

**Virtual 3D Map for Library User.  
(vSearch)**

**by**

**Nurhafizah bte Sharif**

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

**JULY 2006**

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- 1) Computer graphics
- 2) Three-dimensional display systems

**CERTIFICATION OF APPROVAL**

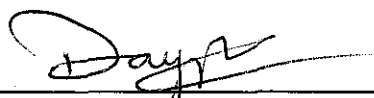
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Approved By,



Dr. Dayang Rohaya Awang Rambli

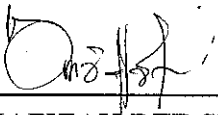
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JULY 2006

## 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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NURHAFIZAH BTE SHARIF

## ABSTRACT

*This report describes the architecture and preliminary design of a prototype system to enhance services/tasks of the current online digital library system through the integration of virtual 3d map. The aim for a virtual map is to further assist the end user on location a book's physical location in the library. Customarily, an online catalogue search for books/journals/magazine would provide the user with details of the books/journals/magazines including information on books' locations; none have shown the user how to get to the exact location visually. This capability only can be done by integrating a virtual 3D map into a simulation of current online system. The main purpose of adding the virtual element is to provide the user with the interactive virtual environment that can help user navigate through the library environment to find desired location. Instead of knowing where the material location is, user also will get to know how to get 'there' and which path can aid the user to get 'there'. An initial survey has been done on library users' reveals that locating the library material takes up much of their time. A virtual 3d map was proposed to be incorporated into the system to reduce the amount of time to acquire the library material. Modeling the virtual 3D map into current online system will make for an extremely useful resource. User will be able to access the 3D map as a Flash application via the online system. This will allow users to easily locate specific material within the actual library, to determine the best way to get to a location and possibly to get suggestions on what route to take. The major challenge of the design is the integration of a simulated database of the current system to the virtual 3D map applications. Other enhancements done in current library includes a more user friendly interface.*

**Keywords :** vSearch, virtual navigation, navigation aids

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# **CHAPTER 1**

## **INTRODUCTION**

### **1.0 INTRODUCTION**

#### **1.1 Background of Study**

Virtual Reality is a powerful user interface technology that incorporates the users' environment with computer generated entities. It is composed of interactive computer simulations that incorporate the user's sense of position and giving the user feeling of being mentally immersed or present in the simulation. The virtual reality blends the real and virtual environment within a real environment, interactive and registered in 3D.

The rapid development of virtual technologies opens the opportunities for new direction in implementing the virtual reality in library system. Many ways can be done in incorporating the virtual reality into library system, for example in web-based virtual libraries; user can either get an overview of the context or focus on the single item located in the library. It is because the virtual library offers a lot of information by nature and allows it user to navigate or having the walkthrough experience inside the library environment.

This project was planned to be developed using virtual reality for many reasons. First, it contains complex three-dimensional geometries that the user must be able to gain an adequate understanding of. Second, the simulation of a route through the library environment is realistic in order to train the user to find his or her way along that path in reality. Third, a virtual model is much more effective than two-dimensional maps for demonstrating navigation through an area and communicating the actual appearance of the route.

Finally, a virtual prototype is necessary in order to really envision what effect proposed renovations will have on the area and to explore various alternatives for construction. To implement virtual reality inside the library system usually requires large powerful computers and this has been a significant restriction on its availability. However, the increasing power of PCs now means that virtual reality has reached the point where ordinary PCs can be used. Here in this project, the implementation of virtual reality will not cover for the whole library; it will only be used to simulate a real-like environment of library bookshelves to aid the user in finding the path way to the intended bookshelf. For this project, the tasks include the development of a web based system for simulating the Online Book's Catalogue (OPAC) and creating the library environment to be included inside the OPAC.

## **1.2 Problem Statement**

### **1.2.1 Problem Identification**

Currently, Information Resource Center (IRC) does provide its user with this OPAC service. This service already helps user a lot especially in finding the desired material or books by simply entering the keywords of the book's title or author. Then the system will display all the data that are related to the keyword including the location of the material or books. User need to jot down the location number or the book in order to get it from the shelves. However, the instruction and explanation provided by the IRC is not sufficient to help the user to locate the searched materials. In current scenario, there will be given the call number or the location code (e.g. 'TK 5015.586.B44 2000') to indicate the location of each book. There is no such explanation provided to show what this code is stand for and to which area this code were to represent. This may confuse the users when locating books because they do not know which part of the code they have to refer for.

Furthermore, here in Universiti Teknologi PETRONAS (UTP) there are more than 20 rows of bookshelves in the IRC and each row of bookshelves consist of five levels and each level consists of seven to eight mini shelves. Due to this complicated arrangement of the bookshelves, it makes it hard for user to find the physical location or to locate the location of book even though they were given the 'call

number' or the location code for each book or material. User has to walkthrough row by row and level by level to locate the bookshelf stated on the call number or location code and find its physical location.

In addition, there is no map or instruction given by the OPAC and IRC on how to locate the searched material visually. Moreover, the sign located at each bookshelf is too small and it can't be seen from the ground floor and again user has to search the bookshelf one by one. Worst scenario is when some of the library user give up on finding the books and use the internet as another alternative way to gain the resources or content material.

All these stated problems above burdened the IRC user in finding books and searched material. Due to complicated design and improper instruction given, user has to spend their time just only for locating book. Therefore, some improvements need to be identified in order to enhance the performance of the IRC's services.

### **1.2.2 Significance of the Project**

This project has two main target groups. The first one comprises visitors to the library who are not familiar with the building. This group may also include students and staff who have to find and use a certain facility in the library for the first time. The same is true for new students who are just being introduced to the environment of the library. The second group includes students and staff who already have a general knowledge about getting around in the building but do not know where exactly the material or facility is located. This application will allow user to remotely explore the existence of the searched material and the location of the materials inside the library. In addition, this virtual 3D map application (vSearch) will enable users to find their way to the specified location.

Modeling the library environment in 3D will make for an extremely useful resource. Students and visitors alike will be able to access the 3D model as a Flash application via the simulated OPAC. This will allow users to easily locate specific materials within the library, to determine the best way to get to a location and possibly to get suggestions on what route to take. Since users will be able to view all of this information in 3D, they will gain a very intuitive understanding of the locations that they are interested in.

### **1.3 Objective and Scope of Study**

#### **1.3.1 Main Objectives**

- To investigate and simulating the effective way of reducing the location problem by implementing the virtual search simulation of the OPAC. It also includes with the insertion of virtual reality elements inside the web page to make the virtual search look like similar environment in the library.
- To successfully aid the user to find the physical location of a book in actual environment by using the new enhanced additional services inside the simulated OPAC.
- To enhance the interface of the current OPAC by adding the instruction or explanation this is necessary to the simulated OPAC and at the same time to give the satisfaction of the end user of using this application.

#### **1.3.2 Scope of Study**

The scope of study of this project will only focus on simulating search and retrieval application that helps a library's visitor to locate a physical location of books in the library bookshelves. The implementation of the simulation will cover only the searching function not including other functions that are available inside the current library's website. The searching function will be used to simulate the OPAC in order to retrieve the information from the simulated database. Then, these data

will be used by the virtual scene inside the simulated OPAC to aid the user to find the correct location as stated in database.

The project is neither creating the digital library nor providing the virtual walkthrough inside the library. This project will only focus on simulating the virtual search for the library which helps the user to locate a desired book or its designated place inside the library. The application will maintain the model of library's shelves and the position of the books within the shelves. The virtual reality elements will be used to create library environment to give the realism to the end user. However, it will not cover the whole environment of the library; it will be used to model the bookshelves of the library.

User is interacting with this application via a user interface presented on the simulated OPAC. First, one of the search options like searching by title or author must be selected. A list of books matching the search is returned and displayed. The user then selects the book the user is looking for and then the system will aid the user in finding the book.

The study also focuses on attending the questionnaires that were disseminated among the UTP's residents to collect their opinion about the current library's services and performance. Based on information collected, discussion and results will be made to conclude the findings of this project.

### **1.3.3 Limitations of the Project**

There is however some limitations to this project, some of them already mentioned in previous paragraphs. A summarized list of limitations of this project as it follows:

- Single user experience -- Only one participant per session on a single desktop system.
- Not a fully immersive system -- This project is a desktop based system since fully immersive display is not currently available for the development of the project.

- The scope of virtual map – This project would only focus on simulating the virtual search for the library which helps the user to locate a desired book or its designated place in the library bookshelves. The application will maintain the model of library's shelves and the position of the books within the shelves.
- The scope of search engine - This project will only focus on simulating the search and retrieval application that helps a library's visitor to locate a physical location of books in the library bookshelves. The implementation of the web based service will cover only the searching function not including other functions that are available inside the current library's website. The searching function will be used to simulate the OPAC in order to retrieve the information from the database.

## **CHAPTER 2**

### **LITERATURE REVIEW AND THEORY**

#### **2.0 LITERATURE REVIEW AND THEORY**

##### **2.1 Virtual Library and Digital Library**

A similar to this project has been implemented in Vienna University of Technology by Gerhard Reitmayr Schmalsteig. The system is implemented using augmented reality and requires additional mobile devices to location the desired location. In contrast to virtual reality which completely replaces the real world, augmented reality displays virtual objects and information along with the real world registered to real world locations. The project is focus on the implementation of ARLib – Library Information Application. ARLib aims to aid the user in stereotypical tasks that are of use in a library by augmenting a book's position on a shelf. The user is interacting with the application via a user interface presented on the touch pad. The keyword is entered by using either a virtual keyboard or a graffiti pad. A list of books matching the search is returned and displayed. User then selects the book that been looking for and the corresponding book's position on the shelf and the shelf itself are highlighted in the heads-up display to aid the user in finding the book

However, the ARLib requires powerful hardware to navigate through the virtual environment and it may need high cost to implement it. This project proposed to implement the simulation of virtual 3D map application by remodel the library environment using virtual reality.

Study was done on a few virtual libraries in public and private universities in Malaysia such as Multimedia University's Library (MMU), Universiti Utara Malaysia's Library (UUM) and Universiti Tun Abdul Razak (UNITAR). Overall, most of the libraries have provided its user with the electronic resources and digital library. However, none of the library in Malaysia has implementing the virtual 3D map that could help the user in locating the searched material or books.

The term "Digital Library" has a variety of potential meanings, ranging from a digitized collection of material that one might find in a traditional library through to the collection of all digital information along with the services that make that information useful to all possible users. Terms such as "electronic library" and "virtual library" are often used synonymously to digital library. The working environment of electronic resource collections is still called a library. A digital library is a library that provides access to a collection of distributed information in electronic format through pointers provided locally or a collection of digital objects housed in the same place, virtual or physical. A digital library is also described as "*a zone of convergence where librarians, computer scientists, electrical engineers, cognitive scientists, cultural anthropologists, organizational theorists and sundry others are forging a lingua franca for better understanding the nature of distributed information systems and knowledge access*" (Cronin 1998, p.43).

Digital library or virtual library is the library as a building has been transformed to the library as an environment of electronic services established on a computer server or a network of cooperating servers. The client is not obliged to go to a certain place for searching and retrieving his information, since the information is coded in a binary form being available to any person linked locally or through the Internet to the specific server. Contrast to traditional library which has limited space but digital library have the potential to store much more information, simply because digital information requires very little physical space to contain it. As such, the cost of maintaining a digital library is much lower than that of a traditional library. A traditional library must spend large sums of money paying for staff, book maintenance, rent, and additional books. Digital libraries do removes away with these fees.



The goal of the digital library is to assist users by satisfying their needs and requirements for management, access, storage, and manipulation of the variety of information stored in the collection of material that represents the "holdings" of the library. Users may be humans or they may be automated processes acting on behalf of or in support of human needs. Users also vary and include those who are end users, library operators, and information "producers" who want their material available through the library.

A library is created to serve a community of users. Users who participate in the digital library should be aware of its design and be able collectively to refine that design to better serve their own information needs. Therefore, the ongoing human usability of a digital library depends on the clear and unobtrusive exposure of the library's design, its near-term goals, and its overall objectives.

Electronic resources are also available on the Internet and it is commonly indicated as Networked Information Resources or NIRs. The NIRs is also described as *"uncontrolled and free controlled access for example through user registration and passwords, and fee-based access based on networked payment mechanisms are options, which allow the addition of commercial and copyrighted materials to the range of networked information resources"* (Mackenzie & Wierck 1996, p. 9)

According to Anglo-American Cataloguing Rules, Second Edition (AACR2), 2002 revision, an electronic resource is *"Material data and or programs encoded for manipulation by a computerized device. This material may require the use of a peripheral directly connected to a computerized device for example CD-ROM drive or a connection to a computer network like Internet."* However, this definition does not include electronic resources that do not require the use of a computer, for example, music compact discs and videodiscs.

As described by Riccardo Ridi from University of Studies in Venice, the electronic resources is the term used to mean a wide range of products going from electronic periodicals to CD-ROMs, from e-books to websites, from mailing lists to data banks, all of them having the common feature of being used and sometimes modified by an electronic device. In fact inside this all-inclusive terminology lies a great variety of entities which are extremely different one-another. The off-line resources is called "local access electronic resources" by ISBD, "direct access electronic resources" by AACR2 and the on-line Resources is called "remote access

electronic resources” by ISBD, “distant access electronic resources” by AACR2 and “remote electronic resources” here.

An electronic resource is every document in electronic form which needs special equipment to be used. Electronic resources are the expression of a work encoded for manipulation by computer and it can be accessed either directly or remotely. Some of the electronic resources may require use of a peripheral device attached to computer for example a CD-ROM player. Electronic resources include digital documents, electronic serials, databases, patents in electronic form and networked audiovisual documents. Electronic documents differ radically from printed ones. Printed documents are typically distinct entities of a static, unchanging nature. However, the electronic resources do not include the type of resources that do not require the use of computer for example music compact disks and video disks. Initially, electronic documents were just imitations of printed documents in electronic form.

This project is not focusing on developing digital library or electronic resources but it is more on the simulation on how to locate the library material. However, the findings on the virtual library and electronic resources contain a lot of useful information that may help in developing this location aided system for the library.

## **2.2 Technical Background**

### **2.2.1 The Implementation of Navigation Aid**

Designing a virtual reality system that incorporates the navigation aids is not an easy task due to the lack of both proper design guidelines and proper tools that could help the designer in identifying and correcting possible navigation problems. The main way to discover usability problems in virtual project is to observe how user interacts with the system itself. In particular, one interesting aspect to study is what extent the user able to navigation the virtual environment, access and sees locations and object of interests.

The most relevant usability issue for virtual reality project is the navigational support provided by its user interface. Inadequate support for user to user navigation is also likely to result the users in leaving the system before reaching their target of interests. A possible solution is to provide the user with the electronic navigation aids to guide user to explore and get to the intended target. Navigation aids that indicate the path the user should follow can be used whenever a given destination for the user is specified. The purpose of the navigation then is to help the user in following path to the destination. This can be achieved in various ways for example changing the view points to suggest the walking direction along the path at each time or using animated character that travel towards the destination and help the user by showing his or her way.

Each of these approaches requires calculation of the path to be followed. A possible solution for this project to control the navigation is Action Script. As the virtual environments become more interesting, larger and more complex, the ability of users to intentionally find their way around the environment plays a more important role in their behaviors and this may requires very large memory storage.

A possible solution for this problem can be done by exporting the 3D animation and environment into vector format that is smaller in size. This is perfect for web animation and flash because it is faster to download.

### **2.3 Motivation for the Project**

The purpose of designing this project is to provide user with the simulation of an interactive virtual environment that can help user navigate through the library environment to find the physical location of the library material. Even though similar system has been created using Augmented Reality, the ARLib requires very powerful hardware and it may need high cost to implement it. Therefore, the designing of the system is the solution to ease the user tasks and to reduce the amount of time to acquire the library material. The vSearch system comes out with very simple architecture so that it can be supported by any workstation. Beside it does not have to require any external hardware or higher cost to implement it. Moreover, none is recorded has implemented this application before. So, being the first to simulate this application motivates the student to ensure the output like will be extremely valuable for all users.

## **CHAPTER 3**

### **METHODOLOGY AND PROJECT WORK**

#### **3.0 METHODOLOGY**

The methodology follows the method of lifecycle assessments of the project. This project systematically and adequately specifies the development process of the system starting from the user requirement acquisition to final phase of the development process. The method distinguished three main steps which are preliminary study, the design method and usability study. The methodology applied is described further in these main steps.

#### **3.1 Preliminary Study**

An initial survey on library users' has been done for the requirement analysis of this project. The survey measures satisfaction with library services by asking users to assess these areas:

- Level of satisfaction of using the OPAC
- The ability to find the books or material easily
- The service levels that they perceive the library should provide.

Overall, 100% of survey forms were returned and most respondents were moderately satisfied with the current library services and current databases resources. However, there is some specific service areas of concern that will be elaborated in the result and discussion section.

## 3.2 Design Method

### 3.2.1 Procedure Identification

The development of this project is done by following the waterfall methodology. Based on the waterfall methodology, one proceeds from one phase to the next in a purely sequential manner.

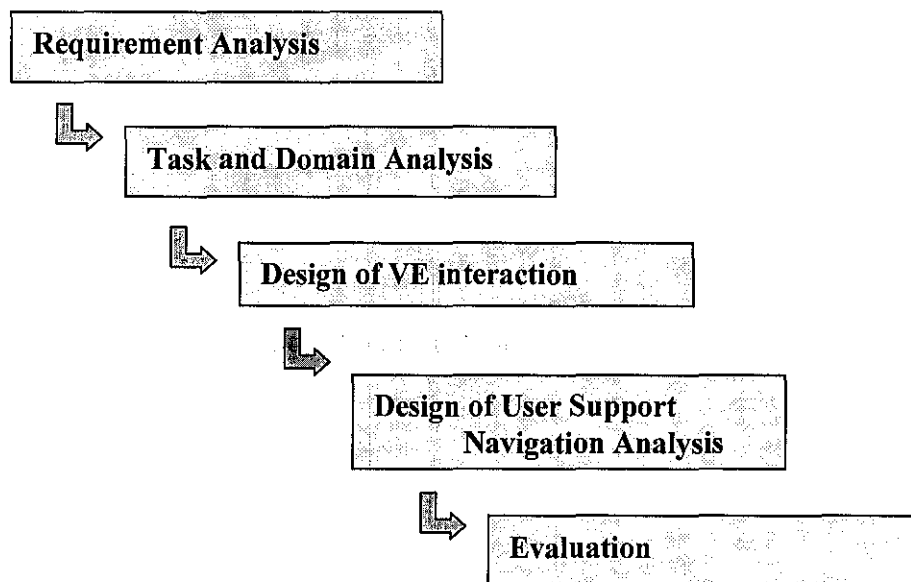


Figure 3.1 : Waterfall Methodology

### **i. Requirement Analysis**

During the first phase, student will focus on researching and studying on virtual reality concepts, technology available and existing applications that can be made as guides to application for the library. In order to gain extra knowledge, visiting the virtual library and study how to implement the searching part and familiarize with what kind of functionalities that can be incorporated into the application. This phase also involved in collecting the available information regarding the current library service by disseminating the library survey among UTP's residents and gathering all useful information that related to the project.

### **ii. Task and Domain Analysis**

Based on the result of the survey, the problem of the scenario is identified and the scope of the project is defined. This part is including determine the way user will interact with the application. As described in the scope of the project, the project goal is to successfully aid the user to the desired location of the bookshelf and here the user tasks is identified whereby the role of user is to explore and navigate through this application.

The domain analysis for this project is to identify the object navigation and the physical area of the virtual environment. The object navigation selected is the movements of view points that will guide the user to the correct direction in the virtual library environment itself. Then, the sketching part is done by capturing the photograph or sketching the library environment based on its floor plan. During this phase, the type of hardware and software specifications is identified.

#### **a) Recommended tools and programming language are:**

- Swift 3D
- Macromedia Flash 8
- Adobe PhotoShop
- Macromedia Dreamweaver
- 3DS Studio Max 6
- Active Server Pages (ASP)
- 3D Models from 3D Café

- b) Recommended Database for the system:
  - Oracle 9i Database
  - Front end Application for Oracle
  
- c) Recommended Devices or development platform
  - Normal PC workstation with Internet Explorer and IIS.
  - Flash Player

### **iii. Design of VE interaction**

This phase cover the design and development of the OPAC's simulation using ASP language. For this project the simulated OPAC will be run on the student local host to simulate the current OPAC and to display the data requested together with the location of the material. Then design phase proceeds with creating the background for the virtual world. For this project, it covers the modeling of part of library environment which is the bookshelves area. Here image texturing will be used to add more sense or realism to the project.

Next, the project proceeds with the design of the interactive object. The selected interactive object for this project is the changes of view points guide the user to the actual location in virtual map. Then, adding the navigation landmark or pathway for the interactive object to navigate through. The last stage in the design process is to integrate the virtual environment with the user interface. This is to ensure that the OPAC will works well with virtual environment.

### **iv. Design of User Support and Navigation Analysis.**

This application adds the use of interaction support by providing the user the shelves code to indicate the current position.

### **v. Evaluation**

This part focused on ensuring that all of the individual parts of the system work and that the system as a whole meets the requirements.



### 3.2.2 System Architecture Design

This section provides an overview of the current OPAC and proposed vSearch system architecture. For the current OPAC, there are three standing terminals available on each level inside the IRC. On ground level itself, they are twelve OPAC terminals available for users. The Web-based search engine provides access to all PETRONAS Group-wide Resource Centres. In addition, OPAC is also available through all PCs in IT Zone in the IRC. Four online database search terminals located on ground are also provided with printing facilities.

A simulation for the current OPAC is implemented inside a stand alone server. This simulation is developed using ASP Language, Java Scripts and HTML. The important points about ASP are that the script runs entirely on server. The entire server side code is processed and only plain HTML or any kind of contents that been chosen to generate is sent to client. A simulation for virtual 3D map is created using Swift 3D and exported into vector format. It is because Flash file is smaller in size and perfect use to web application. Thus, it can be downloaded within a short time.

As the illustration shows, all web clients communicate with ASP application through Microsoft Internet Information Services (IIS). When IIS receives the request for the data searching, it invokes the ASP engine, which invokes the appropriate scripting language to get access to the database to find the requested resources. If the request matches with the data, the IIS will return appropriate resource to the client containing the acquired results and virtual 3D map.

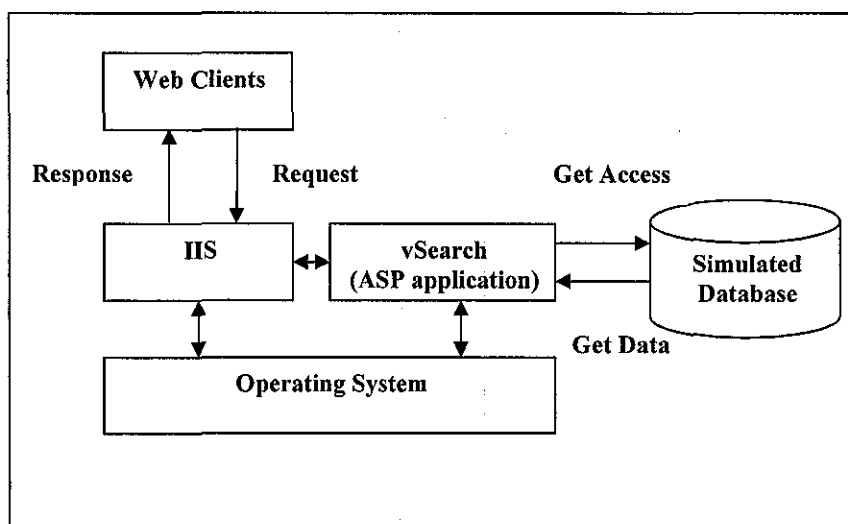


Figure 3.2.2.1 : vSearch System Architecture

### 3.2.3 Project Work

As stated in the objective the project goal's is to implement the effective way of reducing the location problem by simulating the virtual search for the OPAC including with the insertion of virtual reality elements inside the web page to make the virtual search look like similar environment in the library.

Based on the methodology stated in the previous paragraphs, requirement analysis phase and task domain analysis had been done during the FYP Part I. Then, the project proceeds with the next phase where the design of the VE interaction take part is. The goal of this phase is to design the simulation of the OPAC for the library and a virtual model of the library. In order to accomplish this, the project started with creating the database of OPAC for storing the details about the books. Because of the intellectual property issue, the authority to access the IRC's database is denied by the IRC's management. Therefore, fake data has to be used to stimulate how the real OPAC is functioning. All data has been stored in one dataset which containing 14 attributes using Oracle 9i Database. Front end application for Oracle Database such as Toolkits for Oracle (TOra) and TOAD has been used to make the data insertion become easier.

Next, the project proceeds with the development of the OPAC using the ASP language and modeling the virtual environment for the first floor of the library in order to aid visitors, students, and staff with navigation through the building.. The modeling part of virtual environment has been created using 3DS MAX 6 and exported as AUTO-CAD (dxf) file. Then, the saved file was imported into Swift 3D format to include the navigation and used it as a template for the development of the library model. The next step in modeling process was adding textures to the various surfaces in the building. Pictures of the various types of walls and bookshelves were taken and designed textures for the floor tiles and carpeting using Photoshop. Then these images were mapped onto the appropriate surfaces.

The final part of building the model is inserting furniture so that the surroundings would be more recognizable and realistic. Some of the furniture was found in 3D Café's websites such as the chairs and table for the revision area. The virtual environment has to be developed as precise and lifelike as possible so the

user would be able to relate to and recognize his or her actual surroundings when using this virtual 3D map application.

The next stage of the vSearch project is adding the functionality for navigation. First, the geometric information necessary for finding a path need to be obtained by controlling the viewpoint. After that, waypoints will be placed at the bookshelves that have to be connected to represent the navigation path for the user from the simulated OPAC to the bookshelves. Thus, in order to implement this navigation part, each animation is taken as different movie clip and all these movie clips will be exported into Flash. Then, the selection of the path animation is controlled via a Script node. This path is then used to create a plotline representing the path in the 3D map. These are used to automatically “navigate” the viewer along the computed path within the 3D map to the specified location.

#### **3.2.4 Problems Encountered**

The problems encountered when creating navigable part and 3D environment occurred both in the modeling and programming stages. The main idea for vSearch is to create an application that would be accessible from normal pc workstation without requiring any hardware. Previously the 3D map was created using VRML and the source file takes 42 MB of memory. Due to hardware constraint the designing tools have to be changed. It is because with the extensive size and detail of the application, this may not be feasible and it will not be navigable at all. Based on the opinion from the experts, they suggested to do the 3D map in simpler form which can be saved in smaller source file. Then, the virtual 3D map was recreated using Swift 3D. Swift 3D after all, exports its files in vector format. This means a much smaller file size which results in faster downloads. It is perfect for Flash and the web. Also, as previously mentioned, the entire ground floor is not completely modeled. Some textures have not been applied and some of the geometry, particularly in the rear of the building, is incomplete. Implementing this part may require large use of computer memory to render this application and the current system not incapable to do that.

Second problem occurred after the animation was completed and when the animation was ready to be rendered into Flash. Since the 3D animation contains too

many polygons so, it took more time to render. It results in the system is not responding and corrupted the file. Therefore, the 3D animations have to be redesign again with simple navigation and fewer polygons.

Last problem occur when integrating the database of current system into the virtual 3D map application. It is because the data that have been sending does not captured by the Action Script. Another way to do this is to capture the data from the database itself. However, this way is much more tedious because the value from the current system is still needed in order to query the database. A proposed solution for this problem is by passing the variable of the location code through XML. Lastly, Due to time constraints, the entire first floor was not being able to fully model. It can be seen because some textures have not been applied and some of the components of the building are incomplete.

### **3.3 Usability Testing**

Usability testing is a way of evaluating how target users are using a system. This is a necessary step in the design process, because often users do not approach a system in the same way that its developer do. Usability testing helps to identify areas where your site navigation isn't working as it supposed intended to do, and may reveal other user behaviors that hadn't anticipated.

The purpose of this usability test to measure the usability and ease of navigation of the vSearch project for specific target audiences, namely UTP's students and the library's visitor. This test also being executed to get the information about the usability of the vSearch project in the aspects of design, educational value, and navigation from users, detecting problems of the design and gaining targeted users' feedback for further revision of the project.

The project is tested with 11 individuals pulled from the defined audience groups. The goal of this usability test to determine what is or is not working successfully on the project from the users' perspective.

The information that been looking for such as:

- Do users complete each task successfully?
- If so, how fast do they perform each task?
- Is that fast enough to satisfy them?
- What paths do they take in trying?
- Do those navigations seem efficient to them?

### **3.3.1 Testing Method**

Below are the adopted methods to gather information about the usability of the vSearch Project.

- **Non-participatory observation**  
Non-participatory observation allows subjects to get a feel of task situations involved in the prototype design without being interrupted.
- **Face-to-face interview**  
To gather further feedback from subjects, individual face-to-face interviews was conducted after they performed tasks in the in the project. It allowed to clarify with individual subjects what being observed during the testing, but also gives the subjects opportunity to elaborate problems they perceived and provided their opinions and suggestions about the project.

### 3.3.2 Tasks for The Usability Testing

Below are the steps involve in the usability testing

1. Find representative users from target population
2. Ask the users to perform representative tasks on the website  
Tasks:
  - Go to the address stated in the feedback form.
  - Navigate the project and virtual animation
  - Review the website of vSearch.
  - Fill out the feedback form of the vSearch project.
  - Continue with follow up questions
3. Observe what the users do.
  - Write down all the steps they take, and whether they succeed or fail in performing the requested task.
4. Summarize the results.

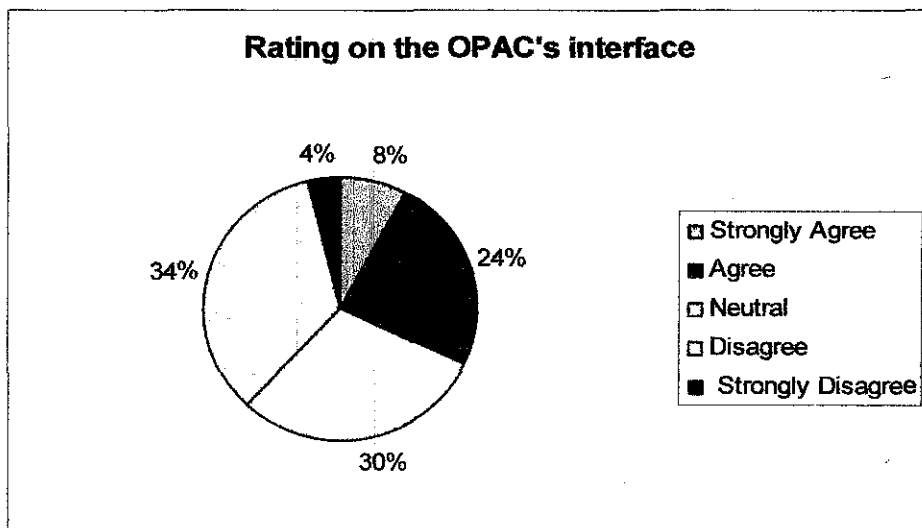
## CHAPTER 4

### RESULT AND DISCUSSION

#### 4.0 RESULT AND DISCUSSION

##### 4.1 Preliminary Result

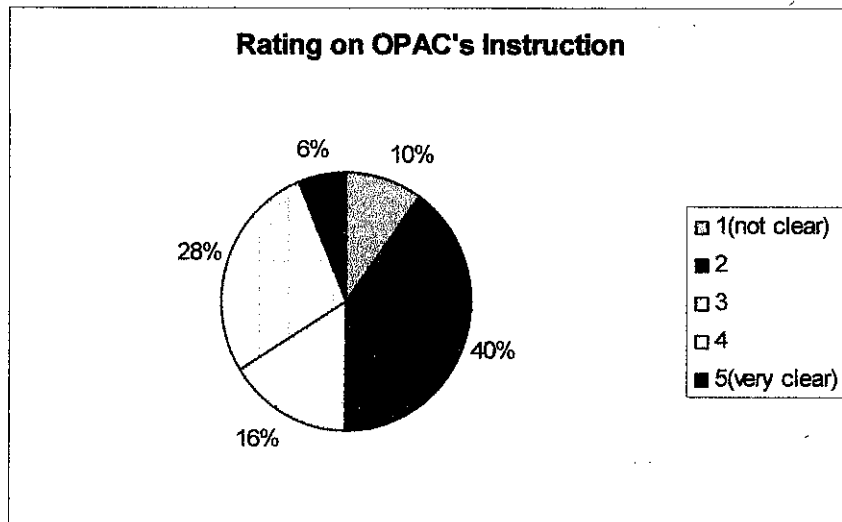
Prior to the design of the system, a survey of the current library users at UTP was conducted. The objective of the survey was to examine user's activities in the library and their views of current library online catalog system (OPAC). Fifty participants, comprising of students and lecturer responded to survey questionnaires distributed. Please refer to the sample of questionnaires in **Appendix 4-1**.



**Figure 4.1.1 : Rating on OPAC's Interface**

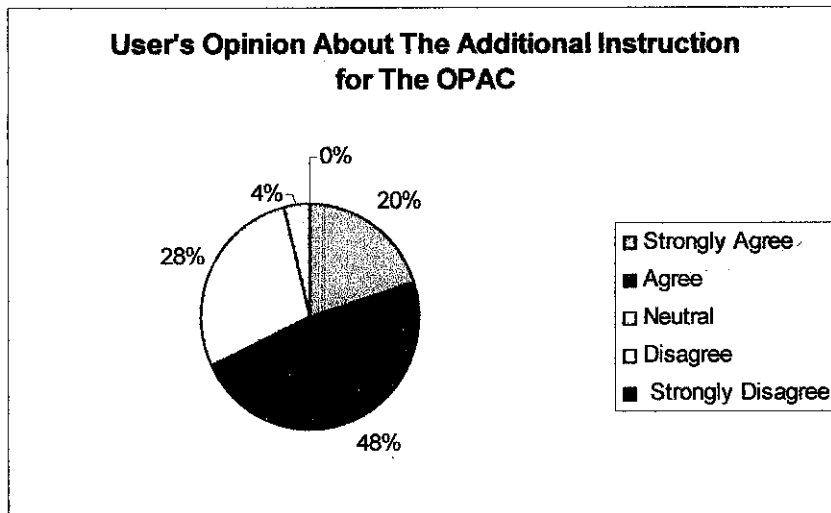
Detail information of user rating on the OPAC shown in Figure 4.1.1 indicates that more than one third (34%) of the user disagrees that the interface is attractive enough for them to use it. About 30% of them feel neutral about this statement and another 32% were agreeing that they are satisfied with the current interface. Please refer to the results of preliminary study in **Appendix 4-2**.

This indicates that the user interface plays an important role in order to attract the user in using the system. An interface with enough information and guidelines is essential for the user since this system does not provide enough instruction in guiding the user using the OPAC. The instruction provided by the current system was also evaluated by the users. The following figures show a summary of user response.



**Figure 4.1.2 : Rating on OPAC's Instruction**

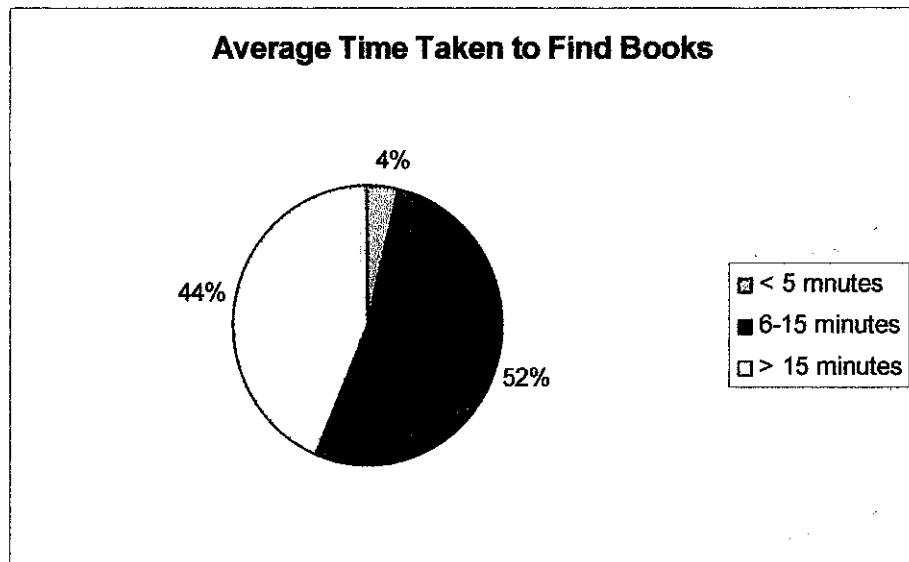




**Figure 4.1.3 : User's opinion about the additional instruction for the OPAC**

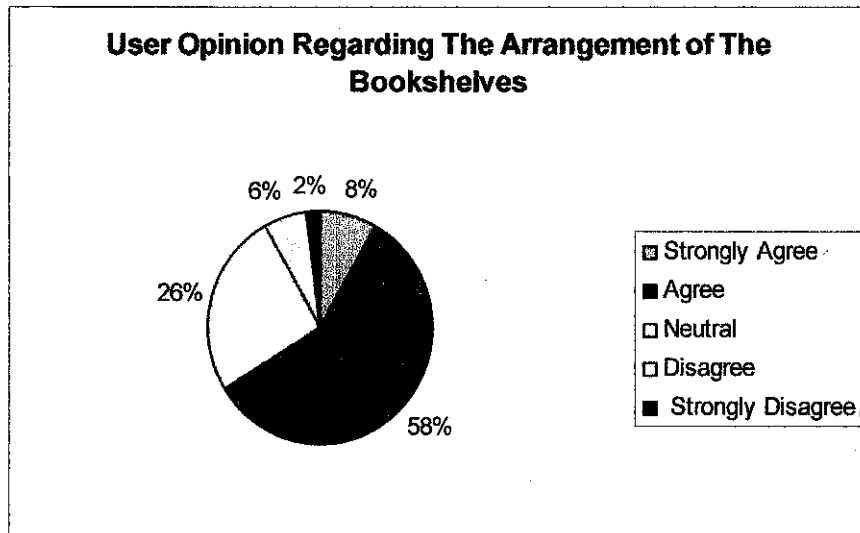
Only 6% of the respondents agree that the instructions given by the OPAC is clear enough to guide them browse through the IRC's databases. However, based on the percentage of the result, most of them agree that the instructions were not clear. Thus, this may explain why user avoids the OPAC and why some of the users cannot locate the desired information from the OPAC precisely.

Pertaining to the additional instruction matter, half of the respondents agree that additional instruction is needed to help the user in efficiently locating the material in IRC. Based on the findings, it is highly recommended for the IRC to revise the instructions and the interface for the OPAC to increase the user's satisfaction with the services provided.



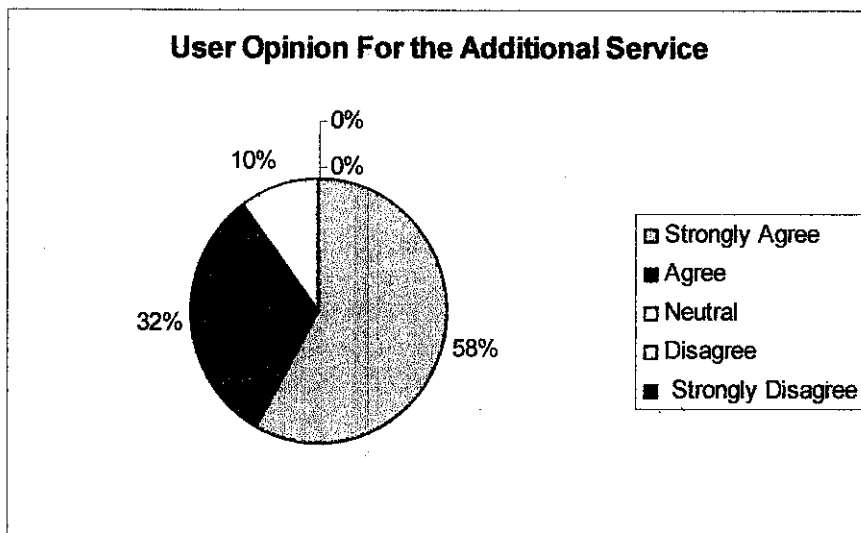
**Figure 4.1.4 : Average Time Taken by the User to Find Books**

Pertaining to the time taken to find the library material after a search through the OPAC reveals that many participants often spend more time to find the library materials. This can be shown in Figure 4.1.4. Only 4% of the respondents took less than 5 minutes to locate the material while a large number of percentage (52%) spend up to 15 minutes to find the materials and the rest took much longer than this. The arrangement of the bookshelves of the library itself makes the problem getting worse. This argument is supported by looking at the Figure 4.1.5 below. More than half (58%) of the respondents were agree that the arrangement of the bookshelves makes it hard for them to find actual material. Without any map provided, it is hard for the user to locate physical location of the material. This is one of the factors for some of the user walk away from searching the books or material in the library because it is time consuming and wasting their time if the desired material cannot be found.



**Figure 4.1.5 : User Opinion Regarding the Arrangement Of Library’s Bookshelves**

Findings from the survey, this indicates that a solution should be provided to improve the efficiency of the IRC. Similarly, the user interface should be improved.

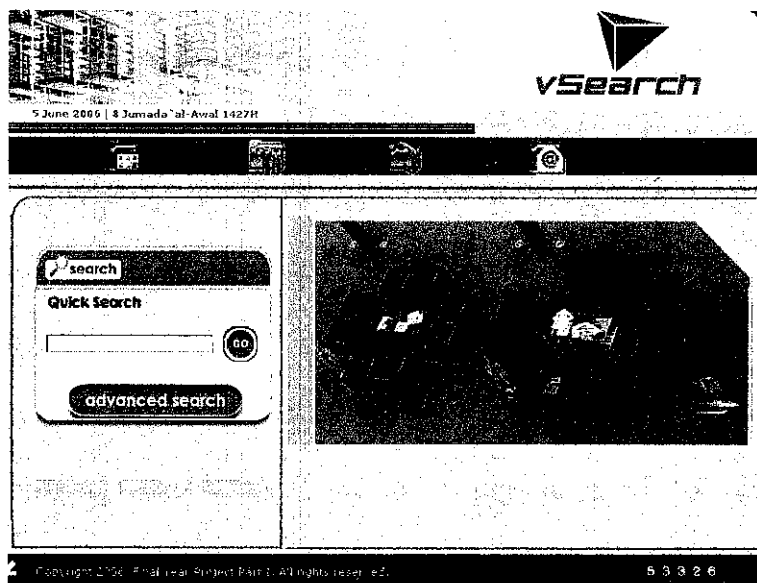


**Figure 4.1.6 : User Opinion for the Additional Services That Could Aid Them Finding Materials.**

By developing the virtual system that could aid its user to find physical location of the material, hopefully it can be applied in the IRC's environment or could be a platform that can lead to the improvement of IRC's services. Result showed on Figure 4.1.6 indicate that 58% of the IRC's user strongly agree if the library could provide them a service or system that could aid them in finding physical location of the material. This indicates an additional service is needed by the user in order to ease their tasks and reduces their time taken to find the physical location of the material.

## 4.2 Interfaces of vSearch Project

Below are a few snapshots of the vSearch project taken from the developed system and virtual 3D map. This application helps user in finding the location of the material or books by entering the keywords of the book's title or author. A list of books matching the search is returned and displayed. The user then selects the book the user is looking for and then the system will display the information of the book including the location number. By clicking on the "Show Location" (Figure 4.2.3), this system will aid the user in finding the physical location of the book. Please refer to the storyboard of the project in **Appendix 4-3**.



**Figure 4.2.1 shows the main page of the vSearch Project**

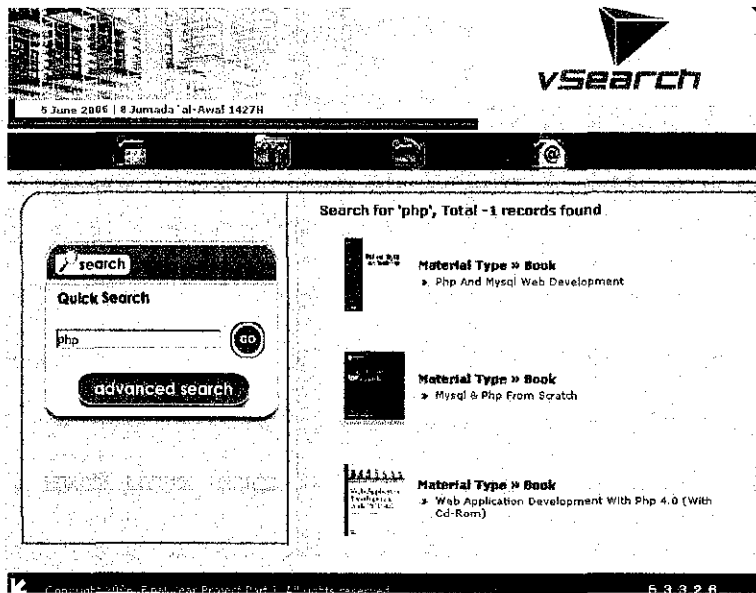


Figure 4.2.2 shows the display results generated by OPAC

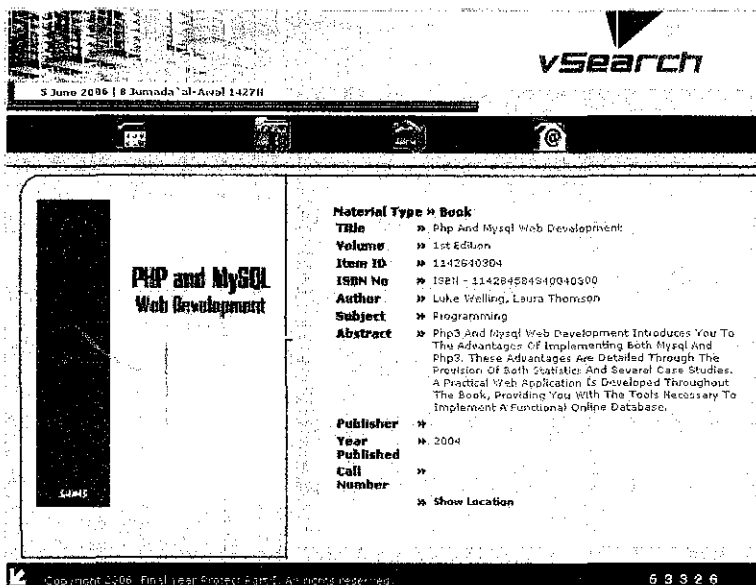


Figure 4.2.3 shows the detail description of selected book.

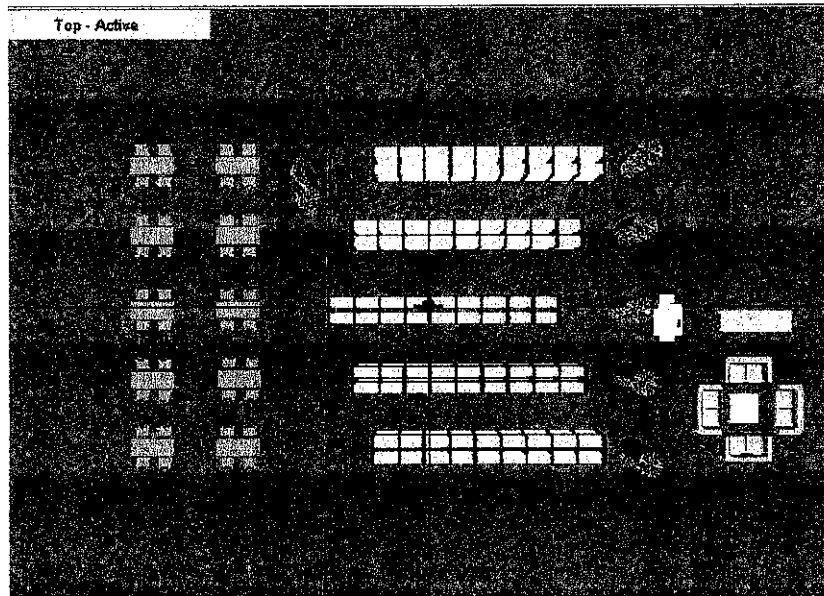


Figure 4.2.4 shows the top view of the virtual 3D map

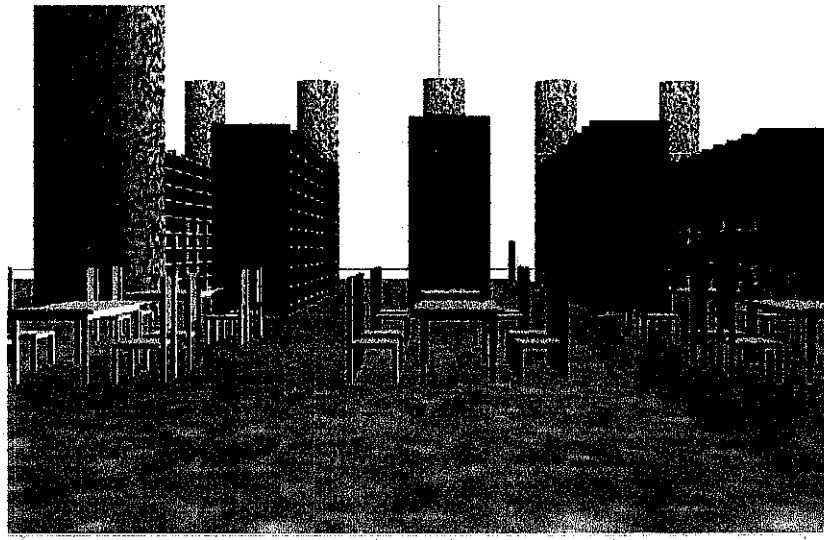
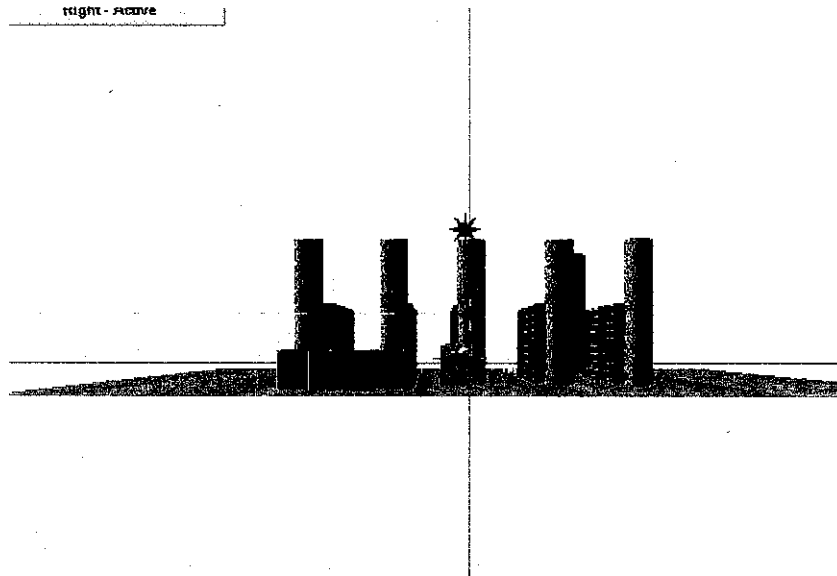
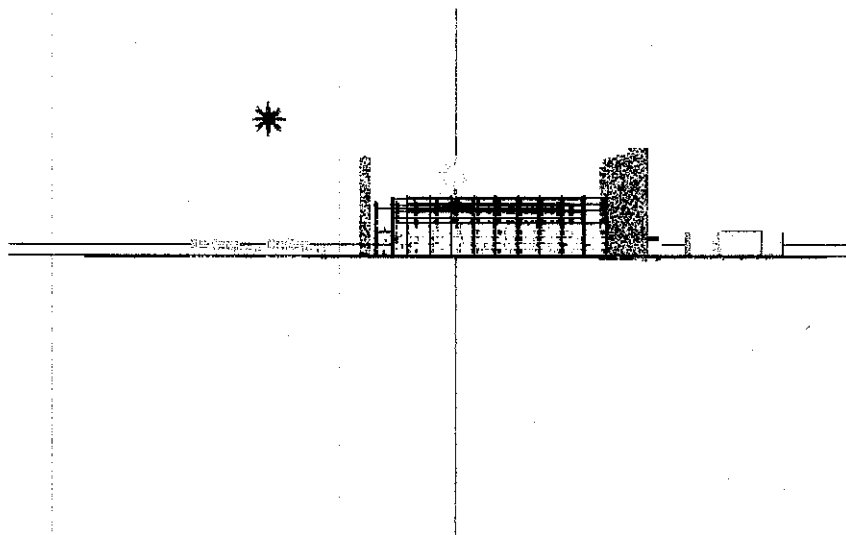


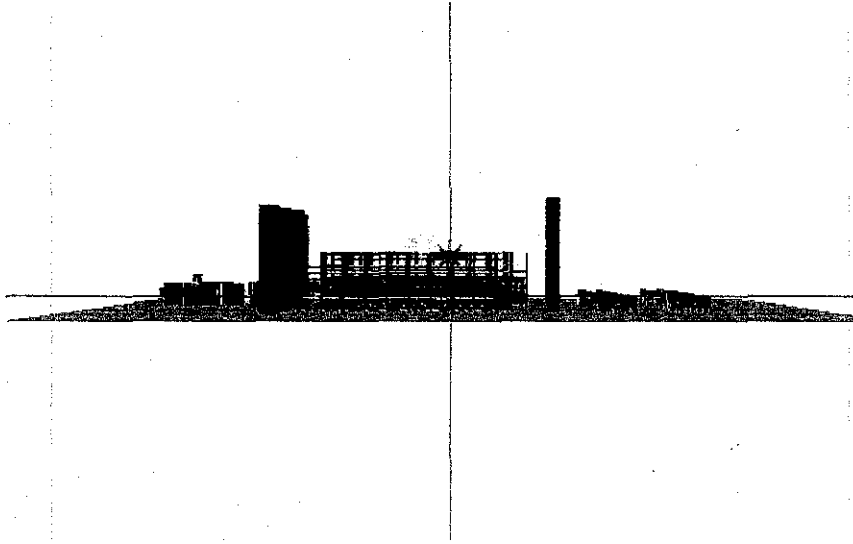
Figure 4.2.5 shows the side view (left side) of the virtual 3D map



**Figure 4.2.6 shows the side view (right side) of the virtual 3D map**



**Figure 4.2.7 shows the front view of the virtual 3D map**



**Figure 4.2.8 shows the back view of the virtual 3D map**



### 4.3 Usability Testing Result

This survey was conducted through a questionnaire on the vSearch project. A total of 11 people were participated in this study, all of whom use the current OPAC on regular basis to search the information in the library. All of them are female students and ranged in age from 20 to 22 year-old. All participants were asked to use the vSearch interfaces before doing the test session, thus allowing them to formulate opinions about the interface on their own. Below are the questions asked on the survey and the answers from each respondent. Please refer to the sample of usability questions in **Appendix 4-4**.

**Table 1: Series of questions posed in the usability test to use vSearch, with results of responses**

<p><b>Q1: What is your first impression on the outlook of this website.</b></p> <ul style="list-style-type: none"><li>- <i>Simple, user-friendly</i></li><li>- <i>Simple and easy to user, Friendly to the user</i></li><li>- <i>Cute, simple and easy to use</i></li><li>- <i>User friendly interface</i></li><li>- <i>Well organized and easy to see</i></li><li>- <i>Simple but interesting</i></li><li>- <i>It is good and impressive because 3D world is something different</i></li><li>- <i>Easy on the eyes, does not look complicated</i></li><li>- <i>Very interesting and easy to navigate</i></li><li>- <i>It looks simple and easy to navigate</i></li><li>- <i>Simple and user friendly interface</i></li></ul>
<p><b>Q2: What items, features did you look at?</b></p> <p><b>What was your observation about what you saw?</b></p> <ul style="list-style-type: none"><li>- <i>The search result is very helpful, it has the pictures of book covers, etc</i></li><li>- <i>The features is also user friendly</i></li><li>- <i>The search engine is easy to use</i></li><li>- <i>The search feature</i></li><li>- <i>How the info is organized and easy to navigate</i></li><li>- <i>The quick search, easy and simple to use</i></li><li>- <i>The realism of the 3D application, lagging or not</i></li><li>- <i>The search result is very organized and colorful unlike the current OPAC which is very bland</i></li><li>- <i>3D application is the most interesting part</i></li><li>- <i>The search box is very satisfying</i></li><li>- <i>Search box, it is simple</i></li></ul>

**Q3: What features of the vSearch website were unclear or confusing to you, if any?**

- *None (7 respondents)*
- *Clear and easy to locate (2 respondents)*
- *The icons on the webpage*
- *The map, I think some indication of direction should be made, like showing where the user at the moment and label the book shelves*

**Q4: What is your impression about navigating the site?**

**Does it seem easy or difficult? What makes it that way?**

- *Quite easy because it has the description of the book and the coolest part is the virtual map*
- *It is easy, because the system shows exactly the location of each book and it is easier for user to find books.*
- *Easy, because we know where the book is located, and the system shows the location.*
- *Easy, because the time to find books is reduced.*
- *Easy but you can always to the help section*
- *It is simple navigation and easy to understand. It uses simple words.*
- *Easy to navigate because it is just like real library*
- *The site is informative and precise about the books. It seems easy because the interface is quite clear and easy to understand*
- *It is easy to navigate because it shows the location in 3D*
- *Very easy and the direction are labeled clearly.*
- *Powerful of user friendly graphical interface*

**Q5: What else should be included on the vSearch website?**

- *Search with printed results should be included.*
- *Add more function on the front page such as new or top books, recommended books, etc*
- *Implement the 3D navigation in every floor. (2 respondents)*
- *Mailing list of new books*
- *Virtual library tour (2 respondents)*
- *Book reservation*
- *Check whether requested books available or not (2 respondents)*

**Q6: What did you like best about the site?**

- *The virtual map(9 respondents)*
- *The 3D environment, same as the actual library*
- *The interface*

<p><b>Q7: What did you like the least?</b></p> <ul style="list-style-type: none"> <li>- <i>Other view is not necessary for this project except for top view.</i></li> <li>- <i>None (10 respondents)</i></li> </ul>
<p><b>Q8 : Do you think some people would have problems using the vSearch website? What kinds of people? What kinds of problems?</b></p> <ul style="list-style-type: none"> <li>- <i>People that aren't at all familiar with the library because the map does not labeled and they may lost</i></li> <li>- <i>The disable of those whom are not familiarize with this system. (2 respondents)</i></li> <li>- <i>Older people who do not understand the icons used.</i></li> <li>- <i>Yes, for people who do not understand English should include other language.</i></li> <li>- <i>None ( 6 respondents)</i></li> </ul>
<p><b>Q10: Would you like to make any other comments about vSearch project?</b></p> <ul style="list-style-type: none"> <li>- <i>The top view of the website should be more precise</i></li> <li>- <i>None ( 10 respondents) .....</i></li> </ul>

The first two questions in the test involved performing the same task and simply asking the participants to evaluate the vSearch interface. From the user perspective, however they were satisfied with the enhanced interface of the OPAC because it is much simpler and well organized compared to the current interface which is unattractive. Based on the result of Q2, users seem too familiar with the features in vSearch and they also satisfied with the features provided by the vSearch.

The next critical point occurs in Q3, when users were effectively asked for the features that were unclear or confusing to them. Results of the test reported that two participants were confused by the icons in the application. Some felt that the directions should be included in the map to help the user notify their current position in the application. A question also been asked about their impression of navigating the site. Overall, the respondents came out with positive feedbacks which are good for vSearch project. They felt that, vSearch has provided a clear, simple and easy to learn application to its user in addition to providing informative and precise information.

Q5 shows for any options or new enhancements should be included in vSearch website and the results indicate that, users requested to add in more features to the OPAC such as printed results of the searched materials, virtual tour of the library, book reservation function and information of new coming books. These feedbacks could be implemented for further enhancements of the system. Referring to Q6, most of the respondents agree that the virtual map is the best feature in the site. About 90% of participants responded that they have nothing that they like the least. Only one participant stated that only a top view of the library is necessary for this application.

Prior to the above results, the participants think that user may have problems to navigate the virtual map for the first time since some of them are not familiar with this system yet. They also requested to put the label in each bookshelf in order to notify the users about their current position. Some of them think that this problem also may occur to the senior citizens who are not familiar with Internet. However, since this system is simulated application for university's library, this kind of problem rarely happens in the actual scenario.

Some verbal comments from the participants reveals that the idea of virtual map is an excellent and it should be implemented in current application. Based on the users' comments, this system could help them a lot in reducing their time taken to find a book. The visualization provided also will give an adequate support to user navigation which results in user reach the target location within a short time. The graphical representation of virtual map allows user a clear view what route or path should be taken to the destination.

Finally, the results if this usability study stated that most of the participants agree they were satisfied with this application. This can be explained by the fact that participants indicated similar level of satisfaction with the enhanced interface and the virtual 3D map (Table 1).

## **CHAPTER 5 CONCLUSION AND FUTURE WORK**

### **5.0 CONCLUSION AND FUTURE WORK**

#### **5.1 Result of the Preliminary**

Prior to the survey done on library users', much of relevant information was gathered. Based on the survey results, the rate of success in finding the physical location of the material in the bookshelves in previous chapter shows that many respondents agree that they need a solution to reduce the amount taken to find the material. Therefore, these results conclude this finding that the integration of virtual 3D map into the current online system is highly recommended to be implemented by the UTP's residents.

#### **5.2 Result of Completed Design of the System**

The aim for this project is to simulate to the user with an interactive virtual environment that can help user navigate through the library environment to locate the library material. Beside that, it tends to provide this capability with as simple as possible rather than acquiring any external hardware and software. The function of this system supports a navigation aid that provides users with information of acquired materials.

The interface of the navigation aid also has been designed to be less obstructive as possible and to provide users with information only when they request it. Since users will be able to view all of this information in 3D, they will gain a very intuitive understanding of the locations that they are searched in. In addition to using the virtual 3D map as a resource for locating specific material within the library, it may also help the user to reduce their time and less physical work.

This way, the navigation aid could be used when it is more important for the user to acquire procedural knowledge about how to reach an object instead of knowing where it is located with respect to the user's current position.

### 5.3 Result of Usability Testing

One of most relevant issues for vSearch project is the navigational support provided by its user interface. A possible solution is to provide the user with virtual map that could guide user along the path to the actual location of the material. As the satisfaction data shows, participants like this interface and the virtual 3D map that incorporates with this system. Overall, they felt the vSearch is easy to use and would enhance the library performance in terms of to reduce their time taken to find the location of library material and to help them in following a path to the destination.

However, they also recognize its limitations and constraint. They had provided wonderful feedback for improving the vSearch project. The following items are outside the scope of this study but should definitely be remedy on any future vSearch version.

- *Search with printed results should be included.*
- *Add more function on the front page such as new or top books, recommended books, etc*
- *Implement the 3D navigation in every floor*
- *Mailing list of new books*
- *Virtual library tour*
- *Book reservation*
- *Check whether requested books available or not*

Part of these results can be attributed to the possible user's point of view towards the enhancements of future work, since users will use this feature.

## 5.4 Overall Conclusion

This study focuses on the development of the virtual aid system by specifying its required functionality. In this study, the data collected from the findings were used to identify the necessary functionality needed by the end user. Overall, this project has proposed a method to automatically show the user to the correct location in the actual library visually. The method employed simplifies the development of navigation aid inside the current system and uses tools to visualize the data to be acquired by the user. The development the project manages to achieve its first objective to implement an effective way of reducing the locating problem by implementing the virtual search for the OPAC.

Feedbacks from the participants shows the system is capable of simulating the environment of a library and is capable to aid user in a following a path to the destination. This system is also able to achieve its second objective, to successfully aid the user to find the physical location of a book in actual environment by using the new enhanced additional services inside the OPAC.

Based on the feedbacks from the participants of the usability test, they find it easy to navigate and use the system as it is contains simple, clear and easy to learn. This will make it easier for users to use this system and hence achieving the third objective to enhance the interface of the OPAC by having additional instruction or explanation which this is necessary to the OPAC. This is expected to give the user satisfaction in using OPAC .Since this application has never been developed before, this proposed method could be also employed to support on demand generation of virtual application for example as navigation aids for user in particular places or location.

## **5.5 Recommendations for Future Work**

With respect to future goals of this project, it is recommended to extend its applicability to provide complete navigation aid to its user. There are many ways in which the application can be modified in order to be more successful. For this project, it assumes that the areas where the guide can navigate are simple and limited to one floor of the library. A path guider such an arrow or avatar should be included to gain the users attention in guiding them to find the actual location of materials.

Consequently, the IRC is a building with multiple floors and the proposed tool is able to derive a path for each floor. It would be more applicable if the other level of the IRC could be modeled and the navigation aid could lead the user walking up the stair to the next level. However, with the extensive size and detail of the application, this may not be feasible within the time given. Moreover, the entire ground floor is not completely finished. Some textures have not been applied and some particularly in the rear of the building and it is incomplete. Thus, these ideas are put for future enhancements of this system.



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The objective of this survey is to collect the information from the UTP residents regarding the library and information services. This information will be used to review and revise the present library services as well as to plan for future improvements. This survey consists of four sections, which is Section A, Section B, Section C and Section D.  
 Your cooperation and participation in completing this survey as soon as possible are appreciated.

**Section A: Respondent's Background**

**Instruction**

Please tick [x] the box given

1. Age range
 

<input type="checkbox"/> 15-20 year old	<input type="checkbox"/> 41-45 year old
<input type="checkbox"/> 21-25 year old	<input type="checkbox"/> 46-50 year old
<input type="checkbox"/> 26-30 year old	<input type="checkbox"/> 51-55 year old
<input type="checkbox"/> 31-35 year old	<input type="checkbox"/> 56-60 year old
<input type="checkbox"/> 36-40 year old	<input type="checkbox"/> >60 year old
  
2. Gender
 

<input type="checkbox"/> Male	<input type="checkbox"/> Female
-------------------------------	---------------------------------
  
3. Race
 

<input type="checkbox"/> Malay	<input type="checkbox"/> Indian
<input type="checkbox"/> Chinese	<input type="checkbox"/> Others: _____
  
4. What is your current academic status?
 

<input type="checkbox"/> Student	<input type="checkbox"/> Lecturer
----------------------------------	-----------------------------------
  
5. Your major or your field of study?
 

<input type="checkbox"/> Mechanical Engineering
<input type="checkbox"/> Civil Engineering
<input type="checkbox"/> Electrical & Electronic Engineering
<input type="checkbox"/> Chemical Engineering
<input type="checkbox"/> Information Communication Technology & Business Information System
<input type="checkbox"/> General Studies

## Section B: Library Usage

### Instruction

Please tick [x] the box given

1. On average, how often do you go to the library?

- > 5 times a week
- 3 – 4 times a week
- 1 – 2 times a week
- Never

2. Please indicate your major uses of the library:

( You may tick more than 1 answer)

- Use computer
- Read print resources
- Check out books or other materials
- Ask for reference help
- Use online resources
- Study
- Meet with friends
- Others: \_\_\_\_\_

3. If you use the Library's desktops, what you use them for?

(You may tick more than 1 answer)

- Email
- Research
- Use the Online Public Access Catalog (OPAC)
- Web surfing
- Others: \_\_\_\_\_

## Section C: Service Questions

### Instruction

Please tick [x] the box given

1. How often do you use:

1.1 The online catalog, OPAC?

- Never
- Once or twice a semester
- At least once a month
- At least once a week
- Every time I came to the library

- 1.2 Reference databases and electronic information provided by the Library?  
 Never  
 Once or twice a semester  
 At least once a month  
 At least once a week
- 1.3 Other UTP's Library websites (Library home page, etc)?  
 Never  
 Once or twice a semester  
 At least once a month  
 At least once a week
2. How easy do you find it to use the OPAC?  
 (very difficult)  1  2  3  4  5 (very easy)
3. How satisfied are you with the book collections and the Online resources(OPAC, library websites, etc)?  
 Extremely Satisfied  
 Satisfied  
 Neutral  
 Dissatisfied  
 Strongly Dissatisfied
4. How successful are you at locating material in the OPAC?  
 Extremely  
 Mostly  
 Sometimes  
 Not at all  
 Do not use
5. Do you find the OPAC is interesting to use?  
 Strongly Agree  
 Agree  
 Neutral  
 Disagree  
 Strongly Disagree
6. Do you find the OPAC's instructions are clear?  
 (Not clear)  1  2  3  4  5 (very clear)

7. Do you feel that you need additional instructions for the OPAC?
- Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree

**Section D: Library Improvements**

**Instruction**

Please tick [x] the box given

1. You can find books and other materials you have looked up in the catalog at the library bookshelf easily.
- Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
2. How long does it for you to find the books and other materials at the library bookshelves?
- < 5 minutes
  - 6 – 15 minutes
  - > 15 minutes
3. Do you find the arrangement of the shelves in the library makes it hard for you to search for books?
- Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
4. Does the library provide you with any map or instructions that could help you finding the books?
- Yes             No
5. Do you feel that the library needs additional service that could help the user in finding the location of the books?
- Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree

6. Overall, how would you rate the library's website?

Consider criteria like...

6.1 Ease of use?

Extremely Good

Good

Neutral

Bad

Extremely Bad

6.2 Ability to find information you need?

Extremely Good

Good

Neutral

Bad

Extremely Bad

6.3 Ability to search the catalog, ability to find  
databases to search?

Extremely Good

Good

Neutral

Bad

Extremely Bad

7. What could the library do to improve its services?

Please comment.

End of Questionnaire. Thank You for your cooperation.

**Results of the Preliminary Study  
For FYP 2006**

**Total Survey Submitted : 50**

**1) Age range**

	Respondent	%
15-20 year old	6	12
21-25 year old	33	66
26-30 year old	5	10
31-35 year old	2	4
36-40 year old	1	2
41-45 year old	0	0
46-50 year old	3	6
51-55 year old	0	0
56-60 year old	0	0
>60 year old	0	0
<b>Total</b>	<b>50</b>	<b>100</b>

**2) Gender**

	Respondent	%
Male	30	60
Female	20	40
<b>Total</b>	<b>50</b>	<b>100</b>

**3) Race**

	Respondent	%
Malay	46	92
Chinese	3	6
Indian	0	0
Others	1	2
<b>Total</b>	<b>50</b>	<b>100</b>



4) Current academic status

	Respondent	%
Student	42	84
Lecturer	8	16
Total	50	100

5) Major of field of study

	Respondent	%
Mechanical Engineering	13	26
Civil Engineering	8	16
Electrical & Electronic Engineering	3	6
Chemical Engineering	5	10
ICT/BIS	16	32
General Studies	5	10
Total	50	100

6) How often users go to the library

	Respondent	%
> 5 times a week	4	8
3 – 4 times a week	10	20
1 – 2 times a week	33	66
Never	3	6
Total	50	100

7) Major uses of the library

	%
Use computer	8.13
Read print resources	9.75
Check out books or other materials	28.45
Ask for reference help	4.06
Use online resources	8.94
Study	23.6
Meet with friends	16.26
Other : Discussion	0.81
Total	100

8) Major uses of Library's computers

	%
Email	13
Research	20
Use the Online Public Access Catalog (OPAC)	43
Web surfing	22
Others(not specified by respondent)	2
Total	100

9) Frequency of user using the OPAC

	Respondent	%
Never	3	6
Once or twice a semester	17	34
At least once a month	7	14
At least once a week	7	14
Every time I came to the library	16	32
Total	50	100

10) Frequency of the uses of electronic information and databases(online journal etc)

	Respondent	%
Never	24	48
Once or twice a semester	13	26
At least once a month	8	16
At least once a week	5	10
Total	50	100

11) Frequency of user using the UTP's Library websites (Library home page, etc)

	Respondent	%
Never	30	60
Once or twice a semester	12	24
At least once a month	4	8
At least once a week	4	8
Total	50	100

12) Rate for the ease of use of OPAC

	Respondent	%
1(very difficult)	3	6
2	15	30
3 (moderate)	19	38
4	8	16
5(very easy)	5	10
Total	50	100

13) User satisfaction of book collections and the Online resources(OPAC, library websites, etc)

	Respondent	%
Extremely Satisfied	0	0
Satisfied	15	30
Neutral	25	50
Dissatisfied	10	20
Strongly Dissatisfied	0	0
Total	50	100

14) Rate for the OPAC working successfully (locating the material needed)

	Respondent	%
Extremely	1	2
Mostly	11	22
Sometimes	29	58
Not at all	8	16
Do not use	1	2
Total	50	100

15) Rate for the OPAC's interface

	Respondent	%
Strongly Agree	4	8
Agree	12	24
Neutral	15	30
Disagree	17	34
Strongly Disagree	2	4
Total	50	100

16) Rate for OPAC's instruction

	Respondent	%
1(not clear)	5	10
2	20	40
3	8	16
4	14	28
5(very clear)	3	6
Total	50	100

17) User's opinion about the additional instruction for the OPAC

	Respondent	%
Strongly Agree	10	20
Agree	24	48
Neutral	14	28
Disagree	2	4
Strongly Disagree	0	0
Total	50	100

18) Books and other materials can be found at the library bookshelf easily

	Respondent	%
Strongly Agree	8	16
Agree	11	22
Neutral	15	30
Disagree	14	28
Strongly Disagree	2	4
Total	50	100

19) Time taken for the user to find books or other material at the library bookshelves

	Respondent	%
< 5 minutes	2	4
6-15 minutes	26	52
> 15 minutes	22	44
Total	50	100

20) User opinion about the arrangement of the bookshelves makes it hard for the to find the books

	Respondent	%
Strongly Agree	4	8
Agree	29	58
Neutral	13	26
Disagree	3	6
Strongly Disagree	1	2
Total	50	100

21) Any user map or instruction provided by the library to help the user finding the books

	Respondent	%
Yes	14	28
No	36	72
Total	50	100

22) User opinion about the additional services that could help user in finding the books

	Respondent	%
Strongly Agree	29	58
Agree	16	32
Neutral	5	10
Disagree	0	0
Strongly Disagree	0	0
Total	50	100

23) Rate for the ease of use of library website

	Respondent	%
Strongly Agree	4	8
Agree	15	30
Neutral	26	52
Disagree	5	10
Strongly Disagree	0	0
Total	50	100

24) Rate for the ability to find needed information

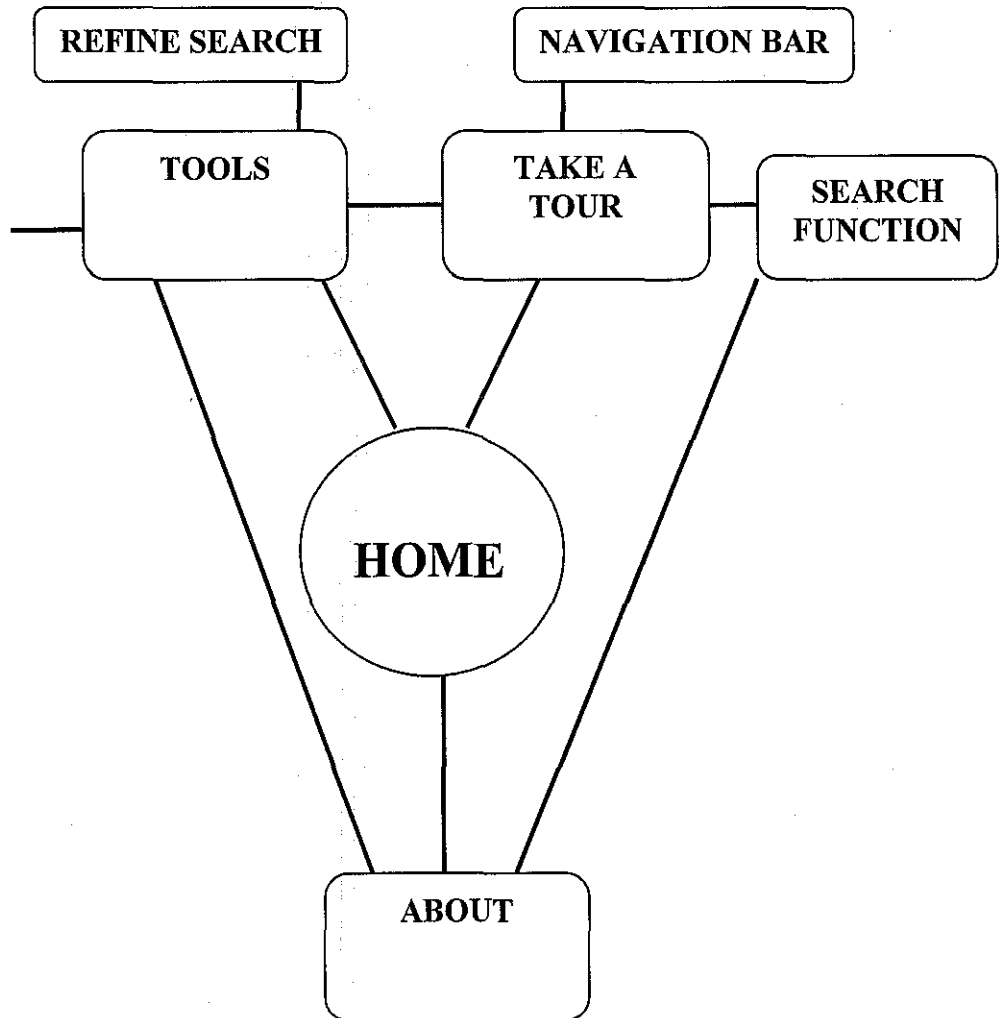
	Respondent	%
Strongly Agree	1	2
Agree	13	26
Neutral	26	52
Disagree	10	20
Strongly Disagree	0	0
Total	50	100

25) Rate for the ability to search the catalog and database

	Respondent	%
Strongly Agree	3	6
Agree	10	20
Neutral	27	54
Disagree	10	20
Strongly Disagree	0	0
Total	50	100

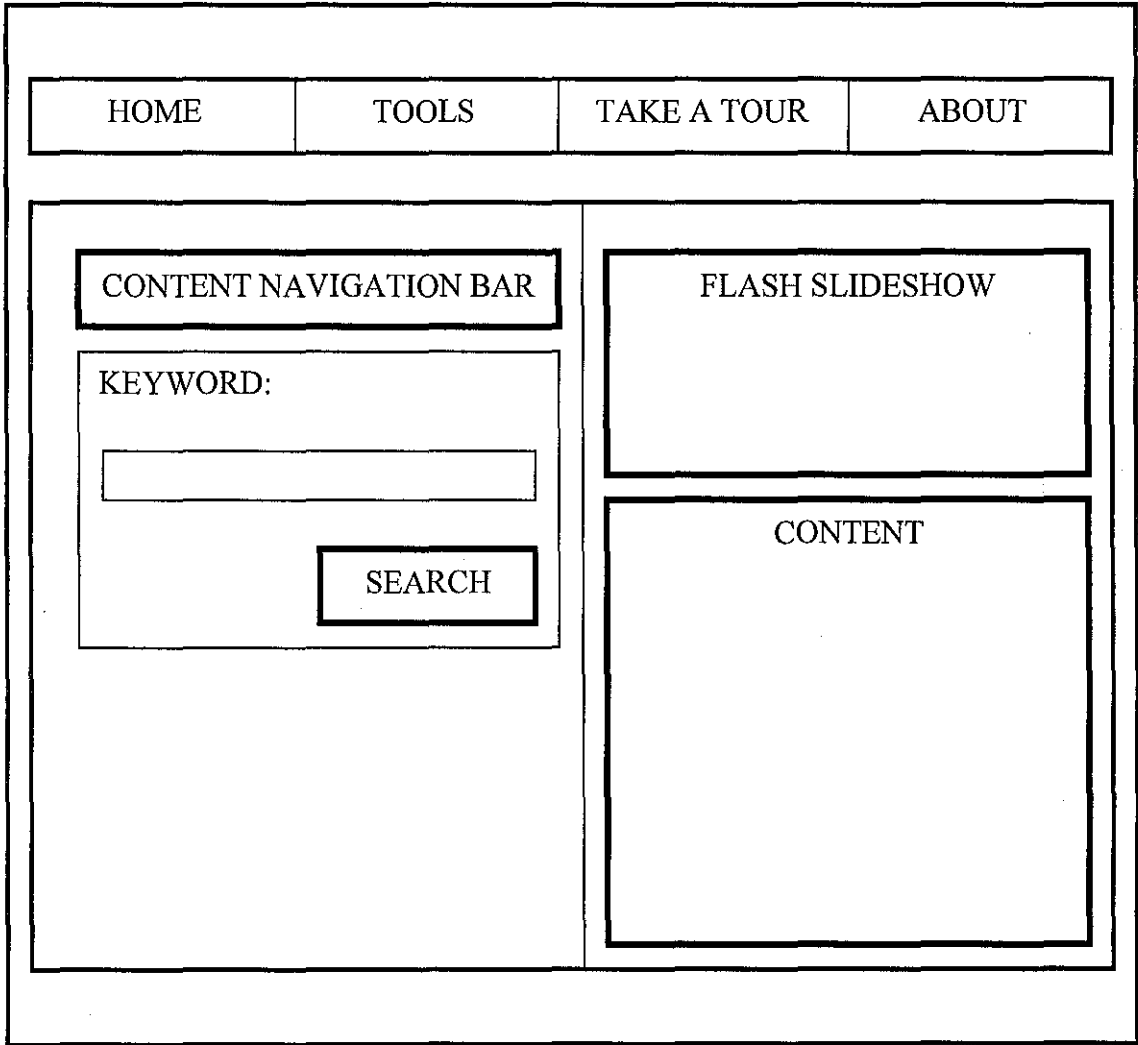
**STORYBOARD OF THE ONLINE PUBLIC ACCESS CATALOGUE (OPAC)  
FOR LIBRARY LOCATION GUIDE'S PROJECT**

**1.0 Main Menu**



**ADVANCE  
SEARCH**

1.1 Home





## 1.2 Tools

### 1.2.1 Advance Search

HOME	TOOLS	TAKE A TOUR	ABOUT
------	-------	-------------	-------

KEYWORD :

SEARCH FIELD:

## 1.2.2 Refine Search

HOME	TOOLS	TAKE A TOUR	ABOUT
------	-------	-------------	-------

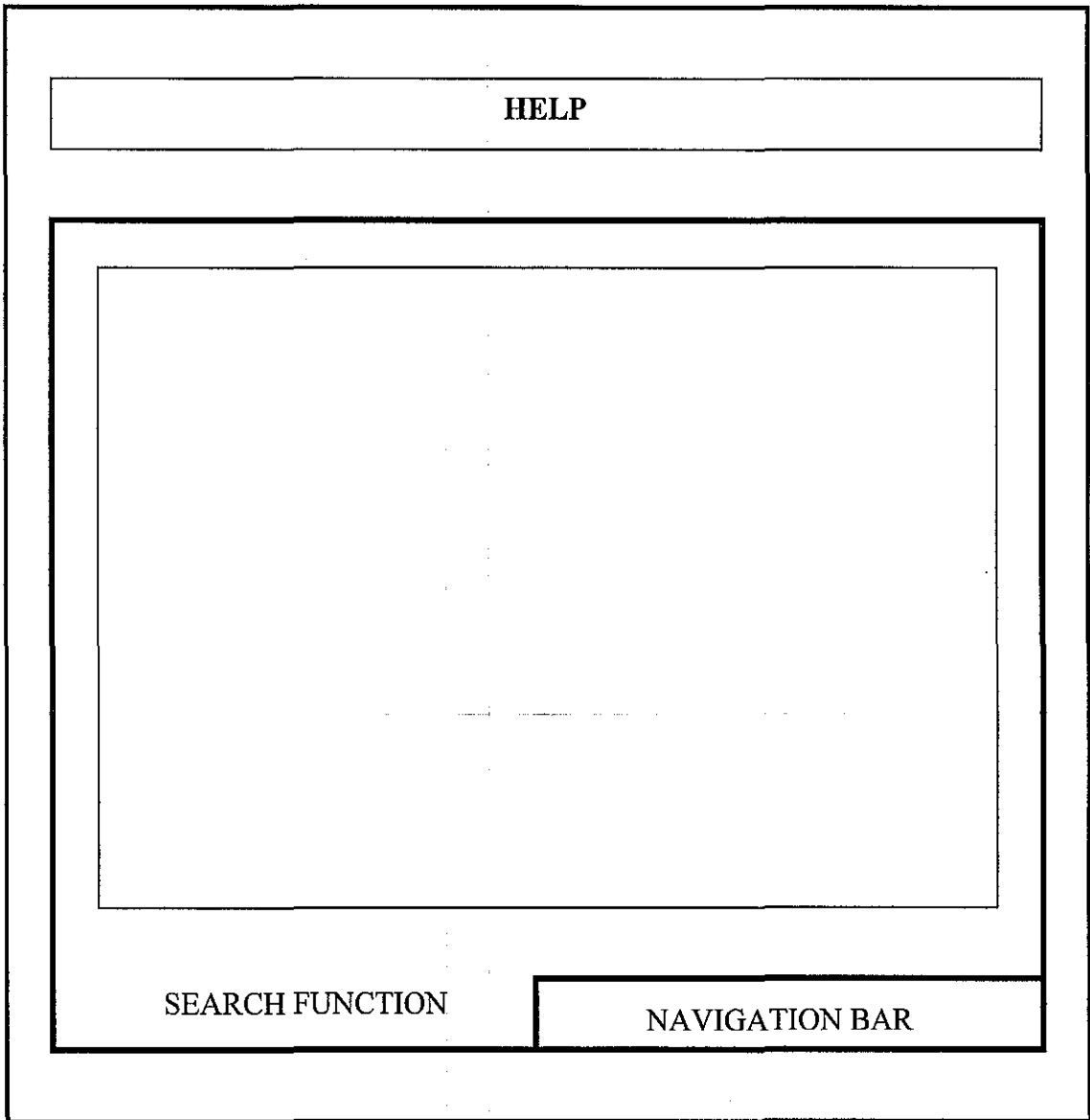
  

KEYWORD :	<input type="text"/>
SEARCH FIELD:	<input type="text"/>
TITLE:	<input type="text"/>
AUTHOR:	<input type="text"/>
ABSTRACT:	<input type="text"/>
SUBJECT:	<input type="text"/>
PUBLISHER:	<input type="text"/>
CONTENT TYPE:	<input type="text"/>

SEARCH	RESET	HELP
--------	-------	------

1.3 Help



## 1.4 About

HOME	TOOLS	TAKE A TOUR	ABOUT
------	-------	-------------	-------

<table border="1"><tr><td>CONTENT NAVIGATION BAR</td></tr></table> <table border="1"><tr><td>KEYWORD:</td></tr><tr><td><input type="text"/></td></tr><tr><td><input type="button" value="SEARCH"/></td></tr></table>	CONTENT NAVIGATION BAR	KEYWORD:	<input type="text"/>	<input type="button" value="SEARCH"/>	<table border="1"><tr><td>ABOUT</td></tr></table>	ABOUT
CONTENT NAVIGATION BAR						
KEYWORD:						
<input type="text"/>						
<input type="button" value="SEARCH"/>						
ABOUT						

1.5 SearchResults

SEARCH RESULTS

KEYWORD :                   XXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
SEARCH FIELD:               XXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
TITLE:                       XXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
AUTHOR:                     XXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
ABSTRACT:                  XXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
LOCATION:                    XXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
PUBLISHER:                 XXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
CONTENT TYPE:              XXXXXXXXXXXXXXXXXXXXXXXXXXXXX

SHOW LOCATION

**Usability Test**

Test participants using the following tasks.

**Task A:**

Using your web browser, go to the following address :

[Http://127.0.0.1:86/fyp/main.asp](http://127.0.0.1:86/fyp/main.asp)

**Task B:**

You are giving 3 minutes to explore this website before proceeding to the next step.  
Enjoy the exploration

**Task C:**

What is your first impression on the outlook of this website.  
Describe in simple word.

---

---

**Task D:**

What items, features did you look at? What was your observation about what you saw?

---

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**Task E:**

What features of the vSearch website were unclear or confusing to you, if any?

---

---

**Task F:**

What is your impression about navigating the site? Does it seem easy or difficult?  
What makes it that way?

---

---

**Task G:**

What else should be included on the vSearch website?

---

---

**Task H:**

What did you like best about the site?

---

---

Task I:

What did you like the least?

---

---

Task J:

Do you think some people would have problems using the vSearch website?

What kinds of people? What kinds of problems?

---

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Task K:

Would you like to make any other comments about vSearch project?

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