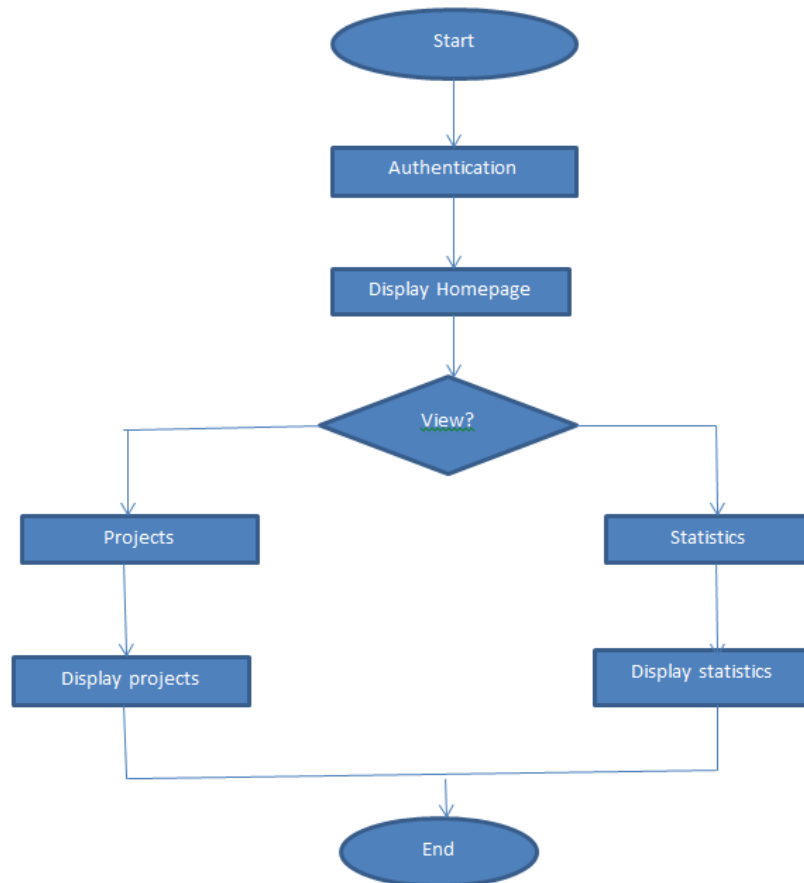
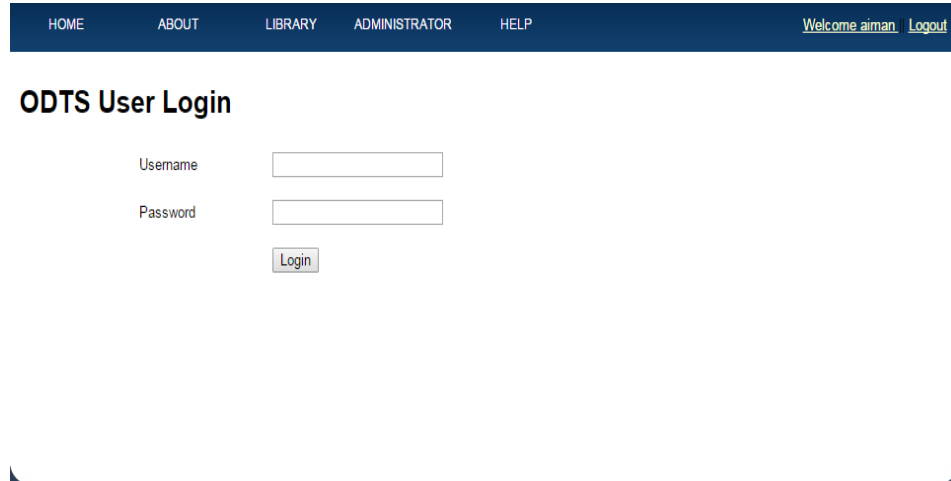


Figure11: System Flowchart

## 4.3.2 Interface Design

### Main Index (Homepage)



HOME ABOUT LIBRARY ADMINISTRATOR HELP Welcome aiman Logout

### ODTS User Login

Username

Password

Login

Figure 12:Screenshot of User Login

The main index portal is the centralized access for all users to connect or access the Online Document Tracking System. Below are the generic functions for the main index portal:

- User Login

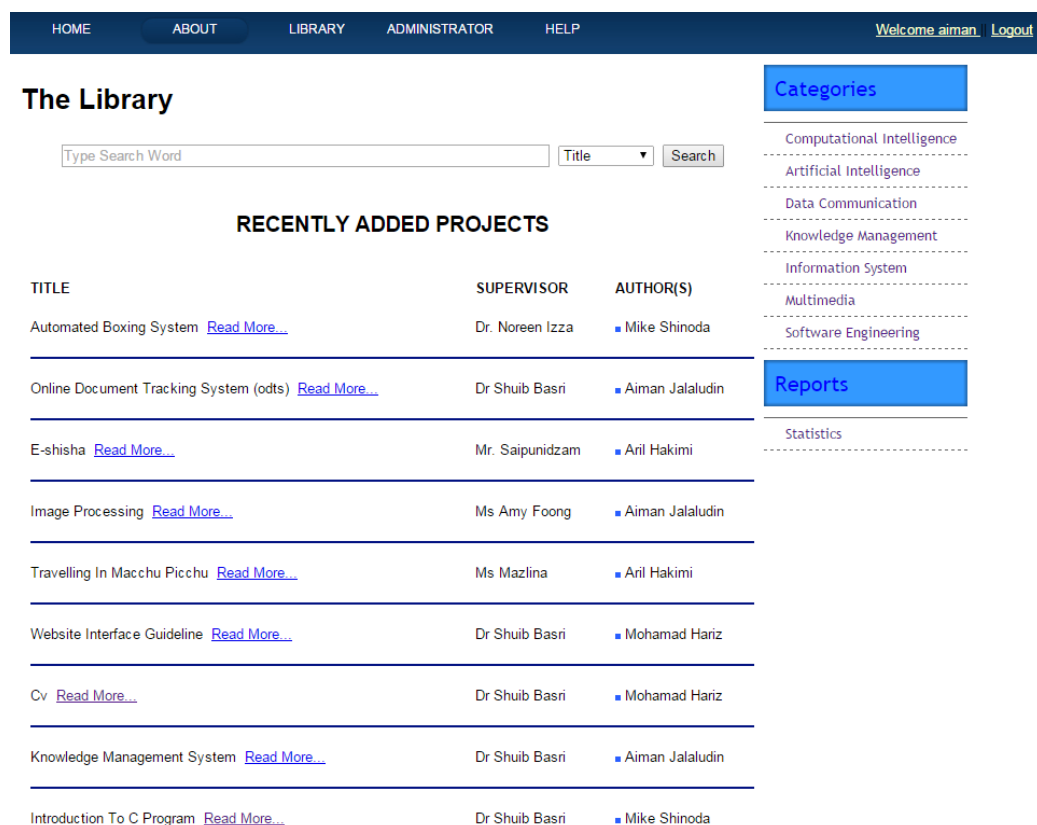
User login will enable authorized personnel to access main home page. Normal users will be directed to pages that are only set for them while admin users will be directed to a page with administrative functions.

## About

This tab directs users to a page where a brief description of the website is included. The purpose is for students to understand what this website is all about.

## Library

When clicking the tab, the users will be able to search the entire database by two ways. The first way is by a search box where users will be able to filter according to title, author, category, and supervisor. The second way is through the “Categories” side link where a list comprising of different categories are shown. Search mechanism provided provides users a customized view of the projects.



The screenshot shows the Library page with a dark blue header containing navigation links: HOME, ABOUT, LIBRARY, ADMINISTRATOR, HELP, and a user greeting: Welcome\_aiman | Logout. The main content area is titled "The Library" and features a search bar with the placeholder "Type Search Word", a dropdown menu set to "Title", and a "Search" button. Below the search bar is a section titled "RECENTLY ADDED PROJECTS" containing a table with three columns: TITLE, SUPERVISOR, and AUTHOR(S). The table lists ten projects, each with a "Read More..." link. To the right of the table is a sidebar with a "Categories" section listing: Computational Intelligence, Artificial Intelligence, Data Communication, Knowledge Management, Information System, Multimedia, and Software Engineering. Below the categories is a "Reports" section with a "Statistics" link.

TITLE	SUPERVISOR	AUTHOR(S)
Automated Boxing System <a href="#">Read More...</a>	Dr. Noreen Izza	■ Mike Shinoda
Online Document Tracking System (odts) <a href="#">Read More...</a>	Dr Shuib Basri	■ Aiman Jalaludin
E-shisha <a href="#">Read More...</a>	Mr. Saipunidzam	■ Aril Hakimi
Image Processing <a href="#">Read More...</a>	Ms Amy Foong	■ Aiman Jalaludin
Travelling In Macchu Picchu <a href="#">Read More...</a>	Ms Mazlina	■ Aril Hakimi
Website Interface Guideline <a href="#">Read More...</a>	Dr Shuib Basri	■ Mohamad Hariz
Cv <a href="#">Read More...</a>	Dr Shuib Basri	■ Mohamad Hariz
Knowledge Management System <a href="#">Read More...</a>	Dr Shuib Basri	■ Aiman Jalaludin
Introduction To C Program <a href="#">Read More...</a>	Dr Shuib Basri	■ Mike Shinoda

Figure 13: Screenshot of Library

## Administrator Main Portal

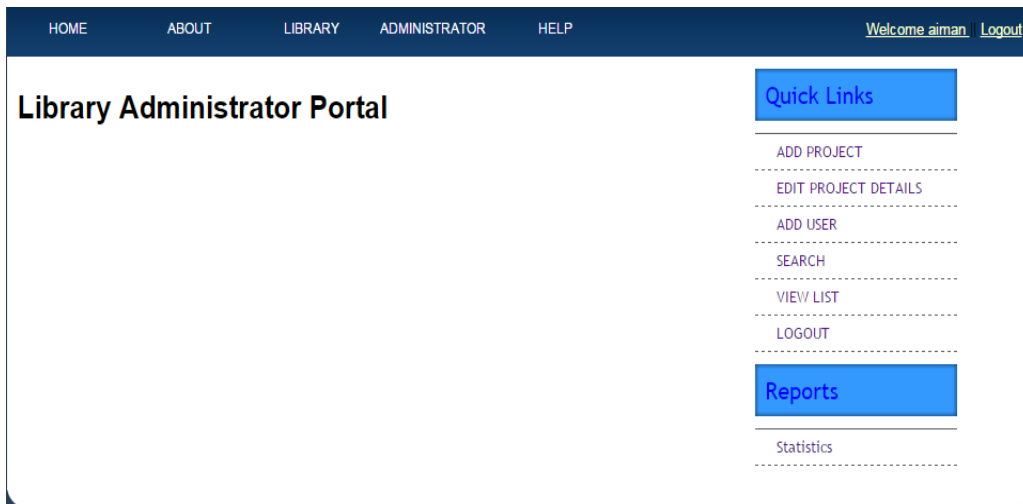


Figure 14: Screenshot of Administrator Portal

The administrator main portal will be the access point for the administrative staff where it comprises all information regarding the Online Document Tracking System that are only accessible by the staff that has been authorized by the department. Below are the tailored functions that can be accessed by the administrative staff:

1. Logout for Online Document Tracking System

The logout function is located at the right top and “quick links” of the web portal where when the staff has finished all the work they can logout from the system for security purposes.

2. Add Project

This link is located in the “Quick Links” where when clicked, administrator will be able to add a project property or the project itself.

- Add Project

The add project page will have a form that needs to be filled by the administrator to store a particular project. The project softcopy can only be uploaded in the format of pdf.

The screenshot shows the 'Library Administrator Portal' interface. At the top, there is a dark blue navigation bar with links for HOME, ABOUT, LIBRARY, ADMINISTRATOR, and HELP. On the right side of the bar, it says 'Welcome aiman' and 'Logout'. Below the navigation bar, there is a 'Quick Links' section with a blue header and a list of links: ADD PROJECT, EDIT PROJECT DETAILS, ADD USER, SEARCH, VIEW LIST, and LOGOUT. The main content area is titled 'Library Administrator Portal' and contains a form with the heading 'FILL PROPERLY'. The form fields are: Title (text input), Author (dropdown menu with 'UNKNOWN' selected), Category (dropdown menu with 'UNKNOWN' selected), Supervisor (dropdown menu with 'Dr Shuib Basri' selected), and Book Copy (file upload button labeled 'Choose File' with the text 'No file chosen (PDF Document only)'). At the bottom of the form are 'Save' and 'Reset' buttons. There is also a link 'previous page || admin' in the top right area of the form.

Figure 15: Screenshot of Add Project

- Project Property

In the project property page includes properties such as author's name, category and supervisors name. Administrator will need to check in the provided drop box whether a particular property value is already registered before adding a new one to avoid duplication.

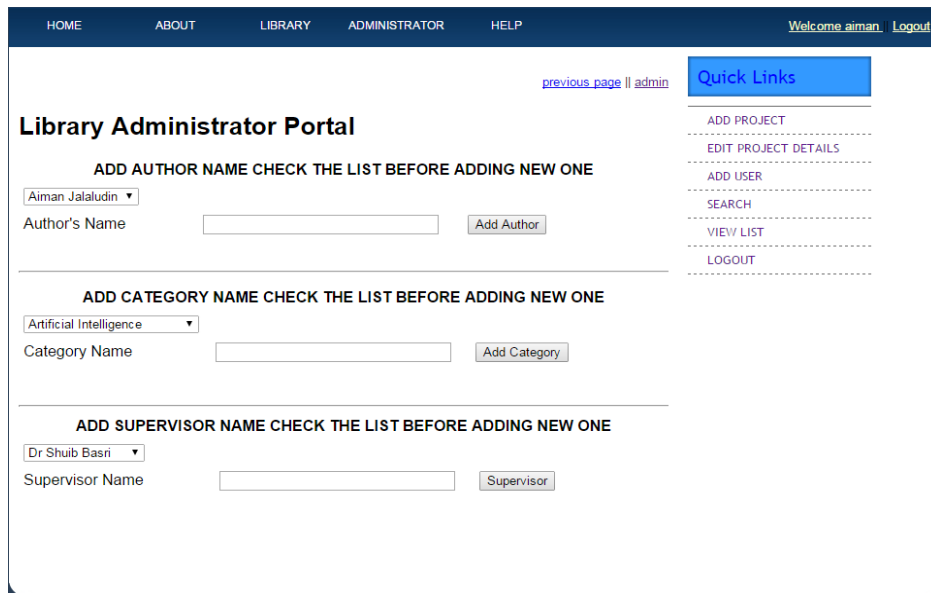


Figure 16: Screenshot of Add Property

### Edit Project Details

This button which is located in the “Quick Links” will allow the administrator to choose, edit/modify and delete the details of the added projects and the project properties (author’s name, supervisors name and category) that were earlier registered in the system.

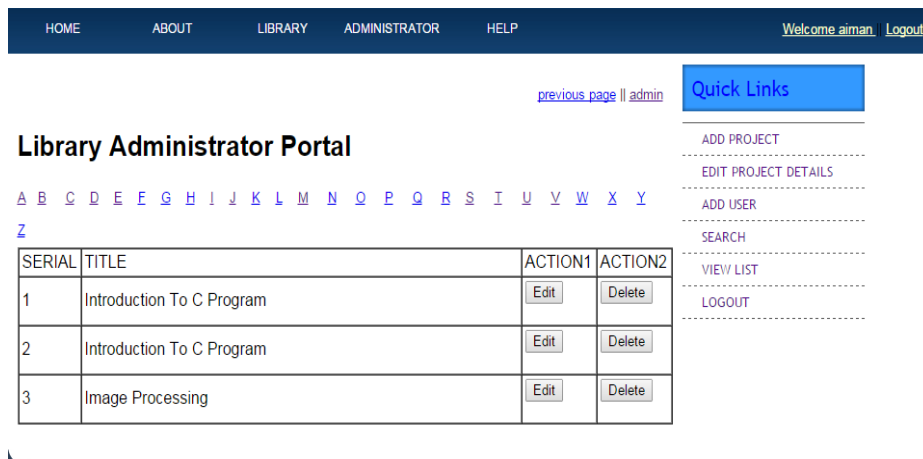
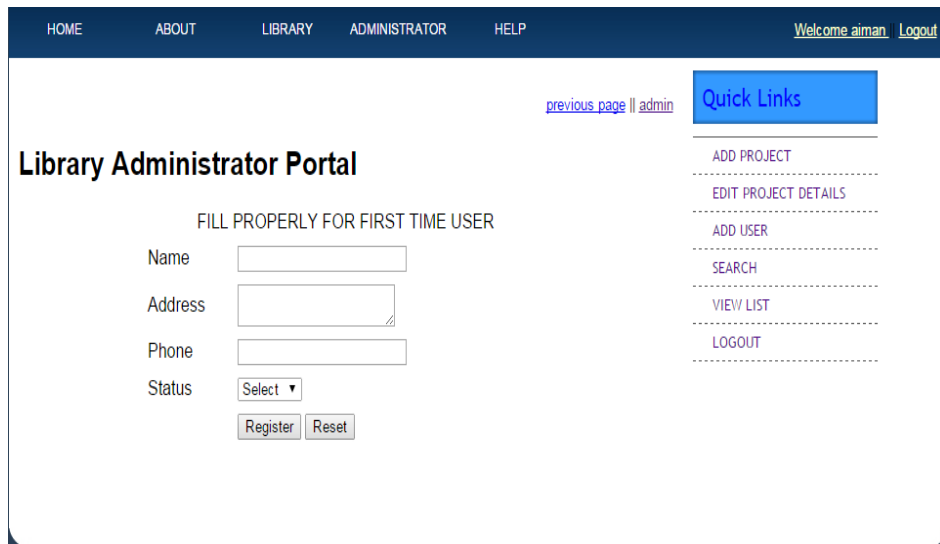


Figure 17 : Screenshot of Edit Project Details

## Add User

This button located in the “Quick Links” will direct the administrator to a page where a form of required personal information needs to be filled in in order to register a new user for the system.



The screenshot shows the 'Library Administrator Portal' interface. At the top, there is a navigation bar with links for HOME, ABOUT, LIBRARY, ADMINISTRATOR, and HELP. On the right side of the navigation bar, it says 'Welcome aiman' and 'Logout'. Below the navigation bar, there is a 'Quick Links' section with a blue header. The links listed are: ADD PROJECT, EDIT PROJECT DETAILS, ADD USER, SEARCH, VIEW LIST, and LOGOUT. The main content area is titled 'Library Administrator Portal' and contains a form for adding a new user. The form has the instruction 'FILL PROPERLY FOR FIRST TIME USER' and includes fields for Name, Address, Phone, and Status. The Status field is a dropdown menu with 'Select' as the current selection. Below the form fields are 'Register' and 'Reset' buttons. There is also a 'previous page || admin' link in the top right corner of the main content area.

Figure 18: Screenshot of Add User

## View List

In addition to search ability, this view function allows the administrator to view information related to author, supervisor and category but in a more customized manner (by alphabet) without the need to enter keyword (normal search box) which in turn speeds up the retrieval process.

The screenshot displays the 'Library Administrator Portal'. At the top, there is a navigation bar with links for HOME, ABOUT, LIBRARY, ADMINISTRATOR, and HELP. On the right side of the navigation bar, it says 'Welcome aiman' and 'Logout'. Below the navigation bar, there is a 'previous page || admin' link and a 'Quick Links' button. The main content area is titled 'Library Administrator Portal' and features an alphabetical index (A-Z). Below the index is a table with the following data:

SERIAL	PROJECT TITLE	AUTHOR NAME	SUPERVISOR
1	Introduction To C Program	Mike Shinoda	Dr Shuib Basri
2	Introduction To C Program	Mike Shinoda	Dr Shuib Basri
3	Cv	Mohamad Hariz	Dr Shuib Basri
4	Knowledge Management System	Aiman Jalaludin	Dr Shuib Basri
5	Fundamental Of Information System	Mike Shinoda	Dr Shuib Basri
6	Website Interface Guideline	Mohamad Hariz	Dr Shuib Basri
7	Online Document Tracking System (odts)	Aiman Jalaludin	Dr Shuib Basri
8	Automated Boxing System	Mike Shinoda	Dr. Noreen Izza
9	Coffee Maker	Mohamad Hariz	Dr. Izzatddin
10	E-mariboro	Anil Hakimi	Dr. Jafreezal

On the right side of the page, there is a 'Quick Links' menu with the following options: ADD PROJECT, EDIT PROJECT DETAILS, ADD USER, SEARCH, VIEW LIST, and LOGOUT.

Figure 19: Screenshot of View List

### Statistics (Artificial Intelligence)

By clicking on “Statistics” which is located in the bottom side link, users are able to view the statistical information of the numbers of projects being submitted under each category (research cluster). Through pattern and trend, these statistical information would be useful for the administrator to estimate the allocation of supervisors in the coming semester. Student on the other hand would be more well-informed on the areas that have not been explored yet, thus assisting them in decision making.



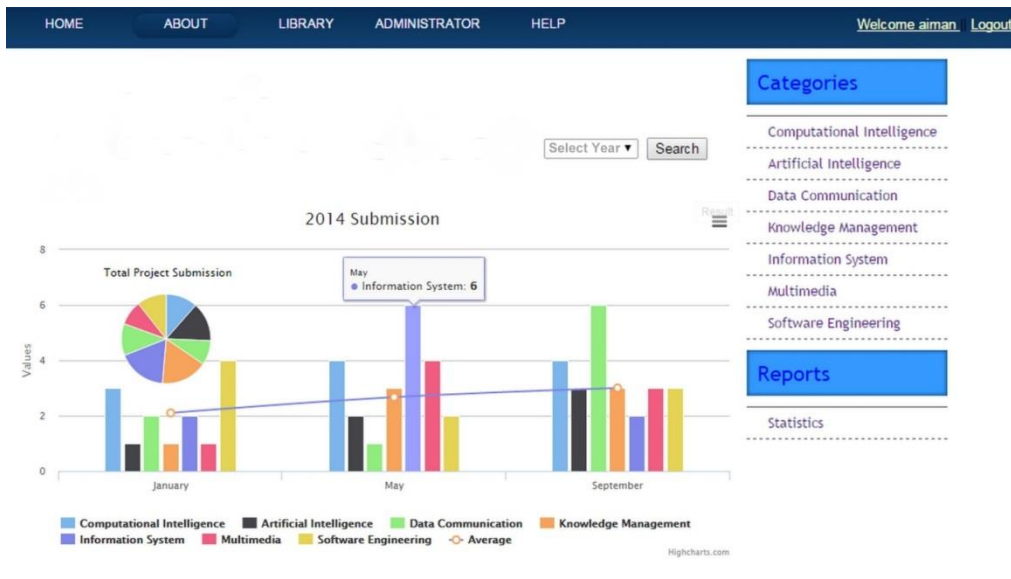


Figure 20: Screenshot of Statistics

## Help

Should users have any inquiries, this tab will direct them to a page where they are able to submit questions to the administrator for clarifications.



Figure 21: Screenshot of Help

#### 4.4 Usability Testing

The usability aspects of this application were measured using System Usability Scale. This test requires the users/participants to fill up a questionnaire after using the system. The users are required to answer each question/item by choosing from a 5 point scale ranging from “Strongly agree” to “Strongly disagree”. The results and analysis from the test are shown below.

Question 1: I think I would like to use this system

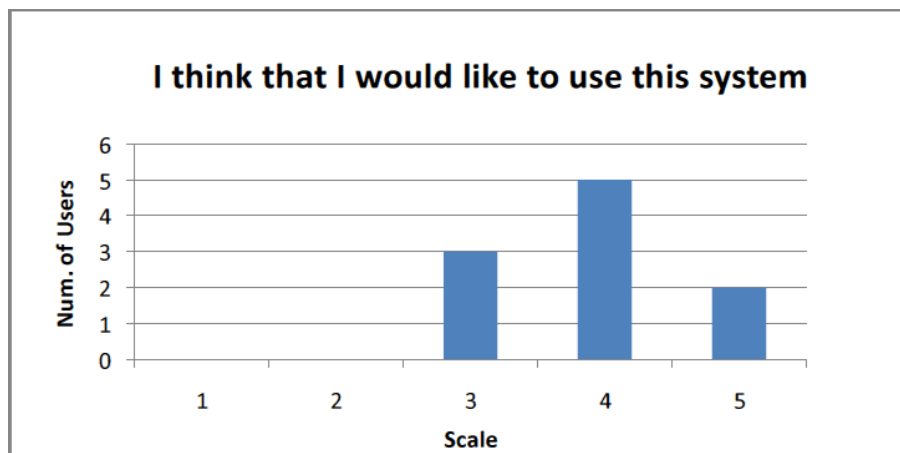


Figure 22: Results of Question 1

The figure above shows the result for the first question. The question asked whether user would like to use the system (application). The result shows that two users rated scale 3, five user rated scale 4, and three user rated scale 5. This shows that 80% of the users agree that they would like to use the application.

Question 2: I found the system unnecessarily complex

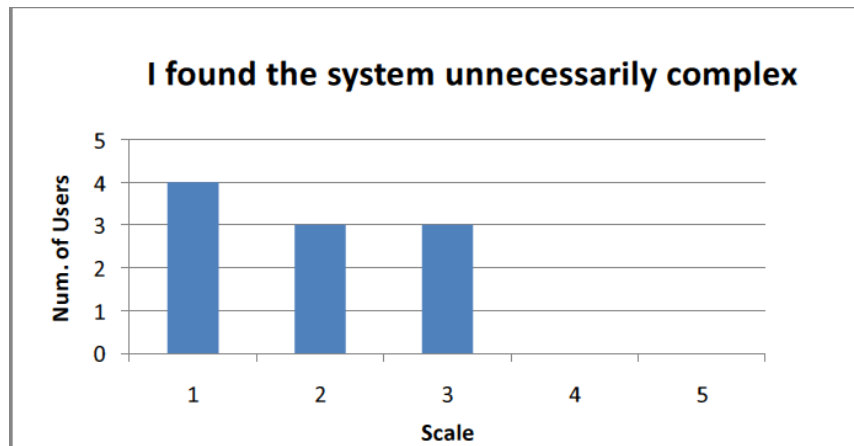


Figure 23: Results of Question 2

The second question asked the user if they find the system to be unnecessarily complex. The result shows that four users chose scale 1, three users chose scale 2 and three users chose scale 3. None of the users chose scale 4 or scale 5. This shows that most of the users do not think that the application is unnecessarily complex, while there can still be room for improvement on system (application) complexity.

Question 3: I thought the system was easy to use

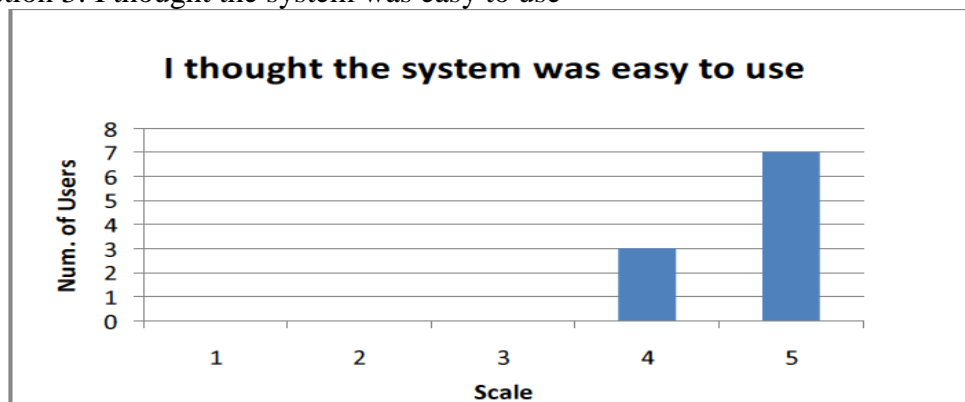


Figure 24: Results of Question 3

The third question in the SUS testing asked the user if they thought that the system (application) was easy to use. Seven of the users rated 5 on the scale, and the remaining three users rated scale 4. This shows that the users think that the application was very easy to use.

Question 4: I think that I would need the support of a technical person to be able to use this system.

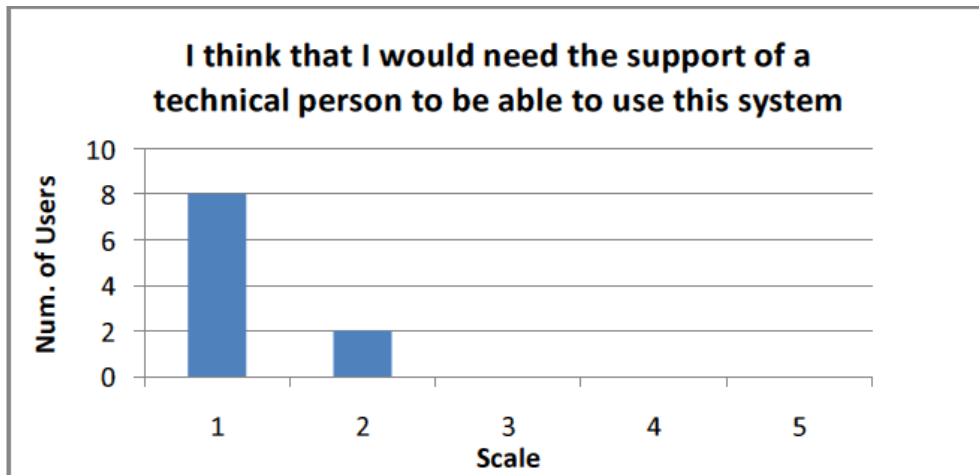


Figure 25: Results of Question 4

The fourth question asked if the users think that they would require support and assistance from a technical person. The result shows that eight of the users chose scale 1, while the remaining two users chose scale 2. This shows that the users did not quite need any assistance from any technical person to use the application.

Question 5: I found the various functions in this system well-integrated

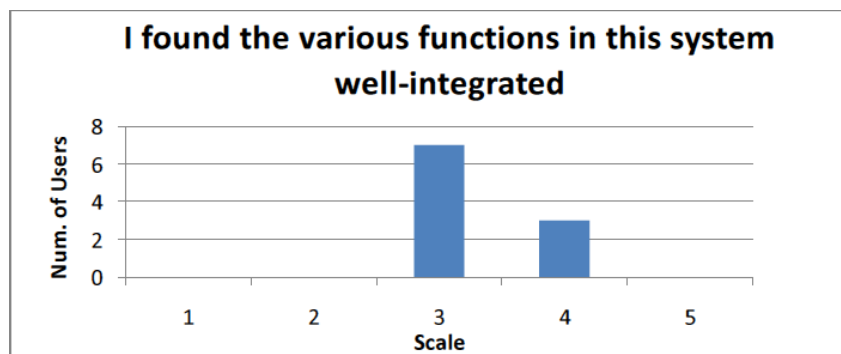


Figure 26: Results of Question 5

The fifth question asked if the users find that the various functionalities in the system (application) are well-integrated. The result shows the seven of the users chose scale 3 as their answer, while the remaining three users chose scale 4. This shows the functionalities inside the application can be integrated better.

Question 6: I thought there was too much inconsistency in this system

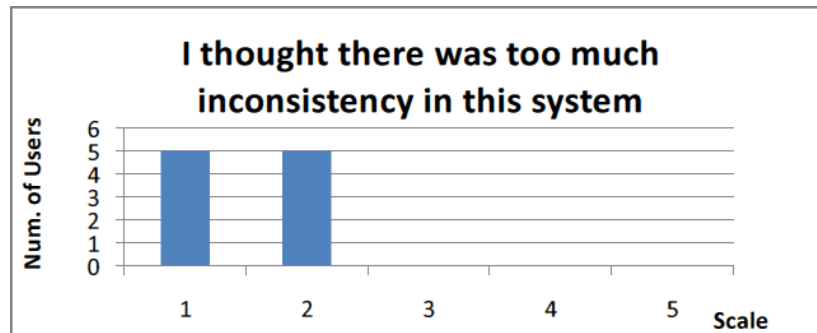


Figure 27: Results of Question 6

The sixth question in the SUS testing asked if the user thought that there was too much inconsistency in the system (application). 50% of the users, which comprises five person, chose scale 1 while the remaining 50% chose scale 2. This shows that not half of the users thinks that the consistency in the application is good, while the rest thinks there are some inconsistency.

Question 7: I would imagine that most people would learn to use the system very quickly.

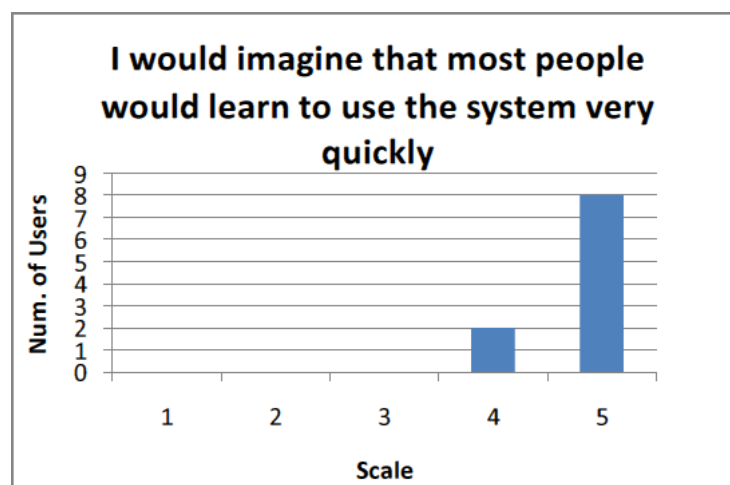


Figure 28: Results of Question 7

The seventh question asked the users if they would imagine if other users would learn to use the system (application) very quickly. The result shows that eight users chose scale 5, and the remaining two users chose scale 4. This indicates that almost all of the users think that other people will learn to use the application quickly.

Question 8 : I found the system very cumbersome to use

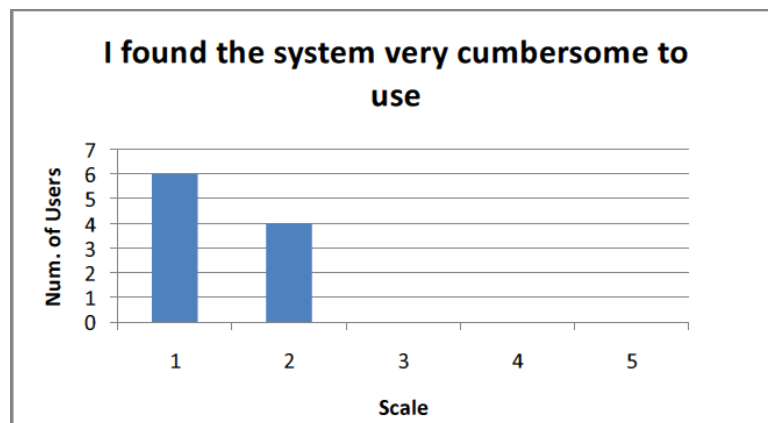


Figure 29: Results of Question 8

The eighth question asked if the users find the application to be very cumbersome to use. The result shows that six of the user rated scale 1 and another four users rated scale 2 as their answer. This shows that over half of the users think that the users think that the application is not at all cumbersome to use.

Question 9: I felt confident using the system

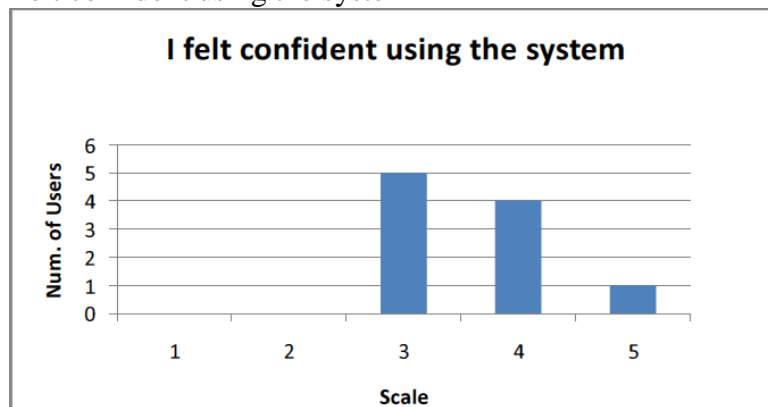


Figure 30: Results of Question 9

The ninth question asked the user if they were confident when they were using the system (application). The result shows that five users scored scale 3 as their answer, four users scored scale 4, and one user chose scale 5. This shows that not all the users felt confident in navigating through the system.

Question 10: I needed to learn a lot of things before I could get going with this System

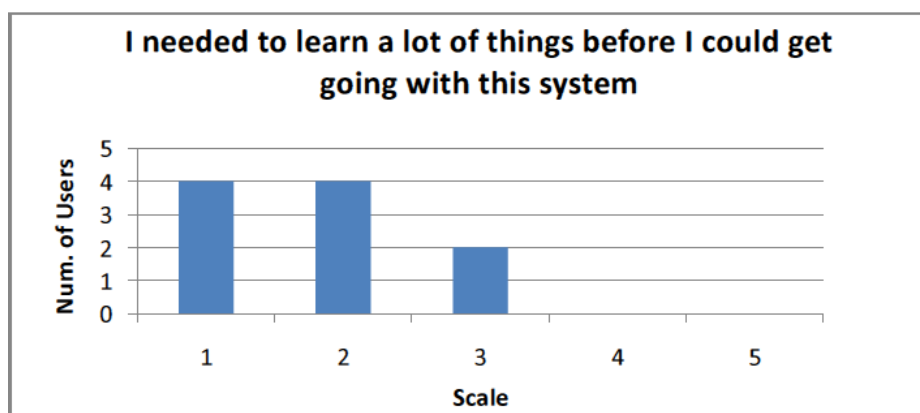


Figure 31: Results of Question 10

The last question asked if the user think that they need to learn a lot of things before they could go on with the system (application). The results show that four of the users selected scale 1, another four selected scale 2, and the remaining two users selected scale 3. This indicates that some of the users still think that they have to learn a lot of things before they could get going with the system (application).

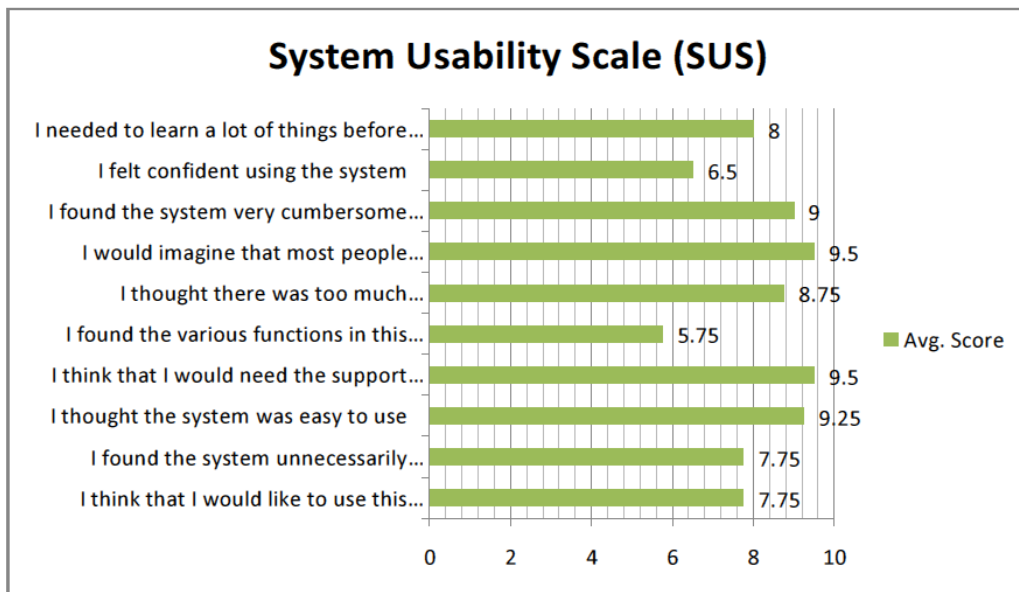


Figure 32: System Usability Scale (SUS)

The figure above shows the average score for each of the question, from a total of ten users. The calculation to obtain average scores for odd-numbered (1, 3, 5, 7, and 9) questions differ from the average scores for the even-numbered (2, 4, 6, 8, and 10) questions. This is because question 1, 3, 5, 7 and 9 expect users to rate more towards the higher side of the scale (3 – 5) to achieve better usability rating, while question 2, 4, 6, 8 and 10 expect the opposites.

The formulas to obtain the average scores for the questions as follows:

Odd-numbered questions

$$\text{Average score} = (\text{Scale position} - 1) * 2.5 / \text{number of users}$$

Even-numbered questions

$$\text{Average score} = (5 - \text{scale position}) * 2.5 / \text{number of users}$$

The System Usability Scale (SUS) score of Online Document Tracking System (ODTS) from the ten users is the sum of the average score of all the questions.



$$\begin{aligned} \text{SUS} &= 7.75 + 7.75 + 9.25 + 9.50 + 5.75 + 8.75 + 9.50 + 9.00 + 6.50 + 8.00 \\ &= 81.75 \end{aligned}$$

An SUS score of above 80 is considered as attaining grade “A” in the usability aspect. The average score of the application showed that development process have been carefully done with regards to the usability aspect. Another reason for this high usability quality of the application is to accommodate the target users of this application, which are STUDENTS OF UTP. It is crucial that an application is easy to use and provide no burden for the users who are using it.

## **CHAPTER 5**

### **CONCLUSION AND RECCOMENDATION**

#### **5.1 Summary**

The Online Document Tracking System (ODTS) development has met its objectives by successfully delivering those requirement defined earlier in the planning stage. By putting the system into use, the CIS department would be able to significantly improve its business process through minimal energy and time consumption that are resulted from the automated system. The improved control over the FYP documents could be translated into high productivity as needed resources are made accessible anywhere regardless of location

Through the implementation of the system, the university is able to conduct its educational processes as effective and efficient as possible.

#### **5.2 Recommendations**

There are still a lot of extensive research and analysis need to be done for the project from the reading materials and source code in order to get best output which involve both the documentation of the project and also the progress of the system development such as the system interfaces and database. Here is it is necessary for the authors to look up into comprehensive research and how the system should look like and how it is going to be implemented in UTP as well as meeting up with the standard that is has been set.

Following are the recommendations that can be further added into the system:

#### 1. Artificial Intelligence Mechanism

Automated processing is considered as a form of artificial intelligence function that can be added in the system. It is really important as it improves decision-making ability. For the time being, the system only has the statistical function that serves this purpose. In future, more of artificial intelligence function such as plagiarism detection that compares those projects submitted against those already registered in the database.

#### 2. Smartphone Compatibility

It is really important for a website to be engineered to be compatible to smartphones especially when it comes to layout. A website built for a desktop need to be tailored by simplification and in accordance to smartphones resolution in order for it to have high usability for users.

## **CHAPTER 6**

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## Appendices

System Usability Scale © Digital Equipment Corporation, 1986.

1. I think that I would like to use this system frequently

strongly disagree strongly agree

--	--	--	--	--

1      2      3      4      5

2. I found the system unnecessarily complex

strongly disagree strongly agree

--	--	--	--	--

1      2      3      4      5

3. I thought the system was easy to use

strongly disagree strongly agree

--	--	--	--	--

1      2      3      4      5

4. I think that I would need the support of a technical person to be able to use this system

strongly disagree strongly agree

--	--	--	--	--

1      2      3      4      5

5. I found the various functions in this system were well integrated

strongly disagree strongly agree

--	--	--	--	--

1      2      3      4      5

6. I thought there was too much inconsistency in this system

strongly disagree strongly agree

--	--	--	--	--

1      2      3      4      5

7. I would imagine that most people would learn to use this system very quickly

strongly disagree strongly agree

--	--	--	--	--

1      2      3      4      5

8. I found the system very cumbersome to use

strongly disagree strongly agree

--	--	--	--	--

1      2      3      4      5

9. I felt very confident using the system

strongly disagree strongly agree

--	--	--	--	--

1      2      3      4      5

10. I needed to learn a lot of things before I could get going with this system

strongly disagree strongly agree

--	--	--	--	--

1      2      3      4      5