WEB-BASED SURVEY MANAGEMENT SYSTEM (W-SMS): USEFULNESS AND EASE-OF-USE

Submitted by

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To my beloved Father and Mother

Being your son is the greatest thing ever happen in my life

To my respected supervisor

Thank you for everything.

KOLEJ SASTERA DAN SAINS
(College of Arts and Sciences)
Universiti Utara Malaysia

PERAKUAN KERJA KERTAS PROJEK
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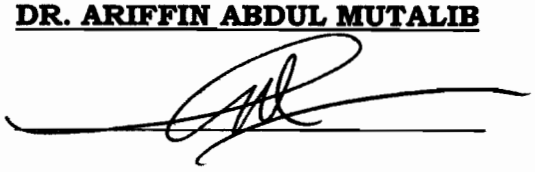
(Signature) : 

Tarikh
(Date) : 18th May 2010

ACKNOWLEDGEMENT

First and foremost, **Alhamed Allah**. I wish to express my sincere appreciation to my project supervisor, Dr. Ariffin Abdul Mutalib, for his precious guidance, encouragement, constructive criticisms, advice, knowledge and motivation. Without his continual support and interest, this project would not have been the same as presented here.

Besides that, I would also like to express my thank you to all my fellow postgraduate course mates for their support. My sincere appreciation also extends to all my colleagues, friends and others who have provided assistance at various occasions. Their views and tips are useful indeed. Unfortunately, it is not possible to list all of them in this limited space. A very special appreciation goes to all my family members and my beloved parents for their continual supports (funding and moral support), love and care.

ABSTRACT

Lecturers carry out research with different techniques of data collection. One of famous data collection techniques is survey. The survey has been proven to be effective in collecting large number of data.

Traditionally, the survey is done morally, via mail or face-to-face. In this digital age, the survey can be carried out online. In fact many online survey management systems have been develop with regards to online survey. Many of them have also been commercially available. However, when asked to real researches, they prefer to use in-house online survey management system rather then the commercial one. This leads to the following questions: (1) how to design an online survey management system so that it is perceived useful? And (2) how to design the interaction style so that the system perceived easy of use?

Answering the questions requires this study to develop a web-based survey management system (W-SMS). To accomplish that, three objectives are formulated: (1).To determine functional component of W-SMS, (2). To develop prototype of W-SMS, and (3).To evaluate the prototype of W-SMS in terms of usefulness and easy – of – use.

From the means gathered through Perceived Usefulness and Perceived Easy – of Use, the prototype of W-SMS was found useful and easy to use. The main contributions of this study are the concept of online survey management system and the prototype of online survey management system. Also, it adds new knowledge to the Information System.

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CHAPTER 1

INTRODUCTION

1.1 Background

Surveys provide a means of measuring a population's characteristics, self-reported and observed behaviors, awareness of programs, attitudes or opinions, and needs (Sekaran, 1992). Hair et al. (2006) adds that it is an ideal mechanism to gather and analyze large amounts of direct feedback about someone's members, prospects, and employees. In supports of gathering big amount of data, computer technology may be a good option. In fact, it is commonly experienced that surveys are distributed through emailing services. Also, there are Web-based systems developed for administering survey practices.

A web-based survey is the collection of data through a self-administered electronic set of questions on the Web (Thomas, 2003). Web-based surveys are able to conduct large-scale data collection. Web-based survey management system encompasses how the organizations organize, run and manage various types of surveys through the internet networks. It lets the user not only to build questionnaires but also to publish questionnaires to the respondents. This technology provides an inexpensive mechanism for conducting surveys online instead of through traditional survey methods. Also, it speeds up the distribution and response cycles. Web-based surveys are expected to be popularly used.

However, it is observable that most people or organizations manage their survey using traditional method by distributing their survey through the mail or by telephoning, and some may afford to self-distribute by hand (Ariffin & Norshuhada, 2008; Zulikha & Ariffin, 2005; Tronstad, Phillips, Garcia, & Harlow, 2009). In current age, where digital is the theme, this is not a timely solution for gathering information because it does not have fast circular returning and responding from the respondents. Other issues such as cost, time and effectiveness are also within considerations.

Therefore, a conceptual model of web based survey management system is required to be the solution for these issues. This initiative is proposed to solve problems as described in the next section.

1.2 Problem Statement

There are many types of surveys carried out by researchers which are by distributing the questionnaires to potential respondents manually through mail. This method requires cost, time, and efforts (Sekaran, 1992; Hair et al., 2006). A preliminary study involving 12 lecturers found that they agree to implement any tool that can assist them in administering survey practice. There are many commercial web-based survey management systems, but users have to pay for use besides having to register such as SurveyGizmo[1], SurveyMonkey[2], and QuestionPro[3]. When these were asked to the lecturers, they prefer not to use the commercial web-based survey management system because they do not have trust on the system. This shows that the lecturers want to use

[1] http://www.surveygizmo.com/
[2] http://www.surveymonkey.com/
[3] http://www.questionpro.com/

any tool that help them in administering their survey practice, but the system is more preferably be in-house. Based on the described problem, a web-based system was developed. In developing and making sure the developed web-based survey management system serves the researchers well in surveying, two research questions were formulated:

(1) How to design the system so that it is perceived useful?

(2) How to design the interaction style so that the system is perceived easy to use?

The system was designed to cater the needs of traditional survey practice; including functions to disseminate questionnaire, gather feedback and store data, specify the period, and analyze the data (Sekaran, 1992; Barnum, 2002; Hair et al., 2006). Accordingly, this study is proposed to achieve objectives as outlined in the next section.

1.3 Project Objective

The main aim of the study is to develop a web-based system that administers survey practice which is called Web-based Survey Management System (W-SMS). To achieve the main aim three objectives were formulated:

- To determine functional components of W-SMS
- To develop a prototype of W-SMS.
- To evaluate the prototype of W-SMS in terms of usefulness and ease-of-use.

1.4 Scope of study

This research will be carried out for use by researchers and lecturers in UUM involving researchers of three main colleges i.e. CAS, COB, and COLGIS.

1.5 Significance of study

This study contributes significantly to different parties, including the body of knowledge and to the researchers.

- To the body of knowledge:

  Results gathered from the evaluations will be used to propose whether W-SMS is useful and easy to use by researchers. This is important because researchers that were asked include all levels of computer background.

- To the researchers:

  By implementing W-SMS, researchers can reduce the cost, time, and efforts in administering their survey.

Previous studies have shown that web-based survey management systems have been used for many reasons. There are benefits out it, and there are also disadvantages. Reviews on previous works similar to this study are discussed in the next chapter.

CHAPTER 2

REVIEWS ON USABILITY AND WEB-BASED SURVEY MANAGEMENT SYSTEM

This section elaborates about related topics to this study including web-based survey; types of web-based system, advantages and disadvantages of web Surveys, web-based survey administration process, and mechanisms to improve the Response of web-based Survey.

2.1 Definition of Terms

Today the word survey is used most often to describe a method of gathering information from a sample of individuals. Surveys can be classified by their method of data collection (Leedy & Ormrod, 2001). Mail, telephone interview, and in-person interview surveys are the most common types (Scheuren, 2004). Besides, surveys are also distributed and collected through the means of electronic application over the Internet (Leedy & Ormrod, 2001; Catherine, Dimitrion, & Mike., 2001)

There are two methods of using the Internet as survey mechanisms: (1) electronic mail (email) and (2) the World Wide Web (the Web). With e-mail, researchers can send surveys to e-mail addresses as text messages, in which the recipient can then read, save, respond to, or throw away, much like a paper survey (Carey, Mao, Smith, & Vredenburg, 2002). Surveys can also be posted on the Web and may include text, pictures, and forms

to be filled in by the respondent (Catherine, Dimitrion, & Mike., 2001). According to (Galin, 1998), the primary difference between these two response modes is that e-mail is a "push" technology while the Web is a "pull" technology. That is, with e-mail, the sent messages are automatically received in the potential respondent's mailbox, whereas respondents must be attracted in some way to a Web page. Because of this difference, one might expect a higher response rate to an e-mail survey than to a web-based survey (Catherine, Dimitrion, & Mike, 2001).

In short, a web-based survey is a survey conducted by a researcher or the public through the internet. They can create their online questionnaire and distribute it through the Internet. On the other hand, a web-based survey management system is a system which can manage the survey through internet. In this study, a database will be integrated with the W-SMS to store data. When respondents answer the survey at anytime, data will be stored in the database. At the end of data collection period, researchers can retrieve the responses to analyze.

2.2 Types of Web-based Surveys

Nowadays, Web-based surveys are everywhere on the Internet. There are various categories of Web-based surveys. According to (Couper, 2000), there are two major categories of Web-based surveys: probability-based or non probability-based surveys. (Couper, 2000) included the following in the non-probability-based category:

- Entertainment surveys
- Self-selected Web-surveys
- Surveys made up of volunteer panel of Internet users

Entertainment surveys consist of questionnaires that request a vote on particular questions and other instant polls. Usually, people need to spend a lot of time to complete an entertainment survey. These surveys do not lead to generalizations of viewpoints across populations, and are not intended for that reason. Other non probability-based surveys include dedicated survey sites maintained by owners of Web sites. Such surveys could allow multiple submissions, and make no attempt to be representative of the whole Internet population. On the other hand, there are several types of probability-based Web-based surveys as listed below (Couper, 2000):

Intercept surveys which are frequently used to survey on customer satisfaction (Couper, 2000):

- Surveys that obtain respondents from an e-mail request.
- Mixed-mode surveys where one of the options is a Web survey.
- Pre-recruited panel of a particular population as a probability sample

In addition, the Intercept survey polls every n^{th} visitor to a Website and prevents multiple submissions from the same computer by using cookies. This is important to make sure that every response is sent by different respondent. In the survey that obtains respondents from an e-mail request, the survey will be sent to respondents who agree to complete a survey in response to an e-mail invitation to participate. Non-response is a big concern with this type of Web survey. The mixed-mode survey let the participants complete the survey on the Web or by paper. With a pre-recruited panel as a probability sample, respondents are provided with passwords or personal identification numbers. In some

cases, the participation of probability-based samples of the full population is obtained by providing equipment in exchange for participation in the survey.

From these, it could be concluded that the type of the web-based survey is determined by the objectives of the survey and also the type of questions that are asked by the researchers.

2.3 Advantages and Disadvantages of Web-based Surveys

Referring to (Rena et al., 2004) Web-based surveys are important today, in the digital age, and most organizations are moving towards digitizing products and process. Also (Rena et al., 2004) mention that technologies are always available to serve the needs. In fact, these technologies are anticipated as one factors to gain advantage in the competitive business square (Dillman & Bowker, 2001). When deploying a web-based survey management system, the organization is able to gain advantages, as well as face some disadvantages as discussed by (Rena et al., 2004).

2.3.1 Advantages

The advantages can be gained obviously in terms of fast processing job, expenditure, and survey management (Dillman & Bowker, 2001; Rena et al., 2004; Couper, 2000; Leedy & Ormrod, 2001).

- Savings in printing, postage, data entry.
- No data entry errors from hand-entry.
- Shortened timeframe to administer surveys (3 weeks with web-based survey Vs. 6 weeks or more with paper surveys).

- Easier and cleaner in providing skip patterns or survey sections customized to different respondent populations.
- Almost immediate access to data for analysis.
- Can easily link to background data, if appropriate (e.g., gender, grades, rank).

2.3.2 Disadvantages

Surveys are meant for human to answer. So, the surveys should be designed in a way it helps respondents understand well. Platform compatibility is another aspect to consider. In this case, the system should be able to run on multiple platforms such as Windows and Mac. Below is a list of possible disadvantages of deploying web-based survey management system (Wyatt, 2000; Fricker & Schonlau, 2002; Information Technology Services, 2008).

- Generality and validity of the results.
- Needs programming and IT expertise.
- Certain populations are not comfortable with using computers.
- Must have accurate email lists.
- Web-based surveys are not recommended for email software that does not support web access. Must be able to click on a URL provided in an email to bring respondents to the system.
- There may be problems finding software that is appropriate for both PCs and Macs, or developing surveys that run on both platforms.
- Data provided via a web-based survey are not anonymous, although the survey administrators may choose to keep the results confidential.

It should now be quite clear about the benefits and limitations of using web-based survey. So, choosing a web-based survey or other survey method depends on the purpose of the organization.

2.4 Web-based survey administration process

According to (Rena et al., 2004), there are four stages when doing web-based survey projects.

Stage One: Survey Background

- Building a survey team.
- Defining survey content.
- Choosing web surveys.
- Selection of the survey population.

Stage Two: Designing the Web-based survey.

- Questionnaire design.
- Choosing HTML software and format.
- Turning a survey questionnaire into the web-based survey: technical issues.

Stage Three: Administering a Web-based survey

- Administering a web survey: technical issues.
- Pre-testing.
- Privacy issues.
- Survey incentives.
- Technical support for duration of survey.
- Output of survey data.

Stage Four: Reportage

In this study, a clear picture about the web-based survey and the administration process are needed in order to come out with the W-SMS. All stages must be done one by one.

2.5 Mechanisms to Improve the Response of Web-based Survey

Low response rate of online survey is one of the major concerns in many organizations which are involved in online survey management. Since online surveys is one of the ways which can help organization gauge expectations, understand participant reaction and meet the organization's target markets, it is very important to increase the response rate of online survey. In response to that, Jennifer, (2006) suggests several ways to increase response rates of online survey:

- Target the audience.
- Personalize email invitations.
- Keep the invitation email short and simple.
- Make simple instruction at the first page of the survey.
- Be clear about privacy protections.
- Send reminder emails.
- Consider offering incentives - gifts, prizes, etc.
- Use graphics and Internet features strategically.
- Publish your results online for survey participants.

2.6 The Perceived Usefulness and Ease of Use

Davies (1989) showed that Technology Accept Model (TAM) can explain the use of IT information. He Applied (Fishbein & Ajzen 's) theory work uncaused to show that beliefs influence attitudes that lead to intentions, thereby generation behaviors. Davies imagines therefore that TAM's Belief - position - faith - behavior relationship predicts accept user IT information. Davis confirmed that perceived usefulness and ease of use represent beliefs that lead to this acceptance. Perceived usefulness is degree which person believes that particular system will strengthen his or her work performance (i.e. by reduce the time for mission accomplishment or providing information timely). Perceived ease of use is the degree which person believes that using particular system will be free efforts.

Two structures in TAM is the attitude towards use and intention behavioral to use. Attitude towards use is user evaluation including the desirability of recruitment particular information systems application. Behavior intention to use is measuring possibility person will employ application.

TAM's dependent variable is actual use. It has typically usually measure reports self time or hesitation recruitment application (see Figure 1). Arrows represent relations interest in current study. May some authors considered additional relationships. Some ignored intention to use and studied instead impact position on use. The current research took that approach. Such theories and models as self-efficacy theory, cost- benefit research, expectancy theory, innovation research, and channel disposition have supported TAM.

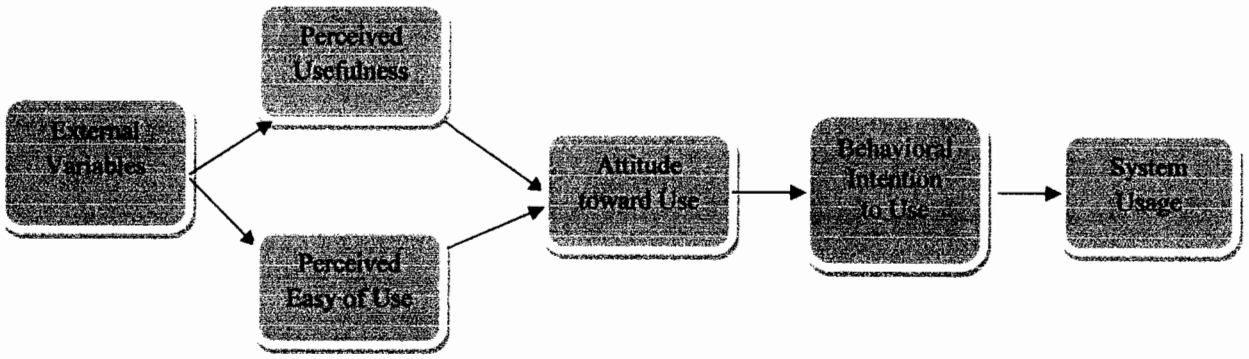

Figure 1: The Technology Acceptance Model

This study has investigated features related to the Perceived Usefulness (PU) and Ease of use (PEOU) of the W-SMS. The Graphic, Visualization, and Usability (GVU) have been conducting Web user surveys for every six months since 1994. The results from the most recent survey identified some key ease of use problems. Most frequently cited was the slow speed of downloading or viewing Web pages. Other problems included disability to perform tasks such as finding a page that they knew existed, organizing the pages and information they gathered, finding a page once visited, and visualize where they had been and could go to find information.

This study found to use the model of PU and PEOU to make the W-SMS totally free without any payment for the user and can help them to organize their work; also the system can be use easily not complicated and with simple design which allows subscribe mange his/her survey comfortably and effectively avoiding the problems with distributing the questioner.

2.7 Best Practices

Best practice is a management idea which asserts that there is a technique, method, process, activity, incentive or reward that is more effective at delivering a particular outcome than any other technique, method, and process. The idea is that with proper processes, checks, and testing, a project can be rolled out and completed with fewer problems and unforeseen complications. According to Dillman (2000), there are some tips in designing web-based survey questionnaire as described below:

- Personalize contacts through e-mail if possible.
- Utilize a multiple contact strategy much like that used for regular mail surveys.
- Keep the invitation brief.
- Begin with an interesting, but simple to answer, question.
- Introduce a Web survey with a welcome screen that is motivational, emphasizes the ease of response, and instructs about how to proceed to the survey.
- Present each question in a conventional format similar to that normally used on paper, self-administered surveys.
- Do not require respondents to provide an answer to each question before being allowed to answer subsequent questions.
- Make it possible for each question, and corresponding potential responses to those questions to be visible on the screen at one time.

Thomas (2003), provides tips in conducting web-based survey which good to do are:

- Shorten the timing between notice and reminders, and the total duration of the response period. Most of the time, 8-10 working days or less is sufficient.

- Shorten the length of invitation and reminder messages.
- Keep the questionnaire short.
- Simplify the questions even more so than in paper surveys.
- Think of the survey as an outline version of a conversation. There should be a natural flow, with transitions between one thought and the next.
- Pilot test each survey with a variety of people using different browsers.
- Avoid undeliverable e-mail invitations by developing accurate Potential respondent e-mail lists.

As a conclusion, a good web-based survey questionnaire design must be able to make the respondents understand the questions easily and answer it in a short time, an appropriate methodology defined to fit the W-SMS developing according to user requirements, system analysis and design is one of the proven methodologies that develop the W-SMS.

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2.8 Chapter Summary

An investigation has been done to define those terms that have been mentioned above. This project is done with some literature review from some resources such as internet, books, conferences and journal. Useful informative such as what are the best practices in handling web-based survey management system (W-SMS) has been covered. Good understanding for each field is very important in order to develop effective web-based survey management system (W-SMS),

CHAPTER 3

METHODOLOGY

3.1Research Methodology

Research methodology is more than just collections of method to perform the W-SMS; it is a systematic way to solve the research problem. This study will adapt a methodology from (Hofer et al., 2004) and is shown in Figure 3.1.

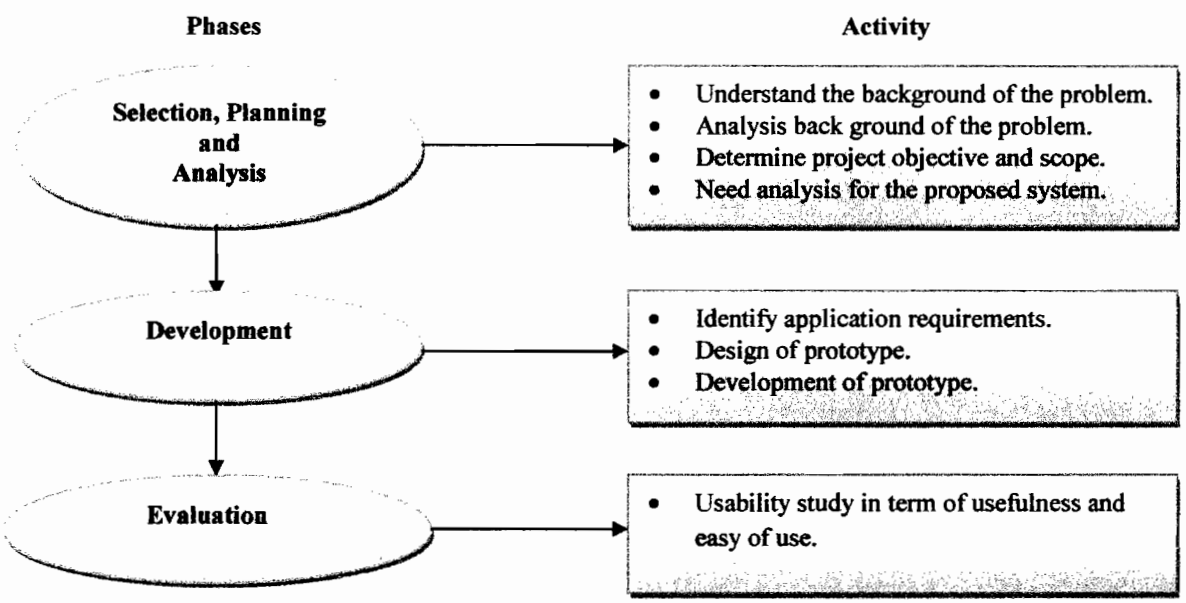


Figure 3.1: Methodology Design

3.2 Selection, Planning and Analysis

Planning is the most important step. The failure of doing a good planning is a hazard to the whole process of implementing the W-SMS. For the beginning, a comprehensive study has to be in order to get the clear idea of the web-based survey management system in term of usefulness and easy of use, the title of current W-SMS was discussed with supervisor. The objective of the W-SMS development was analyzed and defined according to the problem statement. Besides that, the scope of the W-SMS was identified to draw the boundary of W-SMS. Then, some document review including articles in proceedings and journals, magazine, newspaper, and books on the background of the W-SMS was done in order to decide on the methodology of the project.

In the analysis, a few activities was carried out such as document review, Comparative study of current web-based survey management system to identify functional components, interviews with users regarding common process in survey management, and understanding users' background. The aim of this phase is to gain an in-depth understanding of W-SMS. In the literature review essential things, in the requirement of W-SMS such as best practices, common procedures and features of web-based survey management and other related studies were identified and analyzed.

3.3 Development Methodology

After obtaining user requirement in the analysis phase through comparative study and user interviews, it is appropriate to justify on how it meets the identified requirements. In this stage, the interface for the prototype has been designed. Besides that, the database also designed and developed.

3.3.1 Identify W-SMS Requirement

Few activities were carried out in the literature review, such as the definition, types of web-based survey, ways to handle online questionnaire, best practices and guidelines and other related studies were identified and analyzed. Beside that a study on current online questionnaire software has been carried out to understand the processes and procedure of web-based survey management system. Three online survey software's were chosen as examples: my3q, QuestionPro and SurveyMonkey. From these survey software's, the common procedure or functions of W-SMS were recognized and identified.

3.3.2 Design of Prototype

This research proceeded with the design of the prototype based on the requirements gathered for the W-SMS as much as possible to ensure the developed W-SMS can be functioning well and complete. The W-SMS architecture is illustrated in Figure 3.2. User can access to W-SMS via internet.

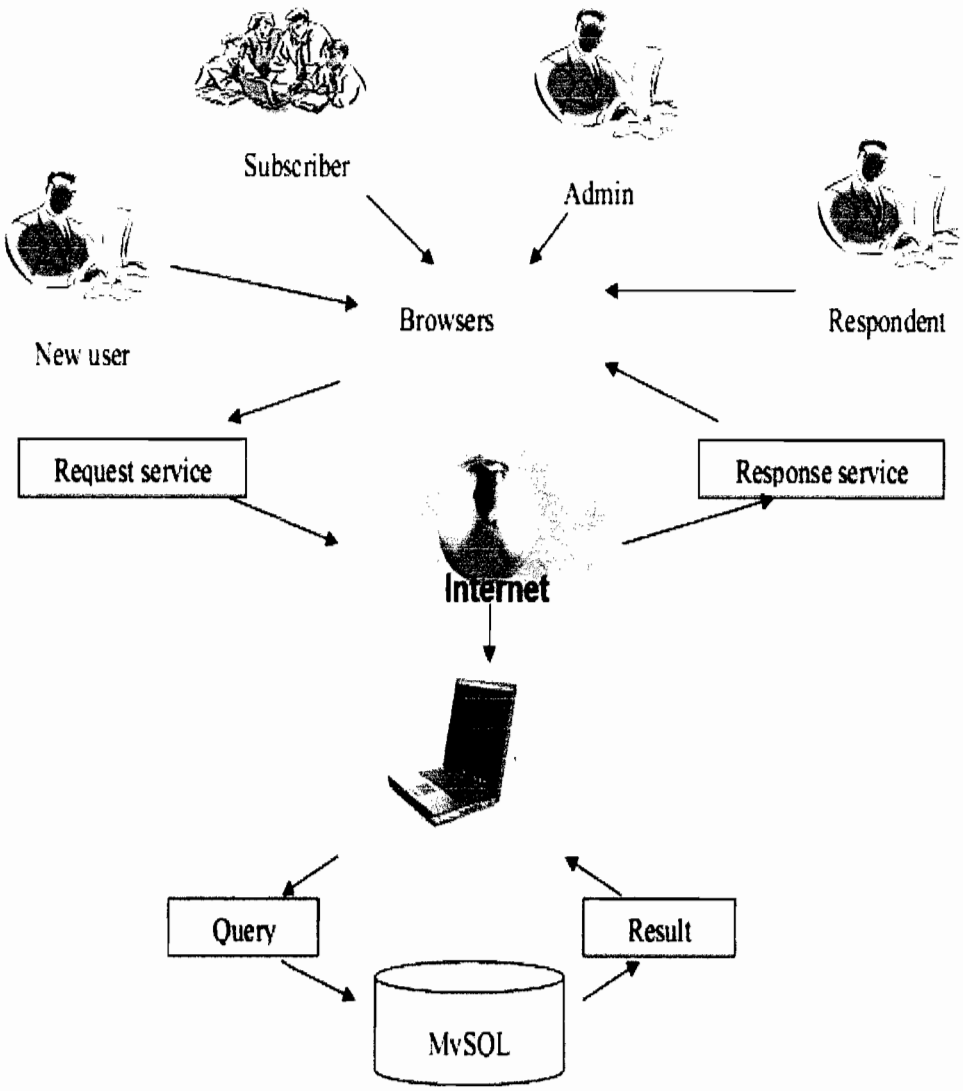


Figure 3.2: W-SMS Architecture Design

Unified Modeling Language (UML) was used to design the Use Case and Sequence Diagram to describe the process of W-SMS and how user can behave with the W-SMS. Further, Figure 3.3 shows the Use Case Diagram, which describes how researches can create questionnaire, distribute questionnaire, and analyzes questionnaire.

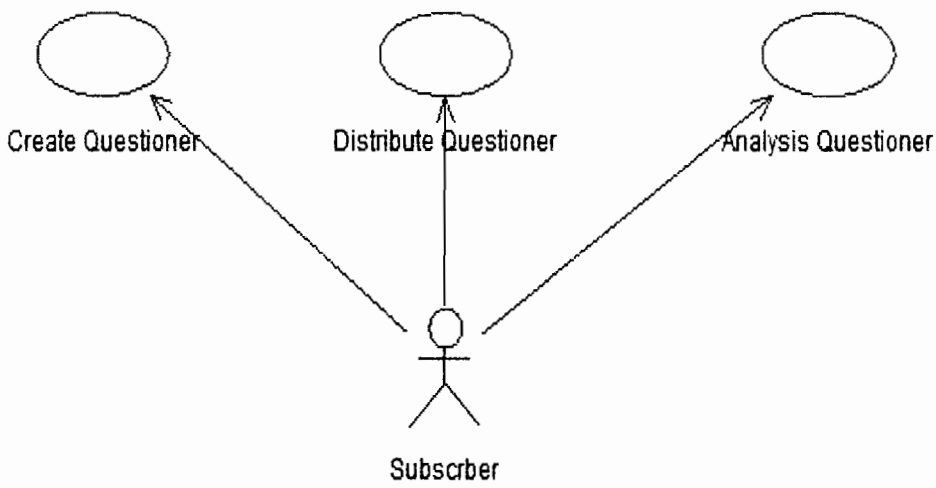


Figure 3.3: W-SMS UML Use Case Diagram

Microsoft (SQL) Server 2005 was used as the Database to store and retrieve all information for the W-SMS; Figure 3.4 shows the database diagram for the W-SMS. The W-SMS contains four tables which are account, email, result, and survey.

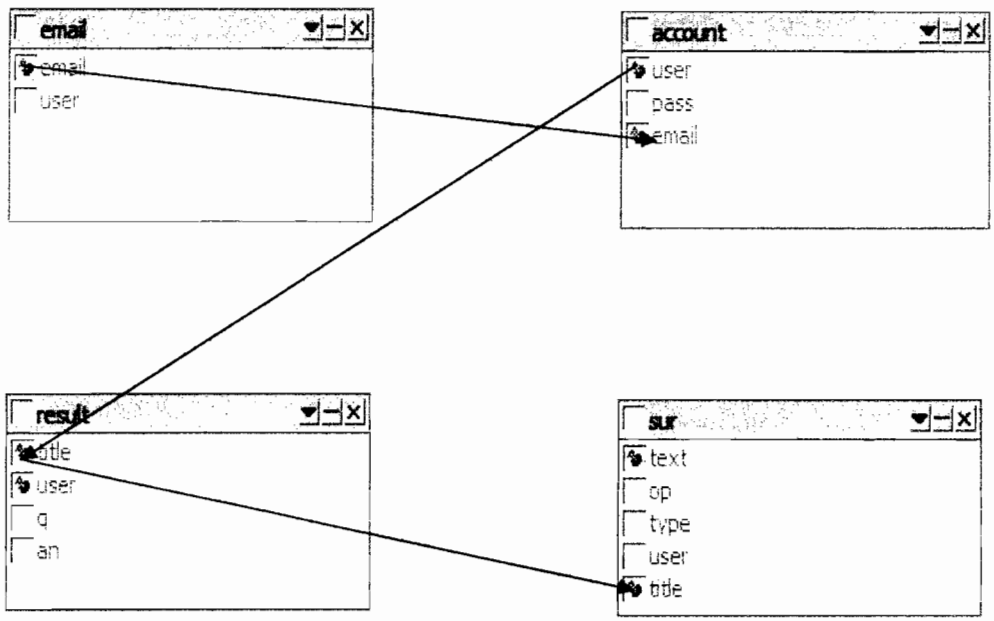


Figure 3.4 W-SMS Database design

3.3.3 W-SMS Development

Java Script Program (JSP) programming language was used to develop the system and Microsoft SQL Server 2005 as database for the W-SMS. By using Xampp, it is easier to execute the W-SMS which uses JSP programming because, Xampp is completed with web servers which is the Apache while JSP My Admin as an interface of MySQL database developer Thus, we do not need to install the server and database separately. After JSP and Apache is successfully compiled, then they can be tested by utilizing the local host

3.3.4 W-SMS Requirements Analysis

Some hardware and software are required to support the development of W-SMS.

3.3.4.1 Hardware Requirements

Hardware requirements are a basic necessity which needed in developing the W-SMS. The hardware includes input and output devices, storage devices and data processor. The identified hardware which are needed in the W-SMS development are personal computer with AMD Turion64, 1 GB RAM, Hard disk with 80 GB capacity, Monitor , Printer, Network card or modem

3.3.4.2 Software Requirements

Software is an important component in developing W-SMS. Table 3.1 list the software and their propose.

Table 3.1: Software required for developing the W-SMS.

Software	Purpose
Microsoft Project 2002.	Microsoft project used to generate Gantt and Pert chart that used as a tool to schedule the W-SMS development.
Rational Rose Enterprise Edition.	Rational Rose is software for UML modeling. This software will be used as a helping tool to model the W-SMS. Example: Use case diagram, Class Diagram, Sequence Diagram and etc.
Adobe Photoshop 7.0.	This software used to create and edit images.
Xampp.	As a server that will be used for the W-SMS.
Microsoft SQL Server 2005 database.	To store all data using by the W-SMS.
Microsoft Words 2007	As a platform to do all documentation work.
JSP	Will be used as programming language of W-SMS.

3.4 Evaluation

Evaluation was carried out to measure the perceived usefulness and easy of use of the W-SMS. The instruments by Davis (1989) that measure Perceived (PU) and (PUEU) which have been widely used in various fields of study such as bank , education, and marketing were adopted for gathering data. Finally, the W-SMS was evaluated by 60 lecturers of UUM; 20 lecturers of each college in UUM; CAS, COB, and COLGIS were involved. First, the lecturers were demonstrated with the W-SMS, and then they tried the W-SMS on their own. A week was allocated for the lecturers to try the W-SMS. Then, their responses on the usefulness and ease-of use of the W-SMS were gathered through the PU and PUEU instruments.

3.5 Gantt chart

Gantt chart is a project scheduling technique. Progress can be represented easily in Gantt chart, by coloring each milestone when completed. The project started in the December 2009 and ended at the end of April 2010 (See Appendix A).

3.6 Chapter Summary

This chapter has identified the W-SMS development methodology and methods or approaches to develop the W-SMS. The prototype methodology is chosen with evolutionary approach as it is appropriate methodology for the W-SMS development. The identified methodology served as a guide to develop intangible information asset

evaluation system prototype. The requirement of software and hardware is stated in this chapter to clarify the W-SMS functions and features.

CHAPTER 4

DESIGN AND DEVELOPMENT OF THE W-SMS

4.1 Design of W-SMS

Chapter 3 states that W-SMS was designed with UML. This chapter details the design in the form of functional and non-functional requirement. Also describes about the result from design phase of W-SMS they were used as inputs for the implementation such as user requirement and prototype design. The end result is a prototype of W-SMS.

4.1.1 FUNCTIONAL REQUIREMENT

Functional requirement describes what W-SMS must do and the process of the W-SMS or information it needs. The functional requirements of W-SMS are listed in Table 4.1. the researches who is going to develop questionnaires in W-SMS is referred to as subscriber.

Table 4.1: Functional Requirement

No.	Requirement ID	Requirement Description	Priority
	W-SMS_01	**Login**	
1.	W-SMS_01_01	Subscriber should be able to login by Username and their password.	M
	W-SMS_02	**Create questionnaire**	
2.	W-SMS_02_01	Subscriber able to create his/her own design questionnaire	M

	W-SMS_03	**View analysis data.**	
3.	W-SMS_03_01	Provide real time analysis for subscribers	D
	W-SMS_04	**Distribute Questionnaire**	
4.	W-SMS_04-01	Subscriber Send the questionnaire to respondents based on selected respondents email list.	M

The above table shows the functional requirements and its usage, there are four main functions of W-SMS which are

Create questionnaire

- Design questionnaire with different types of questions like using radio button.
- Edit the questionnaire design before submitting the questionnaire.

Distribute questionnaire

- Insert the respondents email.
- Insert new respondents email list.
- Send the questionnaire to respondents based on selected respondents.

View analysis data

- Provide real time analysis for subscribers.

4.1.2 NON-FUNCTIONAL REQUIREMENT

Non-functional requirement refers to behavioral properties that the system must have, such as usability and performance. Table 4.2 shows the non-functional requirement for W-SMS.

Table 4.2: Non-Functional Requirement

No.	Requirement ID	Requirement Description	Priority
	W-SMS_05	**Operational**	
5.	W-SMS_05_01	The system can be accessed from everywhere.	M
	W-SMS_06	**Performance**	
6.	W-SMS_06_01	The system should be available for use 24 hours per day and 365 days per year.	M
	W-SMS_07	**Security**	
7.	W-SMS_07_01	All the subscribers and admin of the system have their login ID.	D

Besides the functional and non-functional requirements, the specification for each task is also detailed. The following section discusses on the specifications.

4.2 Use Case Specification of W-SMS

Descriptions about specific functions for each requirement in W-SMS to be understood by the user are listed below

1- Use case: Login ID

Use Case Name: Login	**ID:** _W-SMS_01_01	**Importance Level:** High
Primary Actor: subscriber		
Short Description: This use case is initiated by the subscriber, this will enable the subscriber enters into the W-SMS system and allows subscriber to browse through the W-SMS system.		
Trigger: The subscriber enter his / her username and password to effect the login **Type:** **External** / Temporal		

Major Inputs:		**Major Outputs:**	
Description	Source	Description	Destination
Username	subscriber	subscriber main page	W-SMS
Password	subscriber		

Major Steps Performed	**Information for Steps W-SMS**
1. The subscriber access to learning zone page.	Username entered.
2. The subscriber's username and password are entered in login screen.	Password entered.
3. If the subscriber's username or passwords are invalid, the system wills pop-up an error message "Invalid login, please try again ".	The subscriber presses submit bottom to access.
4. So subscriber should do re-enter the correct username and password again to login into the W-SMS system.	Subscriber's main page is displayed or exception.
5. If the subscriber's username and password are valid, the W-SMS will display the corresponding subscriber main page interface.	

2. **Use case: Create** Questionnaire

<table>
<tr><td colspan="2">Use Case Name: Create questionnaire</td><td>ID: _W-SMS_02_01</td><td>Importance Level: High</td></tr>
<tr><td colspan="4">Primary Actor: subscriber</td></tr>
<tr><td colspan="4">Short Description: This use case allows the user to create the online questionnaire.</td></tr>
<tr><td colspan="4">Trigger: subscriber wants to conduct a W-SMS by letting the respondents to answer online questionnaire.

Type: <u>External</u> / Temporal</td></tr>
<tr><td colspan="2">Major Inputs:
Description Source
<u>Create questionnaire</u> <u>subscriber</u></td><td colspan="2">Major Outputs:
Description Destination
<u>Create questionnaire</u> <u>W-SMS create page</u></td></tr>
<tr><td colspan="2">Major Steps Performed
1. Opens the subscriber part for create the questionnaire
2. Create new secrete key for each new questionnaire
3. Key in the detail about the questionnaire
4. design questionnaire
5. Submit the questionnaire.</td><td colspan="2">Information for Steps W-SMS
Subscriber displayed the create page questionnaire

The subscriber press create bottom to start design questionnaire.

Send to respondent for answering.</td></tr>
</table>

3. **Use case: Distribute** questionnaire

Use Case Name: Distribute questionnaire	**ID:** _W-SMS_03_01	**Importance Level:** High
Primary Actor: subscriber		
Short Description: This use case allows user to send their online questionnaire to respondents.		
Trigger: Subscriber wants to invite respondents to answer their online questionnaire. **Type:** **External** / Temporal		

Major Inputs:		**Major Outputs:**	
Description	Source	Description	Destination
Distribute questionnaire	subscriber	Distribute questionnaire email list	W-SMS

Major Steps Performed	**Information for Steps W-SMS**
1. Opens the subscriber part to create their respondents' email list. 2. Select questionnaire. 3. Set email list. 4. Send the online questionnaire to respondents.	Subscriber displayed the email list page.. Send to respondent to answering.

4. **Use case: View analyze data**

Use Case Name: View analyze data	**ID:** _W-SMS_04_01	**Importance Level:** High
Primary Actor: subscriber		
Short Description: This use case allows user to analyze data to other storage media.		
Trigger: Subscriber wants to analysis data. **Type:** **External** / Temporal		

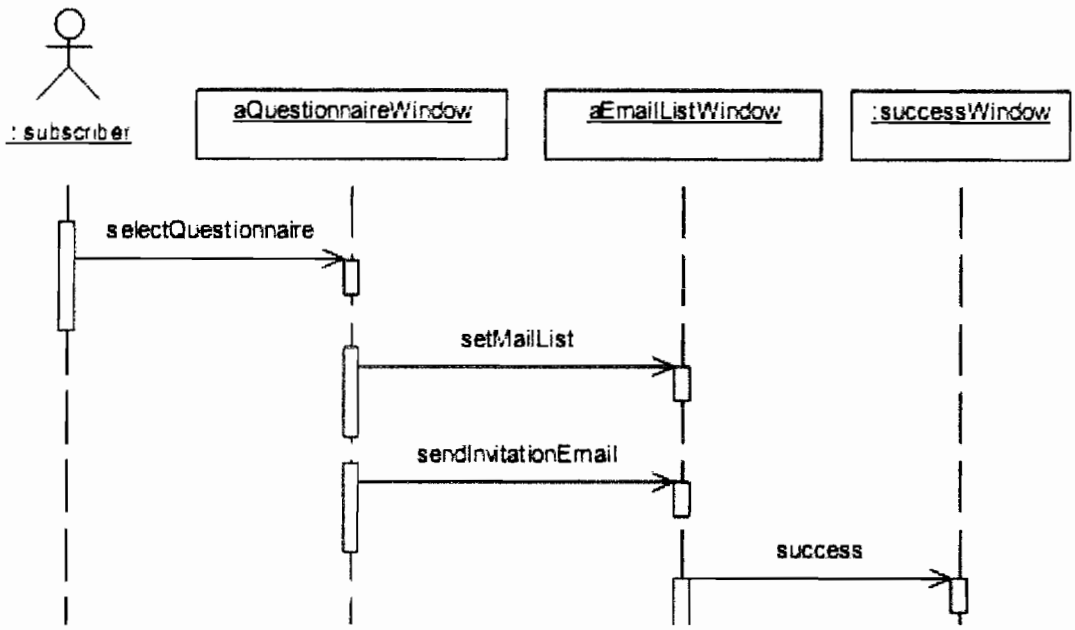
Major Inputs:		**Major Outputs:**	
Description	Source	Description	Destination
View analyze data	subscriber	Analyze data	W-SMS analyze data
Major Steps Performed 1. Opens the subscriber part to analyze data. 2. Select questionnaire. 3. analyze data		**Information for Steps W-SMS** User pres button analyze data. Display the page analyze data	

Besides the use case, sequences diagrams were also developed. The next section discusses about the sequences diagram of W-SMS.

4.3 Sequence Diagram of W-SMS

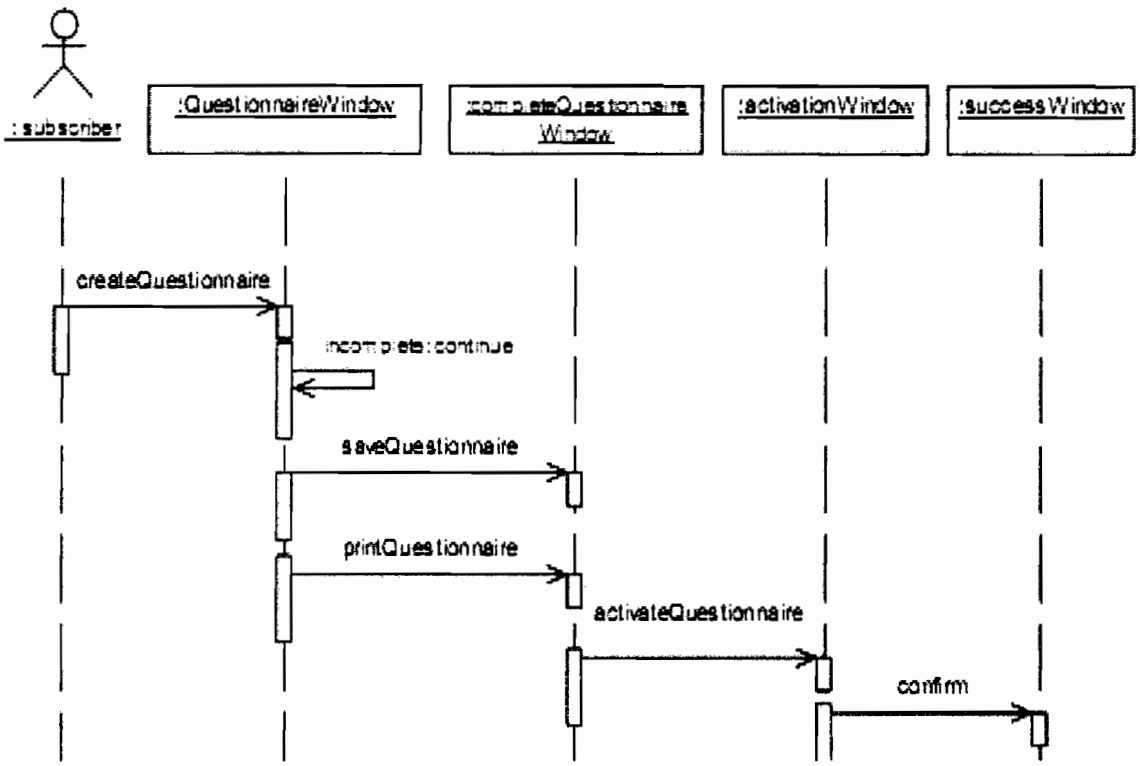
Sequence diagram shows the step of each process involved in the W-SMS. According to Fowler (2004) the sequence diagram is a (UML) diagram that shows the processes that execute in sequence, the sequence diagram shows the sequence of message, which are exchanged among roles that implement the behavior of the system, arranged in time, it shows the flow of control across many object that collaborate in the context of a scenario. The sequence diagram captures the behavior of single use case by showing the messages passed between those object of the case and describe the sequence of operation in that use case. There are three sequence diagrams involved and displayed in the following.

1- Distribute questionnaire



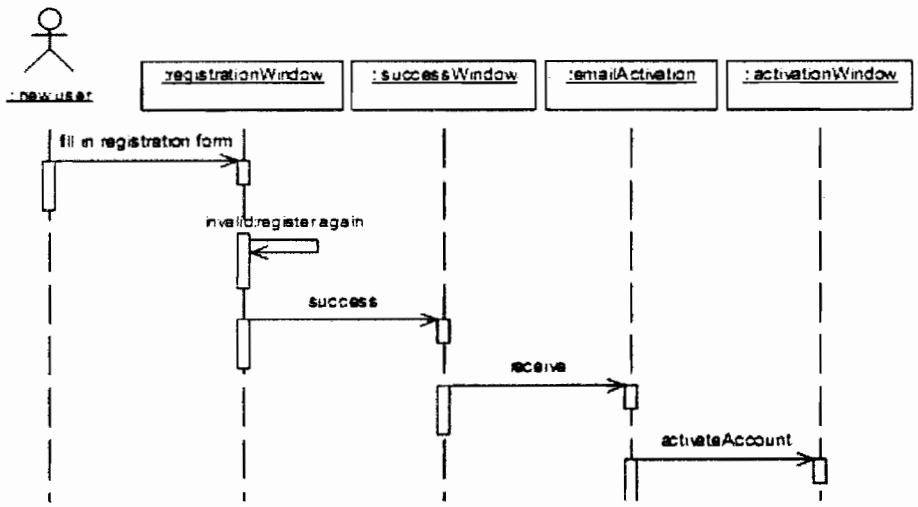
The above sequences diagram shows the operation of how it goes during distribute the questionnaire

2- Create questionnaire



The sequence diagram shown above depicts the steps of creating the questionnaire.

3- Use case: Login



The above sequence diagram shows the steps of log in into the W-SMS.

4.4 Database Development

Data integrity and constraints have been implemented in three stages – in the database level, in the server side code and in the client side. While the client side checks have been implemented using java script in various forms. In the server side, JSP coding checks have been implemented to control the data that which is sent to the database. However, most importantly, checks and constraints have been implemented within the MySQL database in the following manner to ensure that data integrity is not violated the following are Tables 4.3 through 4.6 which details the database design in chapter 3.

Table4.3: Account

Field	Type	Null	Default Value	Constraints
User	varchar(200)	No		PRIMARY KEY (`User`)
Password	varchar(100)	yes		
Email	varchar(100)	No		

Table 4.4: Email

Field	Type	Null	Default Value	Constraints
User	varchar(200)	yes		
Email	varchar(25)	yes		PRIMARY KEY (`Email`)

Table4.5: Result

Field	Type	Null	Default Value	Constraints
Title	varchar(200)	No		PRIMARY KEY (`Title`)
User	varchar(200)	No		
Question	varchar(200)	No		
Answer	Varchar(200)	No		

Table4.6: Survey

Field	Type	Null	Default Value	Constraints
Text	varchar(200)	No		PRIMARY KEY (`Text`)
Choice	varchar(200)	yes		
Type	varchar(200)	yes		
User	varchar(200)	yes		
Title	varchar(200)	No		PRIMARY KEY (`Title`)

4.5 Development of the W-SMS and User Manual

This section elaborates the development of W-SMS. Chapter 3 covered the software used in developing the W-SMS. Beside on the requirements in previous section, this section presents some snapshots of W-SMS. Figure 4.7 depicts the front page when users enter into the W-SMS.

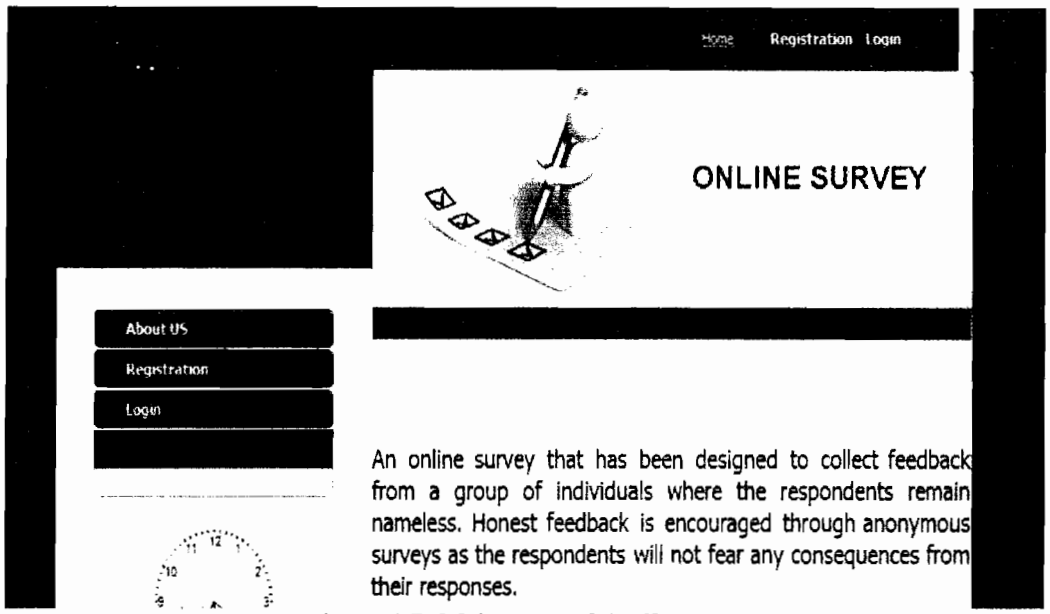


Figure 4.7: Main page of the W-SMS

To use the W-SMS users have to register first. This is for security purpose. After the registration is made, uses will have username and password to enter the W-SMS next time. When users click on registration button, the page as shown in Figure 4.8 is displayed.

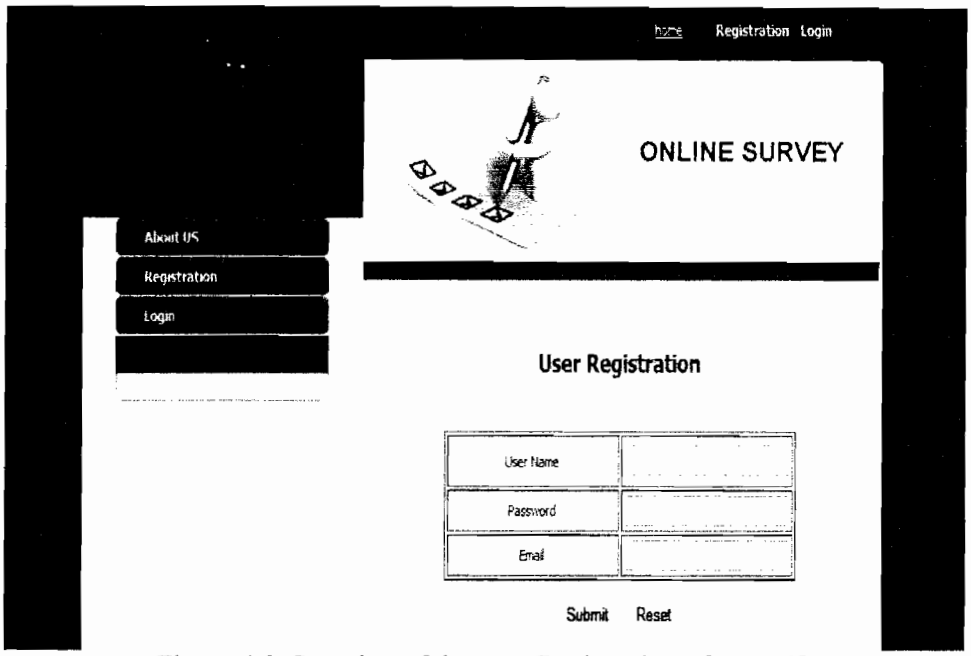


Figure 4.8: Snapshot of the User Registration of W-SMS

Users need to register the username and password. Email is also registered. After that it allows users login into the W-SMS as shown in Figure 4.9.

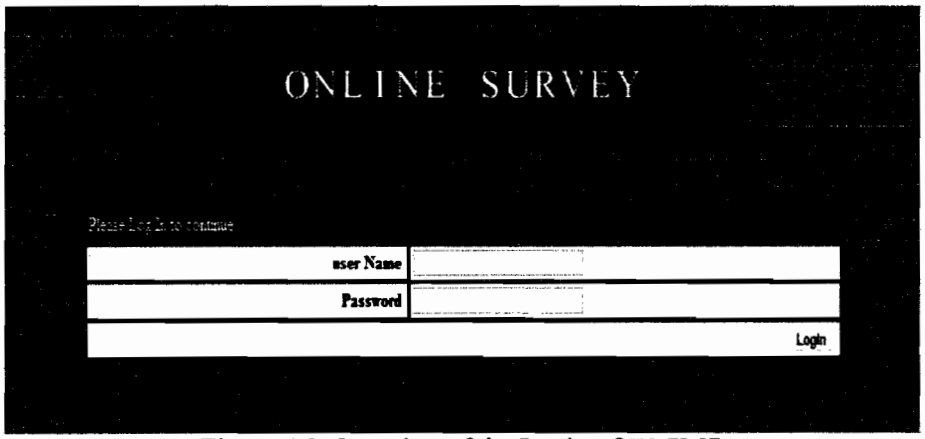


Figure 4.9: Snapshot of the Login of W-SMS

When users enter into W-SMS, they are displayed with the page as shown in Figure 4.10. There are a list of modules user can do including design survey and other functions provided by W-SMS.

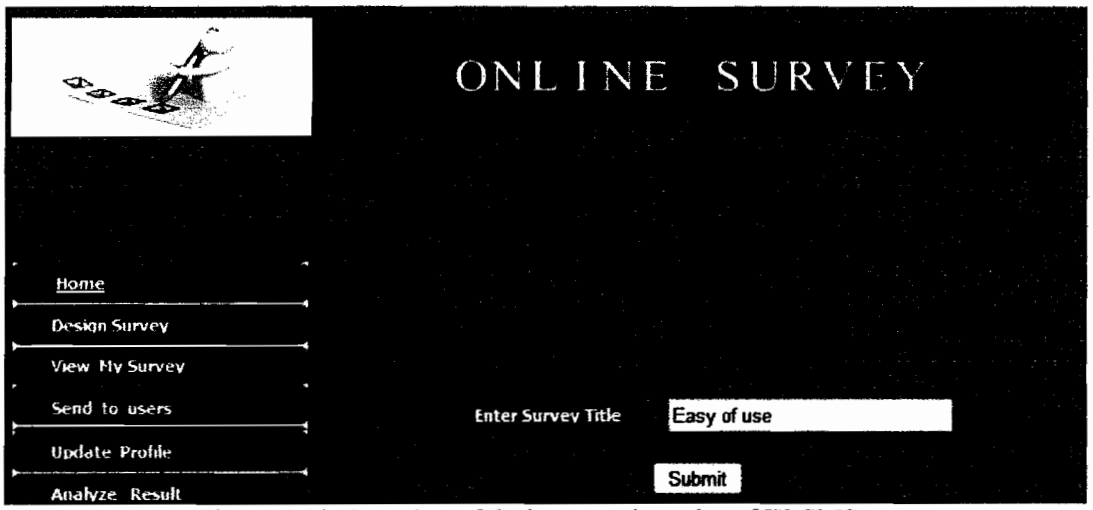


Figure 4.10: Snapshot of design questionnaire of W-SMS

When users click the design survey button, the page as shown in Figure 4.11 is displayed, in this page; users will create the intended questionnaire.

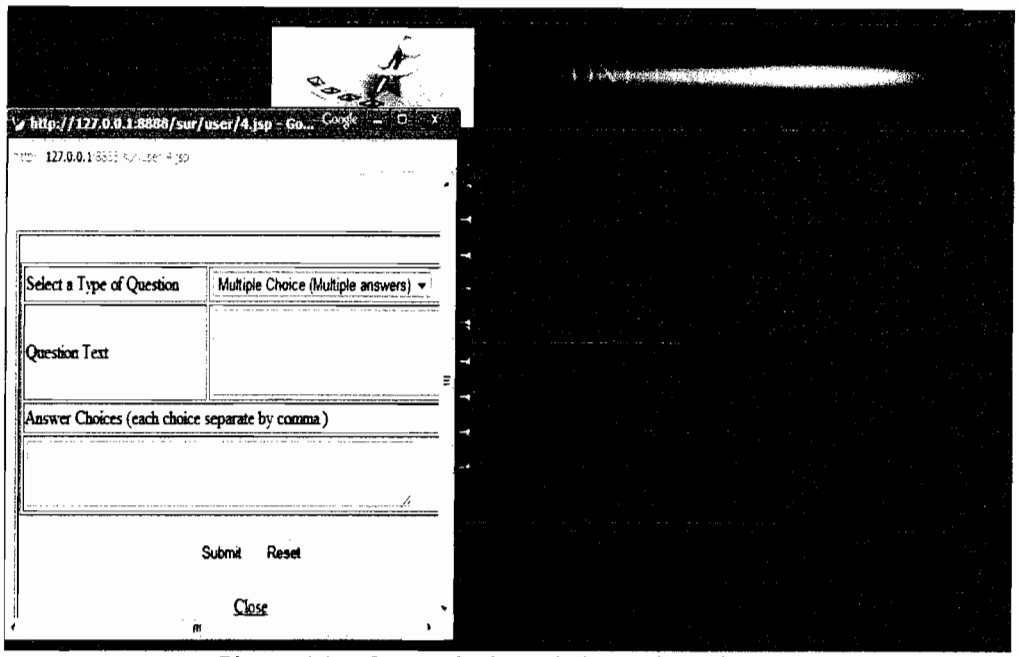


Figure 4.11: Create the intended questionnaire

Users can create survey items in a questionnaire as they want. In addition users can design different formats of questions in questionnaire such as radio button, checkbox and comment. This caters for both open-ended and close-ended. Figure 4.12 shows a page when the questionnaire designed is completed.

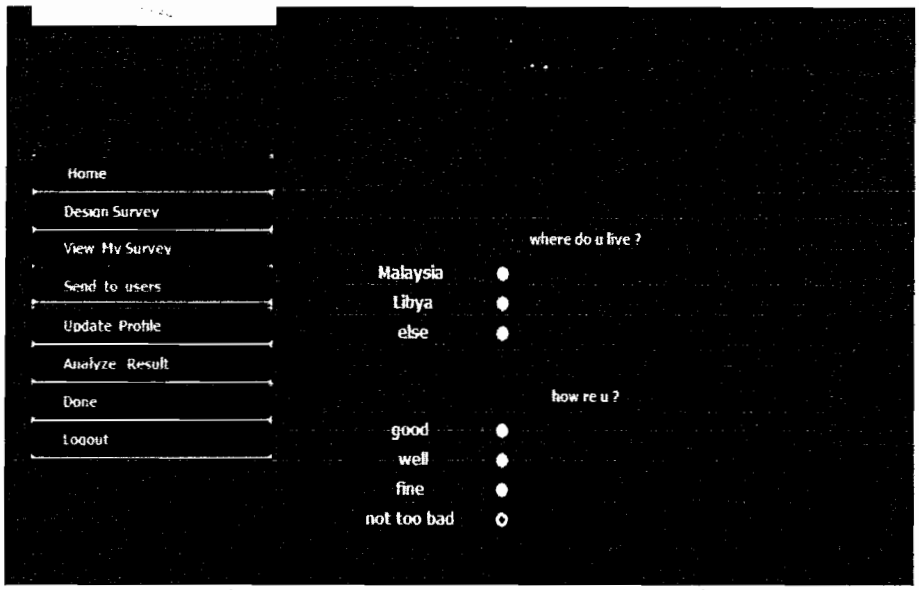


Figure 4.12: Questionnaire designed completed

The completed questionnaire can be emailed to respondents immediately as shown in Figure 4.13.

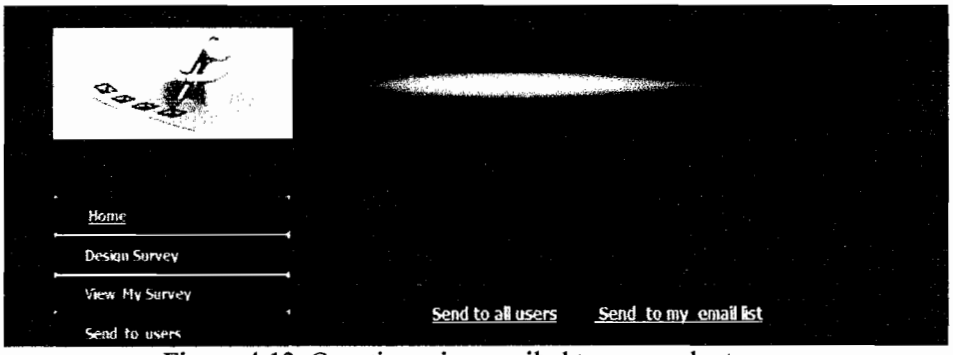


Figure 4.13: Questionnaire emailed to respondents

4.6 Chapter Summary

This chapter discusses about the design process of W-SMS. It is followed with the W-SMS itself, some snapshoot are depicted for the purpose of this study. The developed prototype was sufficiently workable.

CHAPTER 5

TESTING AND DATA ANALYSIS

Chapter 4 elaborates how W-SMS was designed and developed. In addition some snapshots are depicted with sufficient descriptions. The W-SMS as described in Chapter 4 is a working prototype, which is sufficient to convey its functional and non-functional components. The prototype was then evaluated. It was aimed at measuring how usefulness and how easy the W-SMS is to use.

This chapter discusses how the prototype was evaluated. First, it describes briefly about the functional ability, Then the test on usefulness and easy of use follow.

5.1 Functional Testing

This study makes sure that W-SMS functions properly as it should before measuring whether it is useful and easy of use as perceived by real users. All functions were tested in the lab. Table 5.1 details the tests including module name, tasting tasks, expected result, and actual result.

Table 5.1: List of black box testing

Module	Testing	Expected Result	Result
Register user	Insert wrong user ID and password	Error message is Displayed.	Valid
Create survey	Insert survey detail and click "submit"	The newly created survey is displayed.	Valid
	Click the delete link to delete survey item	The deleted item is disappeared from the questionnaire	Valid
Update user detail	Insert wrong staff ID and Password	Error message is displayed.	Valid
	Edit current detail and click "Save"	New data is displayed.	Valid
Email the questionnaire	Email the creates questionnaire to respondent	The respondents receive the questionnaire in their email	Valid
Gather feedback	Respondent sends answers to W-SMS	Requests are stated in database	Valid

From the details in Table 5.1, this study confirms that the W-SMS is functioning as intended. In particular, the major functions such as create questionnaire, display questionnaire, distribute questionnaire, and gather feedbacks perform at their best.

5.2 Non-Functional Testing

Sixty lectures of UUM; 20 lecture of each college, CAS, COB, and COLGIS; were involved in this study. They were identified randomly from the name list printed in telephone directory.

Each lecture was allocated a week to try the W-SMS on their own. At the end of the study, they returned the answered questionnaire. As stated in Chapter 3, this study adapted PU and PEOU (See Appendix B) to collect data.

5.3 General Information

Beside empirical data through the PUEU, the subjects also express their experience in words. This type of comments is important in complementary empirical result. All respondents believe that by using the W-SMS, it will improve the survey process. This is because the W-SMS can shorten timeframe to administer surveys. Besides that, it can let researches to immediately retrieve the data for analysis. They also agree that W-SMS could reduce costs and duration significantly. Moreover it is an in-house system which is trusted to protect their privacy. More importantly the W-SMS is also appreciated by the respondents because it is free and always available.

5.4 Demographic Analysis

The previous section discuses about subjective comments by the respondents who involved in experiencing the W-SMS. Among 60 respondents, 20 are males and 40 are females. In addition, more then half of the respondents are lecture 31-40 years old. Only

5 lectures with age below 31 years old involved besides 20 lecture one at least 40 years old. Table 5.2 lists the details.

Table 5.2: Demographic Data summary

Demographic Data	Frequency	Percentage (%)
Gender		
1. Male	20	60
2. Female	40	40
Age		
1. < 31	05	8.33
2. = 40	35	58.33
3. > 40	20	33.33
online survey system		
Familiar	15	25
Non familiar	45	75

5.5 Usefulness and Ease of Use

All respondents answered the PUEU satisfactorily. This study assumes that the answers are valid because respondents were given one week to use the W-SMS, and they answered the PUEU on their own time. This study utilizes the gather data to measure respondents' level of perceptions on both usefulness of W-SMS and easy of use. The

perceptions are good for means greater then 3.5 and vice versa. When the mean have been calculated, they were tabulated in Table 5.3.

Table 5.3: Descriptive Statistics for All Items

Item	Mean
PERCEIVED USEFULNESS	
1. Using W-SMS would improve my performance.	3.85
2. Using W-SMS would enable me to accomplish tasks more quickly.	4.06
3. Using W-SMS would make it easier to do my tasks.	3.79
4. Using W-SMS would enhance my effectiveness.	3.91
5. Using W-SMS would increase my productivity.	3.94
6. I would find W-SMS useful in my everyday tasks.	3.58
PERCEIVED EASE OF USE	
7. I would find W-SMS to be flexible to interact with.	3.70
8. It would be easy for me to become skilful at using the W-SMS.	3.97
9. My interaction with W-SMS would be clear and understandable.	3.85
10. Learning to operate W-SMS would be easy for me.	3.67
11. I would find it easy to get W-SMS to do what I want it to do.	3.64
12. I would find W-SMS easy to use.	**4.27**

From Table 5.3, it is seen that all items are perceived positive. This could mean that respondents perceived that W-SMS are useful in administrating online survey and also it is easy to use (Refer to Appendix C).

5.6 Summary

Contents of this chapter include general comments about the W-SMS. It was found that the prototype is useful and easy of use from users view. Also, some demographic backgrounds are discussed on top of descriptive analysis of data obtained through the PUEU. Findings in this chapter are discussed in the next chapter.

CHAPTER 6

DISCUSSION AND CONCLUSION

Based on the previous chapter, especially Chapter 4 and 5, this chapter elaborates some achievements and constraints of this study.

6.1 Achievement

After going through processes such as coding design, interview, finding information from internet, books, and journals, a basic concept and theory of the W-SMS were identified. Among each achievements of this study are:

- The basic concept of web-based survey management system including the definition and web-based survey administration processes.
- Best practices in handling web-based survey management system, design questionnaire and way to increase the response rate.
- Prototype of the Web Based Survey Management System

In addition, the prototype has been tested on its functionalities. It was found that the W-SMS works well in creating online questionnaire, displaying it, distributing it, and gather responses from respondents. When it was tested on usefulness and easy of use, the results indicated in Chapter 5 show that respondents perceived the W-SMS as truly useful and easy to use. This could be interpreted that the W-SMS is able to help researches carrying out surveys.

Among characteristics of W-SMS that users appreciate more are:

- In-house management and free.

- Always available.
- Simple navigation.
- Simple instruction and language.
- Comprehensive survey management steps.
- Simple survey management steps.
- Various types of questions supported.

6.2 Constraints and Challenges

There were some constrains and challenges that were faced during the early phase of the W-SMS development especially when conducting the research process for the analysis phase. The identified constraint and challenges are as below:

- It is quite hard to get back all the questionnaires from respondents.
- There is different point of view in best practices and guidelines from different author. Thus, it is bit confusion in choosing the appropriate one.
- The limited time to do more in depth research and study is another challenge to gather the complete information and understanding for this study area.

6.3 Aspirations

Although there were challenges and constraints faced during early phase of the W-SMS development, the literature review about the W-SMS and initial finding to develop the W-SMS has been done successfully.

All the objectives of the W-SMS that has been pointed in the beginning of the project have been successfully achieved. All the user requirements fulfilled according to the W-SMS plan and the W-SMS can help all users in handling web-based survey effectively.

6.4 Future Enhancement for the W-SMS

In this study the W-SMS was developed to carry the functionality and not on its graphical user interface. It is suggests to use more graphically icons to represent some functions or testing the W-SMS and analysis in different model of instruments With this, it will make the W-SMS more attractive and hopefully, this can help in increasing development rate of W-SMS.

6.5 Chapter Summary

In conclusion, all the activities were completed successfully. What can be concluded here is web-based survey management system W-SMS is an initiative taken in purpose to help researchers in managing their questionnaire in more effective and interactive way. The benefit of having web-based survey management system can be seen clearly after all the research on questionnaire management. The expected result of this project is hopefully could give the overall benefits to all the users of the web-based survey management system.

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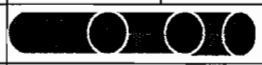
Appendix A

Gantt chart

	December	January	February	March	April	THE INPUT
Problem idea						Schedule + object
Chapter 01						Introduction
Chapter 02						Literature
Chapter 03						Methodology
Chapter 04-06						Analysis and finding and conclusion
Coding						Prototype system
Documentation						Proposal / Final report

Appendix B

Questionnaire

(Survey on Web-Base Survey Management System)

(W-SMS)

This will only take few minutes. Please complete the questionnaire below. Your opinion will be very helpful in a study to develop a useful and interactive W-SMS. Your kind response would be greatly appreciated.

PERCEIVED USEFULNESS 1 2 3 4 5 6 7 NA	
1.Using the W-SMS in my job would enable me to accomplish tasks more quickly	Unlikely ○ ○ ○ ○ ○ ○ ○ likely ○
2.Using the W-SMS would improve my job performance	Unlikely ○ ○ ○ ○ ○ ○ ○ likely ○
3.Using the W-SMS in my job would increase my productive	Unlikely ○ ○ ○ ○ ○ ○ ○ likely ○
4.Using the W-SMS would enhance my effectiveness on the job	Unlikely ○ ○ ○ ○ ○ ○ ○ likely ◉
5.Using the W-SMS would make it easier to do my job	Unlikely ○ ○ ○ ○ ○ ○ ○ likely ○
6.I would find the W-SMS useful in my job	Unlikely ○ ○ ○ ○ ○ ○ ○ likely ○

PERCEIVED EASE OF USE 1 2 3 4 5 6 7 NA	
7.I would find the W-SMS useful in my job	Unlikely ○ ○ ○ ○ ○ ○ ○ likely ○
8.I would find it easy to get the W-SMS to do what I want it to do	Unlikely ○ ○ ○ ○ ○ ○ ○ likely ○
9.My interaction with the W-SMS would be clear and understandable	Unlikely ○ ○ ○ ○ ○ ○ ○ likely ○
10.I would find the W-SMS to be flexible to interact with	Unlikely ○ ○ ○ ○ ○ ○ ○ likely ○
11.It would be easy for me to become skillful at using the W-SMS	Unlikely ○ ○ ○ ○ ○ ○ ○ likely ○
12.I would find the W-SMS easy to use	Unlikely ○ ○ ○ ○ ○ ○ ○ likely ○

~ Thanks for your time ~

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APPENDIX C

DATA COLLECTION

1	ITEM01	ITEM02	ITEM03	ITEM04	ITEM05	ITEM06	ITEM07	ITEM08	ITEM09	ITEM10	ITEM11	ITEM12
2	5	3	4	4	4	5	3	5	5	5	3	3
3	5	3	3	5	5	4	5	4	5	3	3	4
4	5	3	3	4	5	3	5	4	3	3	3	4
5	5	3	3	4	5	4	4	4	3	3	3	4
6	5	4	3	4	5	5	4	5	3	5	3	5
7	5	4	4	4	5	5	5	5	3	5	5	4
8	5	4	4	4	5	3	5	5	3	5	5	4
9	5	5	4	4	3	3	5	5	3	5	4	4
10	4	5	4	4	3	3	5	5	4	5	4	5
11	4	5	4	4	3	5	5	5	4	4	5	5
12	4	4	4	5	3	5	5	5	4	4	5	5
13	5	4	5	5	3	5	4	4	4	4	5	5
14	5	5	5	5	3	5	4	3	4	5	5	5
15	4	5	5	5	4	5	4	4	4	5	5	5
16	5	5	5	5	4	4	4	5	4	5	5	5
17	4	5	5	5	4	4	5	4	4	5	4	4
18	5	5	5	4	4	4	5	3	3	5	4	3
19	4	5	5	4	4	5	4	4	3	5	4	4
20	5	4	4	4	4	5	4	4	3	5	4	5
21	4	4	3	4	4	5	4	5	3	5	5	4
22	5	4	4	4	4	5	5	5	3	5	5	3
23	4	4	5	4	3	5	5	5	3	3	5	4
24	5	5	4	4	3	5	5	5	4	3	5	5
25	4	5	3	4	3	5	5	5	4	3	5	5
26	4	5	4	4	3	5	5	5	4	3	5	3
27	4	5	5	4	3	5	5	4	5	4	3	3
28	4	5	5	3	3	3	5	4	5	4	3	3
29	4	5	3	3	4	3	4	4	5	4	3	5