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ABSTRACT

This project aims to develop an E-Questionnaire for users through the web. Besides that, it will create awareness among users on the proper way of using password and more.

E-Questionnaire System provides users information for example information about password usage. Moreover, this system provides an example for users as a guideline to answer questionnaire on web. Those questions inside E-Questionnaire's questionnaire are in both open ended and closed format. Users can answer in Malay and English languages. E-Questionnaire does provide online submitting facility. After accumulating, reports can be generated by users. This application will be developed using the prototype model.

The software that used to develop the E-Questionnaire System are Microsoft Visual Interdev, Internet Information Server 4.0 and Microsoft SQL Server. The server will run on Windows NT while the client will operate on any platform. The E-Questionnaire will be build using Active Server Page (ASP) technology. ASP provides the capability for the Web server to process application logic, then deliver standard HTML to the client browser. VBScript and JavaScript will be used together with HTML to develop the E-Questionnaire.

The survey method is used to elicit user requirements from potential users. The system is able to perform data entry, modification & deletion of data. The system also has error detection, help facility, and email-sending facility. The system has some security features, efficiency in computer technology, expendability, friendly user interfaces and a reasonable response time. This application will be developed using top down modular approach.

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Chapter 1

1 Introduction

1.1 Project Background

Today, the world is moving towards the information technology age and Malaysia is heading towards that direction too. Technological advancements had imposed radical changes in the field of education. Information is no longer recorded using the traditional method of ink and paper but is stored in databases which reside in servers. Publishing or reading materials will never be the same again with the introduction of information technology. Now in this fast paced world, electronic publishing prevails.

The Internet serves as a catalyst to the web revolution. The presence of the Internet has revolutionized the way information is presented or conveyed to people. The words Internet and World Wide Web are inseparable. The World Wide Web was initially created to share textual information around the world. Currently, information in the form of images can be circulated around the world too.

Today, millions of people around the world view information via the Internet using various types of browsers. Accessing information has never been easier: albeit, information is at our fingertips.

Among information available on the Internet is the *questionnaire on the web*. The word web is derived from the word World Wide *Web*. Thus, a questionnaire on the web means using the Internet to do survey. A typical web questionnaire is a dynamic web page. This web page is linked to a web server that will process the application logic. The execution of this application logic may access databases and enable manipulation of data inside the databases. Finally, the results will be sent back to the user as a web page.

An E-Questionnaire on the web is a type of questionnaire on the web. Therefore, this questionnaire provides questions for users to answer through the web online. After answering those questions, those data will be kept inside a database.

The difference between this E-Questionnaire and other questionnaires is this E-Questionnaire can generate reports faster and easier after submitting the E-form. Anyone who needs to create and publish online forms or surveys for their homepage or website can use this application. E-Questionnaire helps users to create and maintain online feedback forms or surveys from any PC connected to the Internet and a browser. All results will be stored in the database on the server and available for users reference at any time.

1.2 Project Rationality

1.2.1 Motivation

In these days, the Internet is used widely. Everyone wants their applications to be applicable on the Internet, not to mention the numbers of the Internet users increasing daily.

It can be seen through cyber cafes mushrooming in towns, computer labs in schools and offices. It is wise that we start having questionnaires available on the web now before we are left behind.

1.2.2 Problem & Reasons of Developing an E-Questionnaire

The basic problem is to make the questionnaires available on the web where users could answer them online. This system enables users to create and answer questionnaires just by logging onto the Internet. It is capable of controlling and handling every answer given by users and does not need any interference from humans. This will increase the efficiency of answering questionnaires.

1.3 Aims & Objectives

The aim of the project is to develop an E-Questionnaire about password usage for users through the web. Besides that, it will create awareness among users on the proper way of using password.

To achieve this aim, the objectives are set out as below:

i. *To achieve the paperless administration.*
Normally users need to fill up numerous forms for answering certain questionnaires. This approach increases paper usage. Much paper work will be eliminated when electronic forms are used to replace manual forms. It is hoped that E-Questionnaire will reduce paper usage.

ii. *Easy to access.*
The ability to browse through the Internet will allow users to answer questions anywhere they like as long as they can get their personal computer online.

iii. *To reduce manpower for distributing and collecting forms.*
Besides, E-Questionnaire with online ability can reduce a large amount of workers who are distributing and collecting questionnaires.

iv. *To reduce expenses and time.*
Questionnaires can be distributed to related users through this E-Questionnaire system. Organizations do not have to send questionnaires through post to related users. Organizations also do not have to spend more money buying stamps and envelopes. These jobs can be done by the E-Questionnaire system. Moreover, those related organizations do not have to wait for users to reply. Computer will do all the waiting and data arranging.

v. *To avert data from missing.*
With E-Questionnaire, the problem of missing data can be solved. This is because computers do all receiving processes.

vi. *To reduce processing error due to lower level of human intervention.*
E-Questionnaire system can also minimize errors. Errors will surely be less as compared to human intervention.

vii. *To have well-managed information.*
Database is used to keep questionnaire results. Records are well kept inside a database. Those data will remain inside the database unless people who have the rights, for example administrators, can do the deletion. This shows that information is well-managed using E-Questionnaire system.

viii. *Provide an easy-to-use and user-friendly graphical user interface.*
E-Questionnaire is a user-friendly system. This system is easy to use. Moreover, it is full of attractive images and texts.

1.4 Project Scopes

Basically the scopes of E-Questionnaire system are as follow:

i. *Be able to answer questionnaire online through the Internet.*
Questions are provided for users through the web online. They can access the Internet and get those questions online easily. The majorities of those questions are related to the topic of the questionnaires inside E-Questionnaire and some of them are related to personal information.

ii. *Be able for users to create and maintain their own questionnaire.*
E-Questionnaire system helps users to create and maintain online feedback forms or surveys.

iii. *Be able to accumulate reports.*
Database is used to accumulate reports.

iv. *This system provides guidelines for users when they are creating their Questionnaires.*
Users can refer to the tips that are provided in this system when they are creating and publishing online forms or surveys.

v. *This system also provides email-sending facility.*
When users forgotten their Login ID or Password, they can send an email to get access information from system support groups.

vi. *This system is a multilingual system.*
Users can use any language to create their own questionnaires.

vii. *This system provides Error detection services.*
Error will occur if users keyed-in wrong information.

viii. *Display and analyze real time survey reports in text and graphic formats.*
This system can display real-time data for every survey question using bar chart. It will display in percentages how many respondents chose which response to the question.

1.5 Project Target

At first, this project involves only students/staffs in FSKTM, UM. During the development of this E-Questionnaire system the level of people who are involving now not only students/staffs in FSKTM, UM but also organizations in Malaysia or extends to the whole world. It depends on people who needs to create and publish online forms or surveys for their homepage or website.

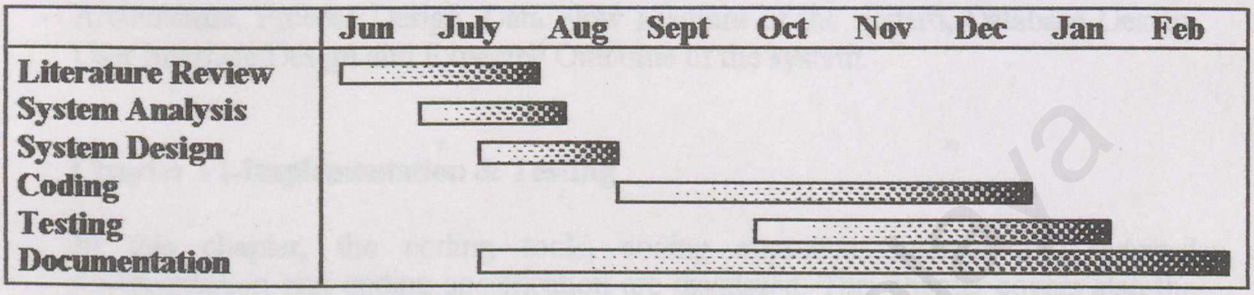
1.6 Project Limitation

E-Questionnaire can only rub in Internet Explorer 4.0 and above. E-Questionnaire requires a browser that can understand VBScript, the default supporting language for ASP and also Java Script. User using browsers that do not support these features will not be able to use the available functions in this system.

1.7 Project Schedule

This project is divided into two phases, which will be referred to as semester I and semester II. During semester I, research on literature review, introduction and system analysis & design are carried out. In semester II, system coding, testing, evaluation and training will be done. Documentation is done from the beginning of the project until the end of the project. Table 1.1 depicts the schedule for this project.

Table 1.1 **Project Schedule for E-Questionnaire on Password Usage among Students/Staffs in FSKTM, UM on the web.**



1.8 Overview Of the Chapters

Chapter I -Introduction

This chapter consists of the introduction of a questionnaire on the web, the motivation of doing this project, project objective, scope of the project, project target, project limitation, project schedule, software and hardware requirements and also an overview of the whole document.

Chapter II- Literature Review

The literature review gives brief explanation on topics researched and studied that are relevant to this project. Among the topics are definition of electronic, questionnaire, password and password usage, password usage guideline, questionnaire design, reasons to use the WWW for this project, the Internet, Web-based application component, the web application development tools and CASE TOOL.

Chapter III- System Analysis

This chapter covers the analysis phase of this project. It includes introduction, the weaknesses of manual system, analyze the existing electronic questionnaire system on the web, analyze Mr. Ahmad Faizal Ibrahim's system, analyze the format and contents of E-Questionnaire survey questions, analysis of the survey results and synthesis.

Chapter IV- System Requirements

This chapter describes the methodology used to design E-questionnaire, the methodology used to elicit user requirements, Server and Client Requirement, Explanation of Hardware and Software Requirement, Functional Requirements, Non-functional Requirements

Chapter V- System Design

This chapter consists of the introduction of system design, E-Questionnaire System Architecture, Process Design, Data Flow Diagram of the system, Database Design, User Interface Design and Expected Outcome of the system.

Chapter VI-Implementation & Testing

In this chapter, the coding tools, coding approach, internal and external documentation and coding specification are discussed. This chapter covers also the purpose of testing, integration testing, testing planning and system testing process.

Chapter VII- System Evaluation & Conclusion

This chapter will discuss the strengths, limitation, problem and solutions, future enhancements for the application and the conclusion of this project.

Chapter 2

2. Literature Review for E-Questionnaire System Case Studies

E-Questionnaire can be used to publish any type of questionnaires. For testing purpose, a case study on password usage was chosen as an example of E-Questionnaire System after a lot of surveys and findings or rather a literature review that was conducted on various resources before making a conclusion.

2.1 List of Resources Surveyed

The various resources that were surveyed can be summarized as research that was done in order to obtain and gather reliable, relevant, adequate and comprehensive information. This information gathering was done by using a number of methods such as through the Internet, lecturer supply materials and also ideals, reading from newspaper, brochures, journals, articles, books and other relevant materials.

2.1.1 Surfing the Internet

Internet surfing in today's world is a very efficient way of gathering information. There are many web sites available that provide useful and expertise information, which is needed in this system. Some web sites have provided very useful samples that can serve as guidelines in determining system requirements.

2.1.2 Research

Research involves reviewing books and journals that contain relevant information. Researches also include discussion with friends who are doing research on password usage.

2.1.3 Discussion

Discussion with supervisor once a week is very important to gather information and ideas. Advice and guidance from my supervisor, Mr. Omar, is very important in developing a systematic system. He also helps me to solve problems during the process of developing the system.

2.2 Definitions

2.2.1 Electronic

Electronic is an adjective of or relating to electronics. It concerned with or using devices that operates on principles governing the behavior of electrons. [1]

2.2.2 *Questionnaire*

Questionnaire is a printed form containing a set of questions, especially one addressed to a statistically significant number of subjects as a way of gathering information for a survey. [2]

2.2.3 *Password and Password Usage*

A password is a sequence of characters that can be used for several authentication purposes. Passwords are often used to authenticate the identity of an automated data processing (ADP) system user and, in some instances, to grant or deny access to private or shared data. This Standard recognizes that passwords are not the only method of personal authentication, nor does it endorse the use of passwords as the best method; however, it recognizes that passwords are widely used in computer system and networks for these purposes. In these systems and networks, compliance with this Standard will ensure that passwords are used in accordance with accepted practices. This Standard specifies basic security criteria for two different uses of passwords in an ADP system, first, personal identity authentication and second, data access authorization. A password used for personal identity authentication will be called a personal password; a password used for authorizing access will be called an access password. A personal password should not also be used as an access password. This Standard does not require the use of passwords in an ADP system for either purpose, but establishes the basic criteria for the design, implementation and use of a password system in those systems where passwords are used. [3]

2.3 Password Usage Guidelines

2.3.1 Introduction

The following topics contains background information, a discussion of the factors specified in the Password Usage Standard (herein called the Standard) and the rationale for the minimum criteria specified in the Standard. It also provides guidance in selecting parameters of password systems based on increasing security requirements. Examples of three password systems meeting increasing levels of security requirements are included. [3]

2.3.2 Background

Passwords are the most common method of personal identification used in conjunction with remote terminals to deter unauthorized access to computer systems and networks. The effectiveness of passwords has often been questioned, primarily because they can be easily forgotten or given to another person. However, passwords can provide reasonable deterrence to unauthorized access if properly handled by people authorized to use them and if properly stored and processed in the password verification system. Within its Computer Security and Risk Management Program, the Institute for Computer Sciences and Technology of the National Bureau of Standards developed this Standard for secures password usage to assure reasonable handling, storage and processing of passwords. This Standard is one in a series of Standards and Guidelines issued by NEBS in the field of Computer Security. Another in this series, Federal Information Processing Standards Publication (FIPS PUB) 48, Guidelines on Evaluation of Techniques for Automated Personal Identification, describes various techniques for verifying identity and provides a set of criteria for the evaluation of automated identification systems embodying these techniques. [3]

Shortly after issuing FIPS PUB 48, NEBS published Special Publication 500-9, The Use of Passwords for Controlled Access to Computer Resources. This publication considered the generation of passwords and their effective application to the problem of controlling access to computer resources. Following analysis and use of this document, a project was initiated to establish a fundamental performance standard for the use of passwords and a guideline on how to use this Standard to achieve the degree of protection that passwords were intended to provide. [3]

The Password Usage Standard was developed within the Computer Security and Risk Management Program of the Institute for Computer Sciences and Technology with considerable assistance from representatives of Federal organizations and private industry. In 1980, NEBS developed and distributed a draft Password Usage Standard to government and industry representatives for comments and then held a workshop to discuss the benefits and impact of the draft Standard. The draft Standard identified 10 factors to be considered in the implementation of password systems and quantified security criteria in a hierarchical manner for each of the 10 factors. It also proposed five levels of security and specified minimum criteria for each level. The workshop participants felt that the 10 factors were useful in structuring the design of password systems, but that the proposed five levels were unworkable as a basis of a password Standard. As a result of the workshop recommendations, the Standard was revised to specify minimum criteria for the factors of a password system. An Appendix was drafted which provided guidelines for achieving higher levels of security. This revised Standard and the draft guidelines were published for public comment and for agency comment in July 1981. The received comments were used in revising the proposed Standard and draft guidelines in preparing the published Standard and guidelines. [3]

2.3.3. Factors

Ten factors of an automated password system are specified in the Standard. These factors constitute the fundamental elements that must be considered, specified and controlled when designing and operating a password system. The rationale for the factors and for the minimum acceptable criteria for the factors specified in the Standard is provided in the following discussion. Guidance on how to meet the minimum criteria and reasons for exceeding the minimum criteria are also provided. [3]

2.3.3.1 Composition

A password is a sequence of characters obtained by a selection or generation process from a set of acceptable passwords. A good password system has a very large set of acceptable passwords in order to prevent an unauthorized person (or intruder) from determining a valid password in some way other than learning it from an authorized person (i.e., owner). The set of acceptable passwords should be large enough to assure protection against searching and testing threats to the password system (and hence the data or resources that it protects) commensurate with the value of the data or resources that are being protected. The set of acceptable passwords must be such that it can be specified easily, that acceptable passwords can be generated or selected easily, that a valid password can be remembered, can be stored reasonably, and can be entered easily. Composition is defined as the set of characters which may comprise a valid password.[3]

The composition of a password depends in part on the device from which the password is going to be entered. It also depends on how and where the password is going to be stored and how the stored password will be compared with the entered password. Federal Information Processing Standards Publication 1-2 (FIPS PUB 1-2) incorporates the American Standard Code for Information Interchange (ASCII) that specifies a set of characters for interchanging information between computers. Federal Information Processing Standards Publication 1-2 (FIPS PUB 1-2) defines several proper subsets of this set to be used for special applications. The 95-character graphics subset specified in FIPS PUB 1-2 is the set from which the System Manager and Security Officer should select the acceptable composition for a particular system. While backspaces can be used effectively to mask printed passwords, several comments on the draft guidelines described the special use of backspace in many computer systems and recommended that it not be allowed. [3]

The minimum composition contains 10 characters because some systems (e.g., financial transaction systems) use a 10-digit PIN PAD (Personal Identification Number entry device) for entering the password, which is called a PIN. The PIN PAD looks very similar to the keyboard of a push button telephone. Some systems being developed use the push button telephone for data entry and retrieval. Users of these systems stated their desire to use the Standard. A better composition contains 16 characters which includes the 10 digits plus (A, B, C, D, E, F). This set can represent hexadecimal characters, each of which is a four-bit (binary digit) code. For example, 16 hexadecimal characters are used to represent a Data Encryption Standard key (see FIPS PUB 46) which can be used as a personal key in a cryptographic system. Many passwords are composed only of the 26 lower case letters (a-z) or the 26 upper case letters (A-Z). However, using either of these sets often encourages the selection of a person's initials, name, nickname, relative, hometown, or common word easily associated with the person. Even allowing all possible 4-letter, 5-letter or 6-letter English words greatly restricts the number of passwords when compared to all possible passwords of length range 4-6 with the same composition. Totally alphabetic password composition should be discouraged. The best password composition is the 95-character graphic set as specified in FIPS PUB 1-2 (see app. C). [3]

2.3.3.2 Length

Length is closely associated with composition in assessing the potential security of a password system against an intruder willing to try exhaustively all possible passwords. The length of a password provides bounds on the potential security of a system. A length of exactly 1 reduces the potential number of valid passwords to the number of characters in the acceptable composition set. A length of 2 squares this number; a length of 3 cubes this number; a composition of 10 and a length of exactly 4 provides for 10- (read 10 raised to the fourth power) or 10,000 possible passwords. PINs are typically four digits because of low security requirements, for ease of remembering by a large customer base and for speed and accuracy of entry. A PIN verification system generally prevents a person from quickly trying all 10,000 possible PIN's for a particular valid financial account in order to find the valid PIN. If the trial and error process can be automated, even on a small home computer, the valid PIN can be found in a few minutes. Having a length range of 4-6 increases the possible number of PIN's to 1,110,000 (106+105+104).[3]

If all other factors are temporarily ignored, the security provided by a password is directly proportional to the allowed length of the password. In other words, longer passwords are more secure. However, other factors cannot be ignored in practical password systems. Long passwords take longer to enter, have more chance of error when being entered, and are generally more difficult to remember (the latter may not be true unless the password consists of random characters). Sixteen random hexadecimal characters are very difficult to remember and very difficult to enter quickly and accurately. For this reason, DES keys are usually not personal passwords and vice versa. However, long passphrases can be transformed to virtual passwords of exactly 64 bits (or 56 bits with the other 8 bits recomputed to be parity bits). Long passphrases can be easy to remember but still take longer to enter.[3]

The length range should include a number of lengths, probably from 5-8 characters, and the composition should be a large set so that a high level of security can be provided easily.[3]

A passphrase is an understandable sequence of words (sentence, sentence segment, phrase) that can be transformed and stored as 64 bits, and which is used as a password. A passphrase is generally easy to remember by the owner of the passphrase, and hence is allowed on some systems because of this characteristic. Since the number of distinct possibilities of understandable passphrases is considerably smaller than for a random sequence of characters of the same length, a longer passphrase is preferable to a shorter one. For example, the number of understandable 64-character long passphrases composed using the 27-character set A-Z and space, is considerably less than 2764, which is the number of possibilities if the characters are selected randomly. [3]

A passphrase may be used that is equivalent to a password as specified in the Standard. A passphrase may be transformed into a virtual password by using a transformation such as a hashing function or a cryptographic function. These functions should compute a value using the entire passphrase as input such that any change in the passphrase should result in a different computed value (within some probability). The value that is computed is the virtual password and must be 64 bits as specified in the Standard. This allows all password systems to allocate a maximum of 64 bits for storing each password, and therefore allows up to 264 possible passwords (many thousands of years of security against exhaustive searching attacks). Such a passphrase thus provides the benefits of being easily remembered at the added cost of additional time to enter the longer passphrase and the time needed to compute the virtual password. The Data Encryption Standard (FIPS PUB 46) and the cipher block-chaining mode specified in the DES Modes of Operation Standard (FIPS PUB 81) are suggested as the transformation (see app. D). [3]

2.3.3.3 Lifetime

The security provided by a password depends on its composition, its length, and its protection from disclosure and substitution. The risk associated with an undetected compromise of a password can be minimized by frequent change. If a password has been compromised in some way and if a new password is created that is totally independent of the old password, then the continued risk associated with the old password is reduced to zero. Passwords thus should be changed on a periodic basis and must be changed whenever their compromise is suspected or confirmed.[3]

The useful lifetime of a password depends on several variables, including:

- The cost of replacing a password;
- The risk associated with compromise;
- The risk associated with distribution;
- The probability of "guessing" a password;
- The number of times the password has been used;
- The work of finding a password using exhaustive trial and error methods. [3]

Password systems should have the capability of replacing the password quickly, initiated either by the user or the Security Officer. Passwords should be changed voluntarily by the owner whenever compromise is suspected and should be changed periodically with a maximum interval selected by the Security Officer. The interval may be a period of time or depend on a number of uses. The password system itself should have automated features which enforce the change schedule and all the security criteria for the installation. The system should check that the new password is not the same as the previous password. Very sensitive applications may require that a new password not be the same as any of the previous two, three... N passwords. Such a system requires storage for N passwords for each user. It should not be a requirement of a system that the password for each user be unique. Having a new password rejected for this reason confirms that another user has the password. [3]

2.3.3.4 Source

Either the owner or the password generator should select passwords at random from the acceptable set of passwords. However, this guidance may not be possible in all cases and may not be desirable in some cases. The Security Officer often selects a password for a new user of a system. This can be used for the first access to the system. The system may then require that the user replace this password which the Security Officer may know with a password that only the user knows. Passwords that are created or selected by a user should be checked by the automated password system as meeting all of the criteria of the password system. Passwords that do not meet all the criteria should be rejected by the automated password system. A record that an attempt to select an unacceptable password may be made by some automated systems but is not required by the Standard. [3]

If passwords are generated by the system, the method of generation should not be predictable. Commonly used random number generators that are available in computer systems for statistical purposes should be avoided because the sequences of random numbers that they generate are predictable. The DES algorithm, together with a non-deterministic parameter such as the least significant bits of a high-resolution computer system clock may be used. The results of a random generator are then combined with password selection rules to obtain a password that meets mandatory and desirable criteria. [3]

2.3.3.5 Ownership

A personal password should be individually owned rather than owned in common by a group of individuals in order to provide individual accountability within a computer system. This is desirable even though a group of people all has common access privileges to the same resources or data. Individual ownership of personal passwords is required because: [3]

- It can establish individual accountability for the determination of who accessed what resources and for what purposes.
- It can establish illicit use of a password or loss of a password.
- It can be used for an audit trail of the activities of a user.
- It avoids the need to change the password of an entire group when a single member of the group leaves or loses authorization privileges. [3]

2.3.3.6 Distribution

A password must be transported from the owner to the authentication system if selected by a user, from the authentication system to the owner if generated by the password system or from the Security Officer to both the owner and the authentication system if generated by the Security Officer. The initial password is often distributed in a different manner than subsequent replacement passwords. The initial password is generally created and issued directly, either orally or in writing, Curing the meeting at which a user is initially authorized use of the computer system or access to a set of data. This may be a one- time password which must be changed after the initial access request is granted. Changing of a password by a user generally requires that the user supply the old password and then the replacement password. The replacement is checked for meeting the security requirements of the system, checked that it is different than the old password, and then entered into the storage location of the old password. An audit record should be made of the replacement, containing the date and time of the change, but not the new password Forgotten passwords should be replaced and a new password issued in a manner similar to, if not identical with, issuance of the initial password. [3]

Passwords that are distributed in writing should be contained in a sealed envelope marked "To be opened by addressee only." Delivery may be by courier, internal 'nail, or by U.S. Mail. Instructions to the user should be to: [3]

- Destroy the written password after memorizing it; or
- Return the written password to the Security Officer after signing the receipt for the password and after sealing it in the return mailer.
- Use the password as soon as possible and, if the password can be changed by the user, change the password. [3]

Some systems distribute passwords in a sealed mailer that has been printed by a computer. The mailer is designed so that it cannot be resealed once it is open. The password is printed only on the inside of the mailer on the second page using carbon paper attached to the back of the mailer's front page. The instructions say to remove the front of the mailer, which shows the name of, 'the intended recipient, to destroy the front and save the password (in a protected place readily accessible only to the intended recipient). The part of the mailer that has the password has no other identification which would associate the password with either the system or the owner. Thus, anyone finding a lost password would usually not be able to use it. While not as desirable as memorizing the password and destroying the distribution medium, this system is useful when passwords are not routinely used and would be written in a location which-is more easily associated with the owner. [3]

When distributed by a secure mailer, a receipt for the password may be validated by positive response or on an exception basis. When password distribution is done on an unscheduled basis, a positive response is required. When passwords are distributed regularly, the user should be expecting a new password and should report any failure to obtain a new password. In either case, a record must be kept of the fact that a new password was issued. [3]

There may be a transition period in which it is uncertain if the old password is valid or if the new password is valid. Some systems may allow either password to be valid during the transition period. This means that both passwords must be stored and compared with an entered password. Some systems may have no transition period (e.g., a password becomes valid at 8:06 P.M. exactly) and record attempts at using the old password in an audit file. A report of such attempts should be sent securely to the password owner as notification that usage of an old password was attempted. The owner can verify that the use was an accidental rather than an unauthorized use of an old password by an intruder. [3]

2.3.3.7 Storage

Passwords should be stored in the authentication system in a manner which minimizes their exposure to disclosure or unauthorized replacement. Several methods have been used to protect passwords in storage. Most systems have a password file that can be legitimately read only by the "LOGON" program. The file is protected by a file access mechanism which checks a protection bit in a file access table. Only the privileged LOGON program has access to read the file and only (the password program has access to write the file. Some systems separate the password file from the authorized user file. An index file is used to provide the correspondence between the user and the user's password. Some systems encrypt the passwords, either reversibly (two-way) or irreversibly (one-way) using a Data Encrypting Key (DEK) or the password itself as a key. Of course, any key (e.g., a Data Encrypting Key) retained in storage would also need protection by encryption using a Key Encrypting Key (KEK). The type of 'protection provided to the passwords should be commensurate with the protection desired for the system or data and hence a protection system should be used to provide the desired protection. [3]

One-way encryption of passwords is allowed in the Standard when encryption is used for stored password protection. One-way encryption systems transform the password in such a way that the original password cannot be recovered. This protects the original password from everyone, including the Security Officer and the systems programmers. When a user is logging onto such a system, the password that is entered by the user is one-way encrypted and compared in encrypted form with the stored encrypted password. The same encryption method and key must be used to encrypt the valid password before storage and to encrypt the entered password before comparison. [3]

Two-way encryption of passwords is also allowed in the Standard. Given the correct key, the original password may be determined from the encrypted password. A user-entered password may be compared with the decrypted stored password (which was encrypted), or the user's password may be encrypted and compared with the stored password as is done with one way encrypted passwords. [3]

2.3.3.8 Entry

Entry of a password into an automated authentication system in a secure manner is often a difficult task. An observer often is able to detect part or all of a password while the user is entering the password. Typing keyboards are the typical entry devices. A user that is not a trained typist often enters the password with one finger. A long, random password that is difficult to enter may be more vulnerable to observation than an easily entered password. The Standard specifies that a password shall be entered by a user in such a manner that the password will not be revealed to anyone observing the entry process. The following discussion provides some techniques which the user may find useful in achieving this goal and which the computer systems operation staff may find useful in assisting the user. [3]

The computer terminal, keyboard, push buttons, or password entry device should provide a means for minimizing the exposure of the password during entry. The password should not be printed on the terminal during the entry process. If the keyboard and the terminal display or printer are directly coupled, then the password should be masked by obliterating (understriking) the space where the password is going to be printed. The password may be masked further by overstriking the area after password entry. Computer generated masks used during password entry to disguise the entered password should not always be the same. In any case no printed or displayed copy of the password should exist after password entry. [3]

CRT terminals that use half-duplex communications may present a problem because the password overwrites the understriking and remains visible on the display. The password entry program should immediately clear the display after password entry in such systems. Users should be instructed to manually clear the display following password entry if the password entry program cannot clear the screen. [3]

When submitted as a part of a remote entry batch-processing request, the password should be added to the request at the last possible moment and physically protected. Batch processing requests submitted in punched cards should have the password card added by the user just prior to submission. The computer operations staff should maintain the card decks in a protected area and should remove and destroy the password card after the deck has been read by the system. The password should never be printed on any output media. One-time passwords that are distributed to the owner in the form of a password list and sequentially used for sequential batch processing requests may be used. The Standard requires that the owner physically protect such lists. [3]

Users should be allowed more than one attempt to enter a password correctly in order to allow for inadvertent errors. However, there should be a maximum number of trials allowed for a password to be entered correctly. A maximum of three (3) attempts is considered adequate for typical users of a computer system. The system should also prevent rapid retries when a password is entered incorrectly. Several seconds should elapse before another password is requested. This prevents an automated, high speed, trial-and-error attack on the password system. A security record should be maintained of the fact that incorrect passwords were entered but the incorrect password should not be kept in the record. A security alarm should be generated if: [3]

1. The maximum number of allowed password retries is exceeded;
2. The maximum number of allowed failed logons from one terminal is exceeded;
3. The maximum number of allowed failed logons for a time period is exceeded. [3]

These parameters must be set according to the sensitivity of the data being protected, the profile of the typical system user and the policy of the organization. Some organizations will be willing to set the parameters high to prevent customer dissatisfaction while other organizations will set the parameters low to prevent security compromises. Terminals should be disabled and users should be denied service if these parameters are exceeded. The Security Officer should be the only one who can enable the terminal and restore the service of the user following these events. [3]

The system should inform the user, following a successful LOGON procedure, of the last successful access by the user and of any unsuccessful intervening access attempts. This will aid in uncovering any unauthorized accesses or attempted accesses which may have occurred between successful accesses. The user can do several actions to prevent an observer from learning the password by watching the password entry process. First, entry of the password can be practiced so that it can be quickly entered using several fingers. Second, the body can be used to prevent the observer from seeing the keys being pressed during password entry. Third, the user can request that a guest not watch the password entry process. Fourth, the user can perform the password entry prior to demonstrating use of the system. [3]

2.3.3.9 Transmission

Passwords are typically used to authenticate the identity of a user attempting to gain access to a shared computer system or network from a terminal. In order to be authenticated, the password is typically transmitted from the terminal to the computer via the communication line between the terminal and the computer.

Unless the communication line is physically protected or encrypted, the password is vulnerable to disclosure. Most communication lines between terminals and computers are not afforded this protection at present. Therefore, users should be aware that their passwords could very easily be disclosed via passive wiretapping. [3]

Computer systems can also be easily spoofed. This can occur if an intruder has inserted an active wiretap between a terminal and the computer. An active wiretap can be built today for several hundred dollars by a home computer hobbyist. The wiretap can be built into a briefcase and consists of a hobby computer with a receive/transmit communication chip that receives data from the terminal and computer and then retransmits data to the computer and terminal, having scanned and modified the data. The active wiretap can replace one user's password with another user's password, even if the passwords are encrypted at the terminal. Spoofing occurs when the system is fooled into "believing" one user is at the terminal when another user is actually there. Reverse spoofing occurs when a user is fooled into believing that communication with the intended computer when another computer is there. In the latter case, an authorized user can be spoofed into providing the valid user's password by simulating the "LOGON" request of the intended computer. After the password is obtained, the intruder that is controlling the spoofing computer informs the user that the requested service is temporarily unavailable. During this exchange the intruder has obtained a valid password without the user's knowledge. [3]

These threats can be prevented by one of two encryption methods. First, the communication line between the terminal and the computer can be protected by encryption devices which use a secret key (e.g., a Data Encrypting Key) for encrypting all communication between the terminal and the computer. Transmitted passwords are thus protected from disclosure. In addition each transmission can be numbered so that a previous transmission cannot replace a later transmission (.i.e., a previously used valid password cannot be saved and used to replace an invalid password, even if both are encrypted). Passwords are thus protected to the same degree as the data as specified in the Standard. [3]

Alternatively, the password can be used as the encryption key or as part of the encryption key. Suppose a user enters a password to be used as an encryption key at the terminal (i.e., never transmitted to the computer) and the user's password is retrieved from the computer's memory and used as the encryption key at the computer (i.e., never transmitted to the terminal). Then the terminal and the computer are mutually authenticated if normal communication can occur using the encryption and decryption processes at the terminal and computer, both using the password as the key (or a part of the key). This alternative is also allowed in the Standard. [3]

In order to prevent compromise of the level of security provided by the cryptographic mechanism, the Standard specifies that personal passwords that are used as keys as described above are selected at random from the set of all possible encryption keys used by the cryptographic process. It also specifies that passwords that are used as Data Encrypting Keys should not also be used as Key Encrypting Keys, and vice versa. This is to minimize any possibility of attempting to recover the key (and hence the password) through cryptanalytic techniques. [3]

2.3.3.10 Authentication Period

Interactive "sessions" between a user and a computer via a remote terminal often last several hours. While security policy should state that a terminal that is "logged onto" a computer should never be left unattended by the user that is "logged onto" the computer, in practice this often occurs. Many systems have a feature which automatically logs a user off the system if the terminal has been inactive for some period of time. This is to prevent someone who encounters an unattended terminal from using it. Some access control systems require that a user be reauthenticated on a periodic basis in addition to the initial authentication process. These systems often antagonize the user if the authentication frequency is set too high. The message that the authentication process must be performed again often comes in the middle of the work that a user is performing. If this work happens to be a large printout of final text of a paper to be published, the user is rightfully upset. For this reason the Standard did not specify a minimum reauthentication period. Reauthentication should only be required to satisfy high security requirements, and then only requested if the terminal has been inactive for a period of time. This should prevent the authentication process from occurring in the middle of some important work. [3]

2.3.4. Examples of Password Systems

The following examples of password systems that satisfy various security requirements are provided as assistance to Security Officers and System Managers. Determination of the parameters for each of the 10 factors discussed above will permit the preparation of the Password Standard Compliance Document. These examples should not be considered as the only selection of the parameters for the 10 password system factors. [3]

2.3.4.1 Password System for Low Protection Requirements

A hypothetical password system might have the following parameters for the 10 factors that will both satisfy the Standard and satisfy requirements for protection, which are considered to be minimal. The example is similar to that found in much retail, customer initiated financial transaction systems in which the maximum liability of the customer is $50 and the maximum liability of the bank is limited by the number of transactions allowed per day. This example is also typical of many government-owned, government-leased computer systems in which no sensitive applications are performed. Small scientific systems, special purpose systems and systems not making critical automated decisions may fall in this category. Systems that have limited financial liability and those that require only accountability and control of computer usage and costs may also be considered in this category. [3]

1. Length Range: 4-6
2. Composition: Digits (0-9)
3. Lifetime: 1 year
4. Source: User
5. Ownership: Individual (personal password); group (access passwords)
6. Distribution: Unmarked envelope in U.S. Mail
7. Storage: Central computer on-line storage as plain text
8. Entry: Non-printing "PIN-PAD"
9. Transmission: Plain text
10. Authentication Period: Each transaction [3]

2.3.4.2 Password System for Medium Protection Requirements

Government systems which process limited "sensitive" applications may fall in this category. These are applications which process data leading to or directly related to monetary payments or process data subject to the Privacy Act of 1974. Agency management may determine that additional applications should be designated as sensitive. Computer systems that are subject to fraud, theft, erroneous payments or other loss of sensitive information may also fall into this category. Government systems which make payments (e.g., Social Security, Treasury), keep inventories (e.g., Armed Forces), and process personal information (e.g., Internal Revenue, Service, Department of Education) would be examples of systems which would have requirements of this nature and probably would be satisfied by this type of password system. [3]

1. Length Range: 4-8
2. Composition: U.C. Letters (A-Z), L.C. Letters (a-z), and digits (0-9)
3. Lifetime: 6 months
4. Source: System generated and user selected
5. Ownership: Individual
6. Distribution: Terminal and special mailer
7. Storage: Encrypted passwords
8. Entry: Non-printing keyboard and masked-printing keyboard
9. Transmission: Clear text
10. Authentication Period: Login and after 10 minutes of terminal inactivity. [3]

2.3.4.3 Password System for High Protection Requirements

Computer systems which process information of a sensitive nature and which rely on passwords to provide personal identification may have high protection requirements that could be satisfied by a password system for personal identification having these characteristics. [3]

Systems having high protection requirements may include those which have unusually high potential for fraud or theft, have a high economic benefit to a system intruder, and have a substantial impact on safety or the well being of the society. Some computer systems of the Department of Defense or the Federal Reserve Communication System may fall into this category. Systems having very high security requirements may require methods of personal identification which are based on physical characteristics of a person (signature, voice, fingerprint) or on a combination of something unique that the person has (e.g., badge, ID card) and something unique that the person knows (i.e., a password). A risk analysis should be performed for each government owned or leased computer system to determine its security requirements and then a personal identification system should be selected which best satisfies these requirements. [3]

1. Length Range: 6-8
2. Composition: Full 95 character set
3. Lifetime: One month
4. Source: Automated password generator within the authentication system
5. Ownership: Individual
6. Distribution: Registered mall, receipt required; personal delivery, affidavit required
7. Storage: Encrypted passwords
8. Entry: Non-printing keyboards
9. Transmission: Encrypted communication with message numbering
10. Authentication Period: Login and after 5 minutes of terminal inactivity.[3]

2.4 Questionnaire Design

Questionnaires are an inexpensive way to gather data from a potentially large number of respondents. Often they are the only feasible way to reach a number of reviewers large enough to allow statistically analysis of the results. A well-designed questionnaire that is used effectively can gather information on both the overall performances of the test system as well as information on specific components of the system. If the questionnaire includes demographic questions on the participants, they can be used to correlate performance and satisfaction with the test system among different groups of users.

It is important to remember that a questionnaire should be viewed as a multi-stage process beginning with definition of the aspects to be examined and ending with interpretation of the results. Every step needs to be designed carefully because the final results are only as good as the weakest link in the questionnaire process. Although questionnaires may be cheap to administer compared to other data collection methods, they are every bit as expensive in terms of design time and interpretation.

The steps required to design and administer a questionnaire include:

1.Defining the Objectives of the survey
2.Determining the Sampling Group
3.Writing the Questionnaire
4.Administering the Questionnaire
5.Interpretation of the Results

This document will concentrate on how to formulate objectives and write the questionnaire. Before these steps are examined in detail, it is good to consider what questionnaires are good at measuring and when it is appropriate to use questionnaires.

2.4.1 What can questionnaires measure?

Questionnaires are quite flexible in what they can measure, however they are not equally suited to measuring all types of data. We can classify data in two ways, Subjective vs. Objective and Quantitative vs. Qualitative.

When a questionnaire is administered, the researcher control over the environment will be somewhat limited. This is why questionnaires are inexpensive to administer. This loss of control means the validity of the results is more reliant on the honesty of the respondent. Consequently, it is more difficult to claim complete objectivity with questionnaire data then with results of a tightly controlled lab test. For example, if a group of participants are asked on a questionnaire how long it took them to learn a particular function on a piece of software, it is likely that they will be biased towards themselves and answer, on average, with a lower than actual time. A more objective usability test of the same function with a similar group of participants may return a significantly higher learning time. More elaborate questionnaire design or administration may provide slightly better objective data, but the cost of such a questionnaire can be much higher and offset their economic advantage. In general, questionnaires are better suited to gathering reliable subjective measures, such as user satisfaction, of the system or interface in question.

Questions may be designed to gather either qualitative or quantitative data. By their very nature, quantitative questions are more exact then qualitative. For example, the word "easy" and "difficult" can mean radically different things to different people. Any question must be carefully crafted, but in particular questions that assess a qualitative measure must be phrased to avoid ambiguity. Qualitative questions may also require more thought on the part of the participant and may cause them to become bored with the questionnaire sooner. In general, we can say that questionnaires can measure both qualitative and quantitative data well, but that qualitative questions require more care in design, administration, and interpretation.

2.4.2 Defining the Objectives of the Survey

The importance of well-defined objectives cannot be over emphasized. A questionnaire that is written without a clear goal and purpose is inevitably going to overlook important issues and waste participants' time by asking useless questions. The questionnaire may lack a logical flow and thereby cause the participant to lose interest. Consequential, what useful data you may have collected could be further compromised. The problems of a poorly defined questionnaire do not end here, but continue on to the analysis stage. It is difficult to imagine identifying a problem and its cause, let alone its solution, from responses to broad and generalizing questions. In other words, how would it be possible to reach insightful conclusions if one didn't actually know what they had been looking for or planning to observe.

An objective such as "to identify points of user dissatisfaction with the interface and how these negatively affect the software's performance" may sound clear and to the point, but it is not. The questionnaire designer must clarify what is meant by user dissatisfaction. Is this dissatisfaction with the learning of the software, the power of the software, of the ease of learning the software? Is it important for the users to learn the software quickly if they learn it well? What is meant by the software's performance? How accurate must the measurements be? All of these issues must be narrowed and focused before a single question is formulated. A good rule of thumb is that if you are finding it difficult to write the questions, then you haven't spent enough time defining the objectives of the questionnaire. Go back and do this step again. The questions should follow quite naturally from the objectives.

2.4.3 Writing the Questionnaire

At this point, we assume that we have already decided what kind of data we are to measure, formulated the objectives of the investigation, and decided on a participant group. Now we must compose our questions.

If the preceding steps have been faithfully executed, most of the questions will be on obvious topics. Most questionnaires, however, also gather demographic data on the participants. This is used to correlate response sets between different groups of people. It is important to see whether responses are consistent across groups. For example, if one group of participants is noticeably less satisfied with the test interface, it is likely that the interface was designed without fair consideration of this group's specific needs. This may signify the need for fundamental redesign of the interface. In addition, certain questions simply may only be applicable to certain kinds of users. For example, if one is asking the participants whether they find the new tutorial helpful, we do not want to include in our final tally the responses of experienced users who learned the system with an older tutorial. There is no accurate way to filter out these responses without simply asking the users when they learned the interface.

Typically, demographic data is collected at the beginning of the questionnaire, but such questions could be located anywhere or even scattered throughout the questionnaire. One obvious argument in favor of the beginning of the questionnaire is that normally background questions are easier to answer and can ease the respondent into the questionnaire. One does not want to put off the participant by jumping in to the most difficult questions. We are all familiar with such kinds of questions.

It is important to ask only those background questions that are necessary. Do not ask income of the respondent unless there is at least some rational for suspecting a variance across income levels. There is often only a fine line between background and personal information. You do not want to cross over in to the personal realm unless absolutely necessary. If you need to solicit personal information, phrase your questions as unobtrusively as possible to avoid ruffling your participants and causing them to answer less than truthfully.

2.4.4 What kind of questions do we ask?

In general, there are two types of questions one will ask, open format or closed format.

Open format questions are those that ask for unprompted opinions. In other words, there is no predetermined set of responses, and the participant is free to answer however he chooses. Open format questions are good for soliciting subjective data or when the range of responses is not tightly defined. An obvious advantage is that the variety of responses should be wider and more truly reflect the opinions of the respondents. This increases the likelihood of you receiving unexpected and insightful suggestions, for it is impossible to predict the full range of opinion. It is common for a questionnaire to end with and open format question asking the respondent for her unabashed ideas for changes or improvements.

Open format questions have several disadvantages. First, their very nature requires them to be read individually. There is no way to automatically tabulate or perform statistical analysis on them. This is obviously more costly in both time and money, and may not be practical for lower budget or time sensitive evaluations. They are also open to the influence of the reader, for no two people will interpret an answer in precisely the same way. This conflict can be eliminated by using a single reader, but a large number of responses can make this impossible. Finally, open format questions require more thought and time on the part of the respondent. Whenever more is asked of the respondent, the chance of tiring or boring the respondent increases.

Closed format questions usually take the form of a multiple-choice question. They are easy for the respondent to choose.

There is no clear consensus on the number of options that should be given in a closed format question. Obviously, there needs to be sufficient choices to fully cover the range of answers but not so many that the distinction between them becomes blurred. Usually this translates into five to ten possible answers per questions. For questions that measure a single variable or opinion, such as ease of use or liability, over a complete range (easy to difficult, like to dislike), conventional wisdom says that there should be an odd number of alternatives. This allows a neutral or no opinion response. Other schools of thought contend that an even number of choices is best because it forces the respondent to get off the fence. This may induce the some inaccuracies for often the respondent may actually have no opinion. However, it is equally arguable that the neutral answer is over utilized, especially by bored questionnaire takers. For larger questionnaires that test opinions on a very large number of items, such as a music test, it may be best to use an even number of choices to prevent large numbers of no-thought neutral answers.

Closed format questions offer many advantages in time and money. By restricting the answer set, it is easy to calculate percentages and other hard statistical data over the whole group or over any subgroup of participants. Modern scanners and computers make it possible to administer, tabulate, and perform preliminary analysis in a matter of days. Closed format questions also make it easier to track opinion over time by administering the same questionnaire to different but similar participant groups at regular intervals. Finally closed format questions allow the researcher to filter out useless or extreme answers that might occur in an open format question.

Whether your questions are open or closed format, there are several points that must by considered when writing and interpreting questionnaires:

1.Clarity: This is probably the area that causes the greatest source of mistakes in questionnaires. Questions must be clear, succinct, and unambiguous. The goal is to eliminate the chance that the question will mean different things to different people. If the designers fail to do this, then essentially participants will be answering different questions.

To this end, it is best to phrase your questions empirically if possible and to avoid the use of necessary adjectives. For example, it asking a question about frequency rather than supplying choices that is open to interpretation such as:

1.Very Often
2.Often
3.Sometimes
4.Rarely
5.Never

It is better to quantify the choices, such as:

1.Every Day or more
2.2-6 Times a Week
3.About Once a Week
4.About Once a Month
5.Never

There are other more subtle aspects to consider such as language and culture. Avoid the use of colloquial or ethnic expressions that might not be equally used by all participants. Technical terms that assume a certain background should also be avoided.

2.Leading Questions: A leading question is one that forces or implies a certain type of answer.

It is easy to make this mistake not in the question, but in the choice of answers. A closed format question must supply answers that not only cover the whole range of responses, but that are also equally distributed throughout the range. All answers should be equally likely. An obvious, nearly comical, example would be a question that supplied these answer choices:

1.Superb
2.Excellent
3.Great
4.Good
5.Fair
6.Not so Great

A less blatant example would be a Yes/No question that asked:

1.Is this the best CAD interface you have every used?

In this case, even if the participant loved the interface, but had a favorite that was preferred, she would be forced to answer No. Clearly, the negative response covers too wide a range of opinions. A better way would be to ask the same question but supply the following choices:

1.Totally agree
2.Partially agree
3.Neither agrees nor disagrees
4.Partially disagree
5.Totally agree

This example is also poor in the way it asks the question. Its choice of words makes it a leading question and a good example for the next section on phrasing.

3.Phrasing: Most adjectives, verbs, and nouns in English have either a positive or negative connotation. Two words may have equivalent meaning, yet one may be a compliment and the other an insult. Consider the two words "child-like" and "childish", which have virtually identical meaning. Child-like is an affectionate term that can be applied to both men and women, and young and old, yet no one wishes to be thought of as childish.

In the above example of "Is this the best CAD interface you have every used?" clearly "best" has strong overtones that deny the participant an objective environment to consider the interface. The signal sent the reader is that the designers surely think it is the best interface, and so should everyone else. Though this may seem like an extreme example, this kind of superlative question is common practice.

A subtler, but no less troublesome, example can be made with verbs that have neither strong negative or positive overtones. Consider the following two questions:

1.Do you agree with the Governor's plan to oppose increased development of wetlands?
2.Do you agree with the Governor's plan to support curtailed development of wetlands?

They both ask the same thing, but will likely produce different data. One asks in a positive way, and the other in a negative. It is impossible to predict how the outcomes will vary, so one method to counter this is to be aware of different ways to word questions and provide a mix in your questionnaire. If the participant pool is very large, several versions may be prepared and distributed to cancel out these effects.

4.Embarrassing Questions: Embarrassing questions dealing with personal or private matters should be avoided. Your data is only as good as the trust and care that your respondents give you. If you make them feel uncomfortable, you will lose their trust. Do not ask embarrassing questions.

5.Hypothetical Questions: Hypothetical is based, at best, on conjecture and, at worst, on fantasy. I simple question such as:
1.If you were governor, what would you do to stop crime?

These forces the respondent to give thought to something he may have never considered. This does not produce clear and consistent data representing real opinion. Do not ask hypothetical questions.

6.Prestige Bias: Prestige bias is the tendencies for respondents to answer in a way that make them feel better. People may not lie directly, but may try to put a better light on themselves. For example, it is not uncommon for people to respond to a political opinion poll by saying they support Samaritan social programs, such as food stamps, but then go on to vote for candidates who oppose those very programs. Data from other questions, such as those that ask how long it takes to learn an interface, must be viewed with a little skepticism. People tend to say they are faster learners than they are.

There is little that can be done to prevent prestige bias. Sometimes there just is no way to phrase a question so that all the answers are noble. The best means to deal with prestige bias is to make the questionnaire as private as possible. Telephone interviews are better than person-to-person interviews, and written questionnaires mailed to participants are even better still. The farther away the critical eye of the researcher is, the more honest the answers.

2.5 What is Internet?

The Internet is an international computer network that connects millions of computers in just about every country in the world. It is understood that about 35 million people are connected to Internet. The Internet is a networked formed by cooperative interconnection of computing networks. [4]

In fact, the word "Internet" was coined from the words "interconnection" and "network". What this means is that many, many cony connecting networks, usually made up of differing kinds of computers and different technologies, are interfaced together so smoothly that the individual parts appear to be one network. This is accomplished by connecting networks using the same protocol: TCP/IP (transmission control protocol/internet protocol). TCP/IP is a common set of rules that allow the variety of systems to communicate. However, computers on non-TCP/IP networks can access the Internet through gateways that perform the necessary protocol translations and allow appropriate communication.[4]

The Internet begins in 1969 when the US Department of Defense created an experimental computer network originally called the ARPANet. The ARPANet was designed to support military research and in particular, research about how to build computer networks that could withstand partial outages, meaning it would continue to function if one or more computers on the system were eliminated due to a bomb attack, backhoes cutting cables, etc.[4]

There is no central authority, no governing body nor any overall organizational scheme to the vast amounts of information available. The Internet transfers/accesses data in five different ways: gopher, telnet, FTP (file transfer protocol), HTTP (World Wide Web) and e-mail. Each computer that is connected to the Internet is provided a unique address or URL (Uniform Resource Locator).[4]

The main uses of Internet are do research, download software, education, business, Tele-medicine, entertainment, send mail, IRC (Internet Relay Chat), news group, get information and etc. [4]

2.5.1 Advantages of using Internet

Internet can be connected using TCP/IP. The main advantage of using the Internet is that nobody really own the Internet, it is cheap and the information is mostly free and can be found all over the world. Any user with a personal computer, a modem, and some software can make a connection to the Internet.

Besides that, Internet as a modern tool can be utilized to provide ideas and information for improving our knowledge, studies, and infect our life nowadays.

Below are some of the benefits that can be gained through Internet:

- Internet can be accessed 24 hours daily.
- Internet is the cost-effective way to gain information.
- Easy in finding information using the Internet.
- Users can work on the Internet at their own place.
- Users can choose and organize the information on the Internet according to their needs.
- Internet can be accessed from many platforms; such as Windows/ Unix.

- The web pages on the Internet can be updated easily using the required tools.
- The web pages are very interactive with wide range of animation, text display, fonts, graphics, images, pictures, audio and video.
- The web pages are easily integrated to other the web resources.
- Interactivity and rich content can illustrate certain concepts that would be difficult to illustrate in other ways.

2.6 What is World Wide Web?

WWW is an Internet Navigator tool through which the Internet users can access the other front ends, Navigators, information, services and resources. One of the major problems with the existing Internet was very unorganized and unconnected. It was a vast library that had no central index. It was a treasure house of information, but unfortunately no way of accessing the information. The solution to this problem that emerged is known as WWW (World Wide Web). [4]

Englishman Tim Berners-Lee invented the World Wide Web in 1990 while working at CERN, the European Particle Physics Laboratory. At first, the Web was set up as a way for scientists to share information with each other. It has since become a worldwide success because it makes it very easy for computer novices to browser through text, graphics, and multimedia. [4]

WWW is an information system based on hypertext, which offers a means of moving from document to document (usually called to navigate) within a network of information. WWW uses the concept of a page for viewing information. Each page is actually a single text file written in something call HyperText Markup Language, or HTML. This HTML file is retrieved from a remote computer, known as the HTTP Server, by a WWW browser, and is used to determine the appearance of that particular WWW page. An HTML document can contain pointers to other HTML documents, graphics, files, sounds, and even descriptions for buttons and other on-screen elements for displaying data. This interconnection of HTML documents on computers all over the Internet, each containing pointers to other HTML documents on other computers on the Internet, is where the term "web" comes from. [4]

2.7 Web-Based Application Component

Developing the web-based application relies on many network and application components working together to deliver the information to the requesting client.

2.7.1 Web Browser

A browser is a software program that acts as an interface between the user and the inner-workings of the Internet, specifically the World Wide Web. A browser is also referred to as a web client that acts in conjunction with a web server. The browser acts on behalf of the user by contacting a web server and requesting information and receiving information and then displaying it on a screen.

There are many different browsers. All perform the same basic functions (transferring hypertext documents), but many have specific features that are unique. Some commonly used browsers include Microsoft Internet Explorer, NCSA Mosaic, Netscape Navigator and Spry Mosaic. The first browser for the Web was Mosaic. This browser developed by Mark Andreossen in 1993.

Browsers can be text-based or graphical. A graphical browser allows the user to see more of what the WWW has to offer (graphics, photographs and multimedia) and can make the Internet easier and more intuitive to use.

A text-based browser allows a user to see only text. Graphic elements are not displayed. Using the keyboard rather than a mouse accesses hypertext links. LYNX is an example of a text-based browser.

2.7.2 Web Sever

A web server is a software program running on a computer connected to the Internet. The term 'web server' is also used sometimes to refer to the computer on which the software is running. More often, the computer is called a server and is running more software than just web server software. Some examples of Web Servers are MS Internet Information Server for Windows NT, Personal Web Server for FrontPage 98, Netscape Enterprise Serve and Apache.

The purpose of a web server is to respond to requests for WWW files. When you surf the WWW, you are sending requests to web servers all over the country or world. The servers are sending back various files that are used to construct the web pages you see.

When a Web browser tries to access the information stored in a database, Web server acts as client to the Database server. The Web server accepts the query from the browser and passes the query to the Database server. Moreover, the Web server also formats the results into HTML, and sends the result back to the browser.

2.7.3 Database Server

The Database server is very important in the Internet application development. It can be used to store and retrieve the information that is stored in a database. The database connects to the Web server. Web server-not Web browser-acts as the client to the Database server.

2.7.4 Database on the web

The ability of Web-based application to access database is the key to corporate application development on the web. Existing corporate databases can be accessed via the

Web, providing unparalleled information to access. Finally, pre-existing applications that have more traditional components for information input and updating can be augmented with a Web-based front end. These types of solutions allow corporations to take advantage of the Web while still leveraging their previous development investments. Scalability of any application server, Web server, and database server allows someone to develop a simple Web application solution for a large-scale production system. Choosing the correct set of technologies for an information systems project will lead to an effective solution developed in a cost-effective manner, that can take advantage of the client/server scalability and integrate new technologies new technologies as they emerge.

2.8 Web Application Development Tools

In development of one web-based application some of the web-based application development tools have been considered. In below are some of the tools been considered for the new system.

2.8.1 Lotus Notes

Lotus Notes is unique among GroupWare products. In that it is the *only* complete GroupWare solution. It is the only software product that addresses a comprehensive definition of what groups of office workers have to accomplish and how computers can facilitate those activities. Lotus Notes addresses all of these aspects of group activities. Lotus Notes addresses all of these aspects of group activity such as email program, bulletin board, discussion software, form routing products, etc. [5]

It has document database and messaging capability as described before. Moreover, Notes provides a rich-programming environment that offers developers a selection of programming languages from simple (the Notes @ function language) to more powerful and complex (LotusScript; an ANSI BASIC compliant language that similar to Visual Basic; the LoutsNotes API; a library of C functions; HiTestTools for Visual Basic; HiTest Tools for C++; numerous third party programming tools; and due to be available in Notes Release 4.5; an implementation of Java). [5]

2.8.2 Microsoft Visual InterDev

Visual InterDev is a comprehensive, Web-based application development tool. Visual InterDev provides an integrated environment that brings together various technologies to work towards a common goal of building robust and dynamic applications for the Web. Visual InterDev achieves this integrated development environment through the use of the Developer Studio Shell interface, first used in Microsoft's Visual C++. We can open and work on Visual C++ and Visual J++ projects while simultaneously creating your Visual InterDev project. This feature greatly enhances productivity, especially when you're building Component Object Model (COM) and Distributed COM (DCOM) components and incorporating these components into your Visual InterDev application. [6]

Visual InterDev enables the developer to build applications that are dynamic and interactive. Visual InterDev enables the developer to build dynamic web pages through the use of client-side and server-side script. VBScript is the default scripting language, but JavaScript also can be used. [6]

Database integration is vital to any application. Visual InterDev provides a rich and robust set of visual database tools to immediately enhance your productivity. Visual InterDev supports the major OBDC-compliant databases, both on the desktop and the server. [6]

Visual InterDev provides a set of tools to view and maintain ours sites. These tools are similar and compatible with the side management tools found in Microsoft Front Page. [6]

Visual InterDev supports the major object-based technologies that exist for developing web-based applications, including Active-X controls and Java applets. Visual InterDev supports the use of third party Active-X controls and enables you to integrate your own custom Active-X controls. Visual InterDev also provides Design-time controls that enable you to set control properties when you're designing your application and then use this functionality at runtime without the overhead of a typical Active-X control. [6]

In a nutshell, Visual InterDev is an exciting new tool that significantly augments web developer's productivity. [6]

2.8.3 Borland IntraBuilder Client/Server

Borland has created a RAD tool for the web in IntraBuilder Client/Server 1.5, rather than a Web-enable transitional client/server developments solution. IntraBuilder offer a scalable, high-performance application server for creating multi-tier web application. It supports several web servers, most major database, and all HTML standards, and it incorporates Borland's enhanced server-side JavaScript capabilities.

2.8.4 PowerBuilder 6.0

PowerBuilder 6.0 has enhancement including shared server objects, server push, and asynchronous messaging. Programmer productivity improvement, such as completely new debugger, enhancements to PowerBuilder Foundation Class (PFC), a new source code control API, and a new trace engine and profiler application. The Internet Developer's Toolkit (IDT) is now included with PowerBuilder. With the IDT, it is possible to view Powersoft report in a browser using the window plug-in, run a PowerBuilder application within a browser using the window plug-in, and create dynamic HTML pages using Distributed PowerBuilder and Web PowerBuilder. Other Internet enhancement, such as improved Data Window HTML generation, secure mode for plug-in and Active-X, a new PowerBuilder window Active-X and customizable Web jumps from within the PowerBuilder development environment.

2.8.5 Active Server Page (ASP)

Active Server Page is a technology, which is build into some other piece of software. That other piece of software, in this case, is Microsoft's Internet Information Server (IIS) or Personal Web Server (PWS), depending on which operating system used. [7]

When a script is included in a Web page, the script is normally served to the browser, which then complies and runs the script. The problem with this scenario is that not all browsers understand all scripting languages, and not all browsers understand the same scripting languages in the same way. ASP removes the uncertainty by using the server to examine both the script and the browser with which it is communicating and then by passing information to browser in a way that it can understand. The result is that a content developer can focus on the message that he is trying to convey, rather that on the means used to covey his content. [7]

Windows NT Server comes bundled with its own copy of the Internet Information Server Web server. On the other hand, if browsers are running on Windows 95 or Windows NT Workstation, then Microsoft Personal Web Server (PWS) is used. PWS is designed for small to medium scale Web sites and Intranets. [7]

By default, ASP relies in VBScript as scripting language. There are also a number of other scripting languages that can be used, including the following:

- JScript (Java Script)
- Perl
- REXX
- Python

2.8.6 Microsoft Visual Basic 6.0

In Visual Basic, developers create applications by assembling components. Components can include visual Active-X controls, non-visual Active-X servers and Active Documents. These components are meant to encapsulate some business function or business process, allowing developers to reuse components in many different applications. [8]

Visual Basic is based on a component model rather than an inheritance model. It promotes the encapsulation of business logic and other application functions into reusable components. Visual Basic also makes the physical deployment of these components simple to ensure that reuse is optimal and load balancing is straightforward. [8]

Instead of stressing inheritance from ancestor objects, Visual Basic encourages developers to create application elements from smaller parts. Visual Basic is built around the premise of two important methods for building components: composition and aggregation. Composition involves the extension of existing components through the inclusion of new methods or properties. Aggregation involves grouping one or more small components together to create a single, new component. Both aggregation and composition are generally regarded as better forms of reused because they do not rely on inherited changes from ancestor components. Visual Basic's code reuse model also forces developers to think of reuse as it correlates to business processes. [8]

2.8.7 Java

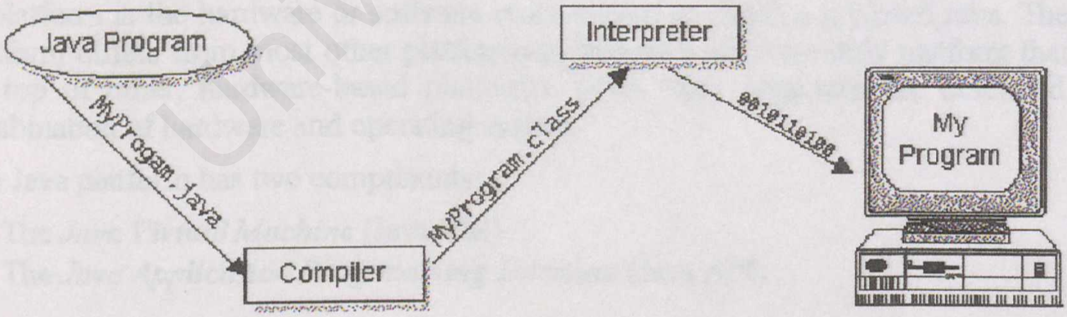
Java is two things: a programming language and a platform.

2.8.7.1 The Java Programming Language

Java is a high-level programming language that is all of the following:

- Simple
- Architecture-neutral
- Object-oriented
- Portable
- Distributed
- High-performance
- Interpreted
- Multithreaded
- Robust
- Dynamic
- Secure

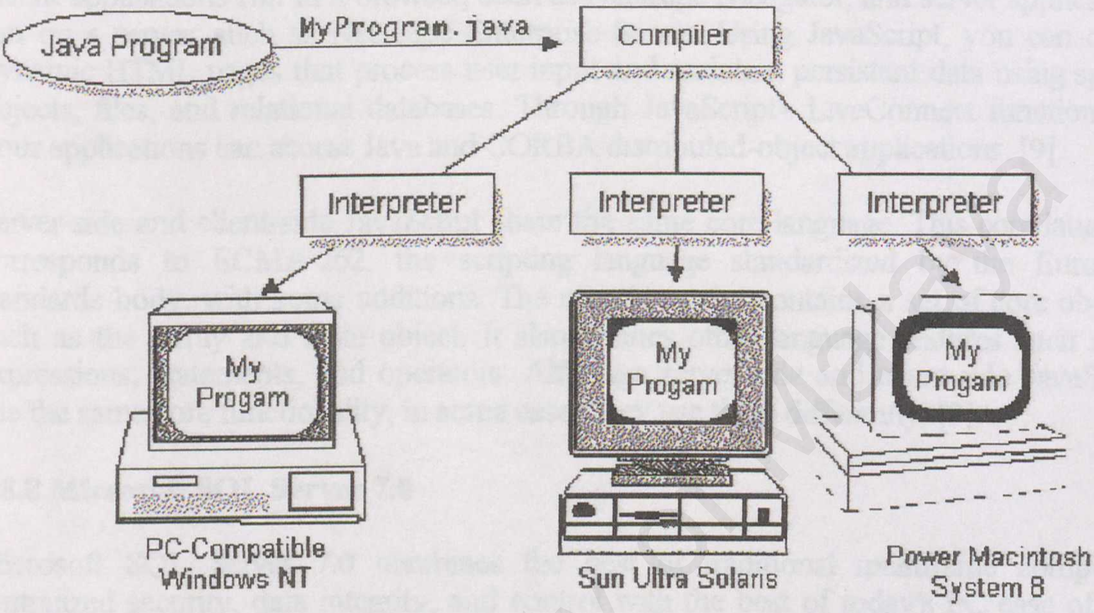
Java is also unusual in that each Java program is both compiled and interpreted. With a compiler, you translate a Java program into an intermediate language called *Java bytecodes*--the platform-independent codes interpreted by the Java interpreter. With an interpreter, each Java bytecode instruction is parsed and run on the computer. Compilation happens just once; interpretation occurs each time when the program is executed. This figure illustrates how this works.



Communication between Java program and computer

You can think of Java bytecodes as the machine code instructions for the *Java Virtual Machine* (Java VM). Every Java interpreter, whether it's a Java development tool or a Web browser that can run Java applets, is an implementation of the Java VM. The Java VM can also be implemented in hardware.

Java bytecodes help make ***"write once, run anywhere"*** possible. You can compile your Java program into bytecodes on any platform that has a Java compiler. The bytecodes can then be run on any implementation of the Java VM. For example, the same Java program can run on Windows NT, Solaris, and Macintosh.



The same Java program can run on any implementation of the Java Virtual Machine for example: Windows NT, Solaris, and Macintosh.

2.8.7.2 The Java Platform

A platform is the hardware or software environment in which a program runs. The Java platform differs from most other platforms in that it's a software-only platform that runs on top of other, hardware-based platforms. Most other platforms are described as a combination of hardware and operating system.

The Java platform has two components:

- The *Java Virtual Machine* (Java VM)
- The *Java Application Programming Interface* (Java API)

You've already been introduced to the Java VM. It's the base for the Java platform and is ported onto various hardware-based platforms.

The Java API is a large collection of ready-made software components that provide many useful capabilities, such as graphical user interface (GUI) widgets. The Java API is grouped into libraries (*packages*) of related components.

As a platform-independent environment, Java can be a bit slower than native code. However, smart compilers, well-tuned interpreters, and just-in-time bytecode compilers can bring Java's performance close to that of native code without threatening portability.

2.8.7.3 JavaScript

JavaScript is Netscape's cross-platform, object-based scripting language for client and server applications. JavaScript lets you create applications that run over the Internet. Client applications run in a browser, such as Netscape Navigator, and server applications run on a server, such as Netscape Enterprise Server. Using JavaScript, you can create dynamic HTML pages that process user input and maintain persistent data using special objects, files, and relational databases. Through JavaScript's LiveConnect functionality, your applications can access Java and CORBA distributed-object applications. [9]

Server-side and client-side JavaScript share the same core language. This core language corresponds to ECMA-262, the scripting language standardized by the European standards body, with some additions. The core language contains a set of core objects, such as the Array and Date object. It also defines other language features such as its expressions, statements, and operators. Although server-side and client-side JavaScript use the same core functionality, in some cases they use them differently. [9]

2.8.8 Microsoft SQL Server 7.0

Microsoft SQL Server 7.0 combines the best of traditional mainframe computing centralized security, data integrity, and control with the best of today's PC ease of use, rich user interfaces, and a variety of off-the-shelf productivity tools. It makes it possible for multiple front ends to share information, enabling the developer to choose the most appropriate tool for the job. SQL server makes efficient use of network, because database queries are processed at a centralized server, network traffic is reduced. SQL server can comfortably handle databases of 200GB of data today, and that number is expected to grow to between 500GB and 1 terabyte with upcoming versions of SQL server. [10]

Microsoft SQL Server incorporates a world-class feature set for distributed client/server computing. Benefits of using SQL Server are as following key areas:

- Reliable distributed data and transactions.
- Centralized control of distributed servers.
- Very high performance and scalability.
- Support for very large databases.
- Full programmability and standard support.
- Rich desktop integration
- Open interoperability [10]

Microsoft SQL Server 7.0 provides robust, efficient, and effective solutions for complex business problem in the Windows NT environment. A host of features, such as the powerful SQL language, an intelligent cost-based optimizer, build-in replication, a versatile locking strategy, and a distributed transaction control mechanism, make Microsoft SQL Server 7.0 ideal for all kinds of client/server computing environment. SQL Server also provides tools for database administrators for centralized management of SQL Server. [10]

2.8.9 Microsoft Access 97

Microsoft Access is a popular relational database management system for the Microsoft Windows operation system. It's a hardworking database without the hard work. This full-featured database is easy to use by everyone, whether an end user, a veteran, or a developer. Microsoft Access can be considered as database management system for developing JMS at standalone personal computer with Personal Web Server (PWS) at home. [11]

2.8.10 Microsoft's Internet Information Server (IIS) 4.0

Microsoft's Internet Information Server is web server software on Windows NT environment. Active Server Page is build into IIS that is bundled with Windows NT. Web pages that are coded in ASP will send to IIS where the ASP script written in VBScript or JScript will be interpreted by the asp.dll file. This dynamic link library file is stored in the IIS. The IIS locates the page and sends it back to the browser, which the page source codes, is pure HTML. All the Visual Basic code has been interpreted by the asp.dll file in IIS. Without Internet Information Server, ASP script cannot be interpreted and the browser will read just the static HTML code. [7]

2.8.11 Microsoft Transaction Server (MTS)

Microsoft Transaction server (MTS) is a vital component in IIS where IIS cannot be installed without MTS. MTS is used to manage IIS Web application. Web application can be run as separate packages under MTS. This approach allows the program to isolated and maintains IIS integrity. MTS is managing Internet Server Application Programming Interface (ISAPI) application, it can stop one application and the visitor will simply get an error message. MTS tracks any changes that are being made to a database. All changes tied to a transaction must be fail or pass together, even if the transaction includes several normally viewed as separate transactions. [7]

The best way in handling any database transactions at Web site through ASP is MTS. MTS can be used to manage database transaction. A transaction is an operation that succeeds or fails as whole; even it involves a lot of steps in between. [7]

2.8.12 Microsoft ODBC 3.0

Open Database Connectivity (ODBC) technology provides a common interface for accessing heterogeneous SQL databases. ODBC is based on Structured Query Language (SQL) as a standard for accessing data. This interface provides maximum interoperability: a single application can access different SQL Database Management

Systems (DBMS) through a common set of code. This enables a developer to build and distribute a client/server application without targeting a specific DBMS. Database drivers are then added to link the application to the user's choice of DBMS.

Benefits

- ODBC Applications are not tied to a proprietary vendor API.
- ODBC 3.0 aligns with, and is a superset of, the X/Open and ISO Call Level Interface (CLI) standards.
- Increased performance.

2.8.13 Windows NT Server 4.0

Microsoft Windows NT Server 4.0 is a network foundation for the future, designed to meet the most demanding requirements of today's business computing world. Windows NT Server is also the easiest network operating system to setup, manage and use. [12]

These robust, multipurpose network operating systems offers dependable file and print services, while providing the architecture to run powerful client/server applications. With built-in support for communications and Internet services, Windows NT Server is the only network operating system that includes Internet and Intranet capabilities. The new features built into Windows NT Server offer a better communication by providing more choices for accessing information - especially through a wide range of built-in Internet tools. New features also provide users with easier, lower cost networking and improved performance. [12]

Windows NT Server inter-operates with a broad range of server operating system including NetWare, UNIX, Microsoft LAN Manager, SNA and Macintosh. [12]

2.9 CASE TOOL

VISIO Professional 5.0 as JMS DFD and ER Model CASE Tool

VISION Professional 5.0 will be used as this project Computer-Aided Software Engineering (CASE) Tool to draw entity-relationship diagram (ER Diagram) and Data Flow Chart (DFD). It provides stencil that includes many drawing tools for different applications. ER Diagram also can be beveled using the database drawing tool provided by VISIO Professional. It is an easy way to draw ER diagram and Data Flow Chart for this system database.

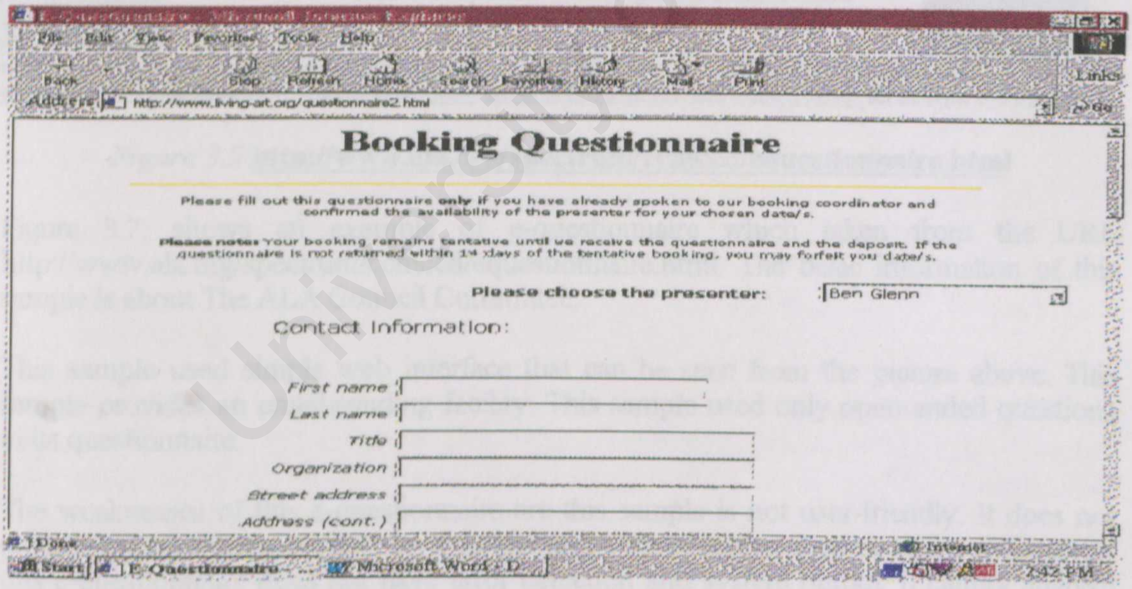
Chapter 3

3.3 Analyze the Existing Electronic Questionnaire System on The web

The purpose of examining existing systems is to determine weaknesses and advantages in the system. Therefore, these good points from the system can be taken as a reference to enhance and sophisticate the incoming E-Questionnaire system.

Ten existing E-Questionnaire examples were taken randomly from the web. To make sure there are no redundancies, they are all from different URLs. Moreover, each of them has their own objectives and scopes. However, these existing systems have some similarities among their characteristics. These E-Questionnaire web sites are listed as below:

1) http://www.living-art.org/questionnaire2.html
2) http://www.ala.org/spectrum/ccmccd/equestionnaire.html
3) http://www.nal-path.com/personal/boequest.htm
4) http://www.ncfsu.org/question.htm
5) http://www.e-questionnaire.com/enfrexample.htm
6) http://www.pjrnet.com/n3kz/n3kz_questions.html
7) http://www.singingelectrons.com/default_survey.html
8) http://www.ocfcu.org/questionnaire.html
9) http://www.bardo.org/reflects.html
10) http://www.nderf.org/Share_NDEhtm.htm



http://www.living-art.org/questionnaire2.html

Booking Questionnaire

Please fill out this questionnaire **only** if you have already spoken to our booking coordinator and confirmed the availability of the presenter for your chosen date/s.

Please note: Your booking remains tentative until we receive the questionnaire and the deposit. If the questionnaire is not returned within 14 days of the tentative booking, you may forfeit you date/s.

Please choose the presenter: Ben Glenn

Contact Information:

First name

Last name

Title

Organization

Street address

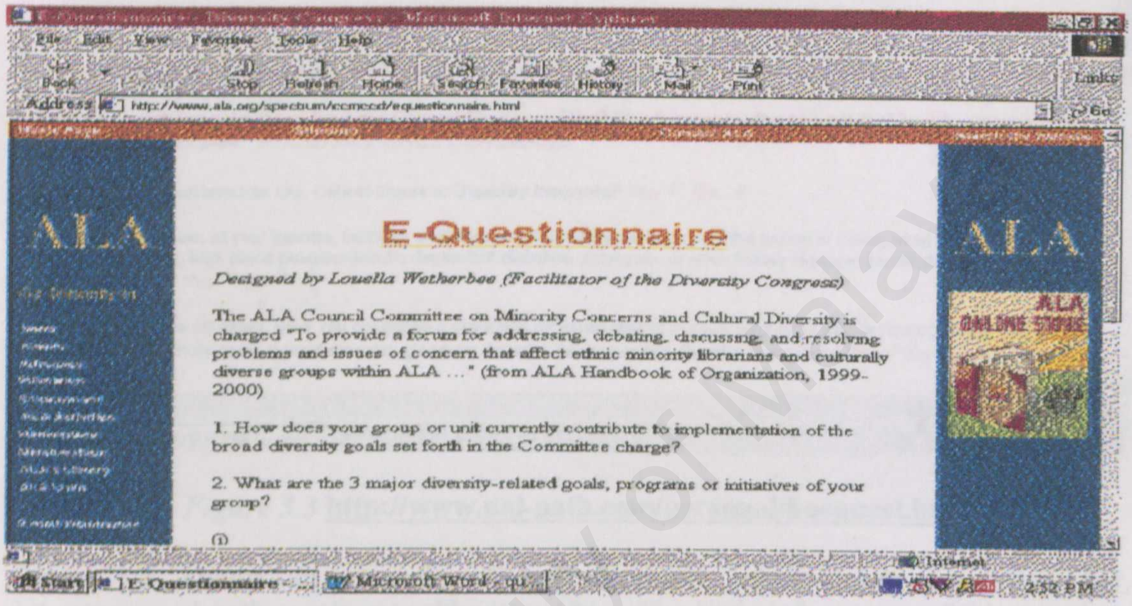
Address (cont.)

Figure 3.1 **http://www.living-art.org/questionnaire2.html**

Figure 3.1, shows an example of e-questionnaire which taken from the URL *http://www.living-art.org/questionnaire2.html*. This e-questionnaire is for booking purpose.

From the picture above it shows that the interface that used by this e-questionnaire is very simple. However, it has the facility of submitting answers online. This sample uses both open-ended and closed questions in their questionnaires.

The weaknesses of this e-questionnaire are this sample is not user-friendly. It does not provide HELP button, sample or example and Email-sending facility. Moreover, this e-questionnaire does not have error detection and system output. It couldn't analyze data and generate reports after users have submitted their questionnaires. This system is not a multilingual system.



E-Questionnaire

Designed by Louella Wetherbee (Facilitator of the Diversity Congress)

The ALA Council Committee on Minority Concerns and Cultural Diversity is charged "To provide a forum for addressing, debating, discussing, and resolving problems and issues of concern that affect ethnic minority librarians and culturally diverse groups within ALA ..." (from ALA Handbook of Organization, 1999-2000)

1. How does your group or unit currently contribute to implementation of the broad diversity goals set forth in the Committee charge?

2. What are the 3 major diversity-related goals, programs or initiatives of your group?

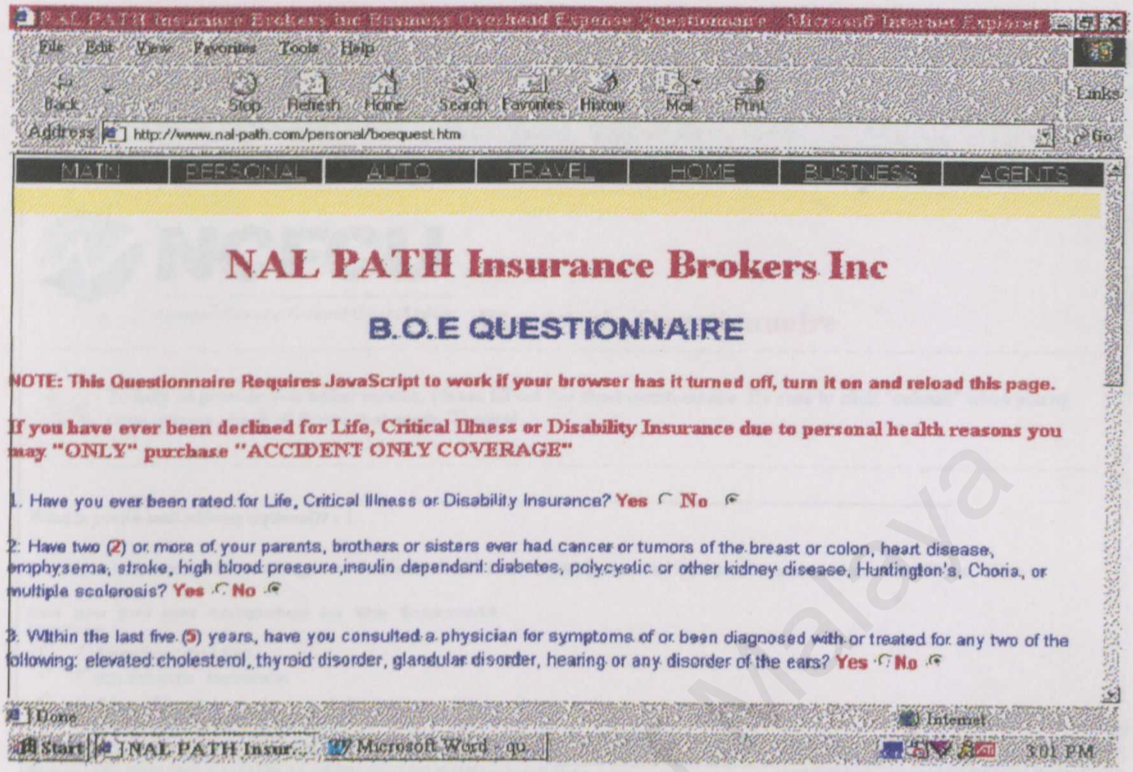
(1)

Figure 3.2 **http://www.ala.org/spectrum/ccmccd/equestionnaire.html**

Figure 3.2, shows an example of e-questionnaire which taken from the URL http://www.ala.org/spectrum/ccmccd/equestionnaire.html. The basic information of this sample is about The ALA Council Committee.

This sample used simple web interface that can be seen from the picture above. This sample provides an email-sending facility. This sample used only open-ended questions in its questionnaire.

The weaknesses of this e-questionnaire are this sample is not user-friendly. It does not provide HELP button, sample or example and cannot submit answer online. Moreover, this e-questionnaire does not have error detection and system output. It cannot analyze data and generate reports after users have submitted their questionnaires. This system is not a multilingual system.


NAL PATH Insurance Brokers Inc Business Overhead Expense Questionnaire - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Stop Refresh Home Search Favorites History Mail Print
Links
Address http://www.nal-path.com/personal/boequest.htm
Go
MAIN PERSONAL AUTO TRAVEL HOME BUSINESS AGENTS
Done
Internet
Start NAL PATH Insur... Microsoft Word - qu...
3:01 PM

NAL PATH Insurance Brokers Inc

B.O.E QUESTIONNAIRE

NOTE: This Questionnaire Requires JavaScript to work if your browser has it turned off, turn it on and reload this page.

If you have ever been declined for Life, Critical Illness or Disability Insurance due to personal health reasons you may "ONLY" purchase "ACCIDENT ONLY COVERAGE"

1. Have you ever been rated for Life, Critical Illness or Disability Insurance? Yes ○ No ●

2: Have two (2) or more of your parents, brothers or sisters ever had cancer or tumors of the breast or colon, heart disease, emphysema, stroke, high blood pressure,insulin dependant diabetes, polycystic or other kidney disease, Huntington's, Choria, or multiple scolerosis? Yes ○ No ●

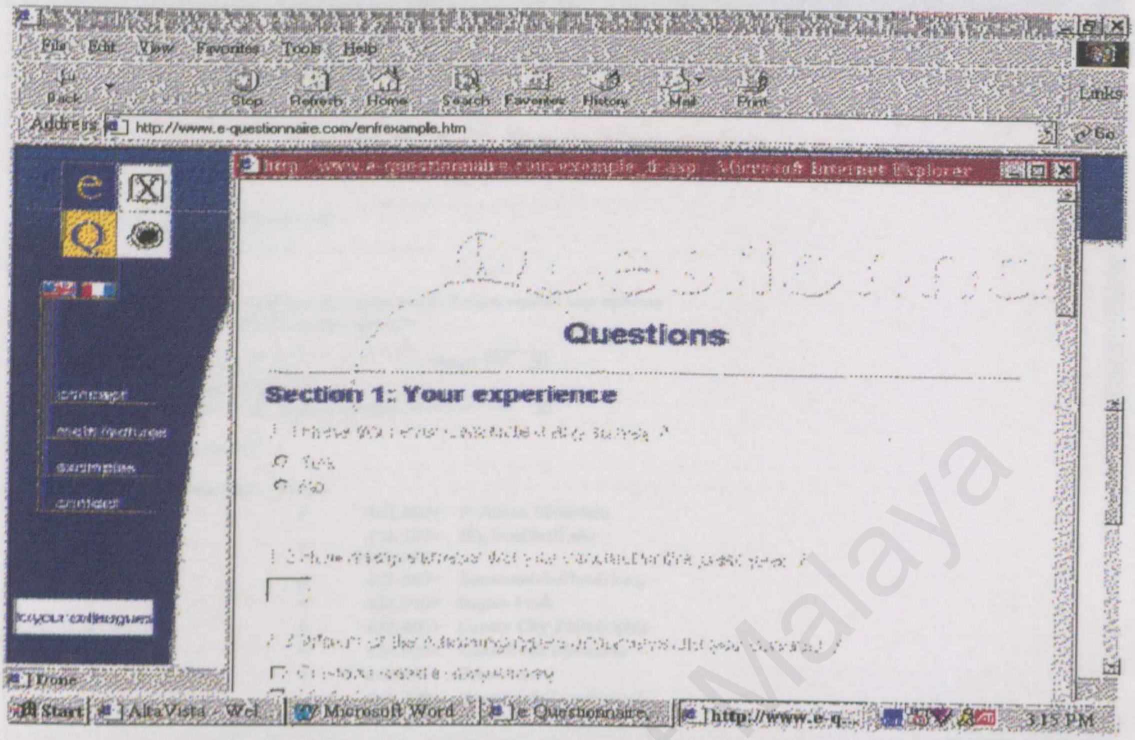
3. Within the last five (5) years, have you consulted a physician for symptoms of or been diagnosed with or treated for any two of the following: elevated cholesterol, thyroid disorder, glandular disorder, hearing or any disorder of the ears? Yes ○ No ●

Figure 3.3 **http://www.nal-path.com/personal/boequest.htm**

Figure 3.3, shows an example of e-questionnaire which taken from the URL http://www.nal-path.com/personal/boequest.htm. The basic information of this sample is about NAL PATH Insurance Brokers Inc.

This sample also used simple web interface and this sample is user-friendly. It has the facility of submitting answers online too. This sample used open-ended and closed questions in its questionnaire. It can analyze data and shows its output to users after submitting the data.

The weaknesses of this e-questionnaire are this sample does not provide HELP button, sample or example and Email-sending facility. Moreover, this e-questionnaire does not have error detection. It cannot generate reports after users have submitted their questionnaires. This system is not a multilingual system.


File Edit View Favorites Tools Help
Back Stop Refresh Home Search Favorites History Mail Print
Links
Address http://www.e-questionnaire.com/enfrexample.htm
Go
concept
main features
samples
contact
Done
Start
AltaVista - Wel...
Microsoft Word
e Questionnaire
http://www.e-q...
3:15 PM

Questions

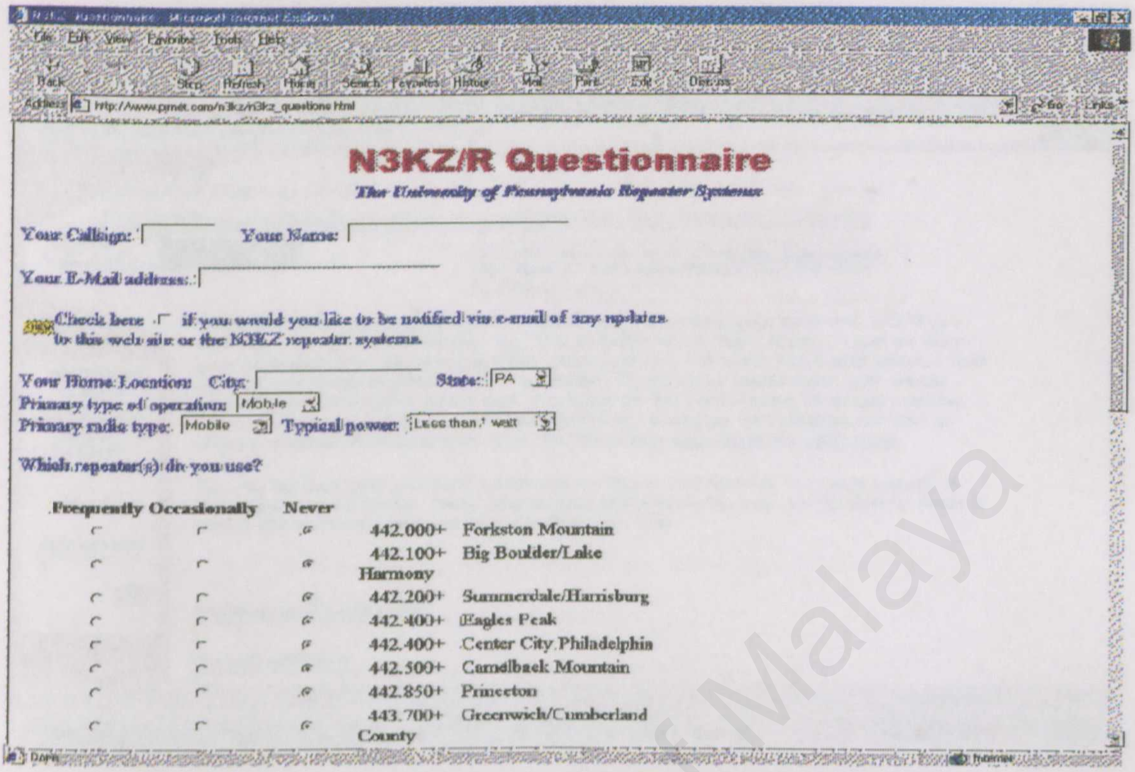
Section 1: Your experience

Figure 3.5 **http://www.e-questionnaire.com/enfrexample.htm**

Figure 3.5 is taken from the URL http://www.e-questionnaire.com/enfrexample.htm. The basic information in this sample is about the concept of e-questionnaire.

This sample used complex web interface but it has user-friendly interface. This sample has HELP button, sample or example and email-sending facility. It also has the facility of submitting answers online. This sample used open-ended and closed questions in its questionnaire.

The weaknesses of this e-questionnaire are this sample does not have error detection and system output. It cannot analyze data and generate reports after users have submitted their questionnaires. This system is not a multilingual system.



http://www.pjrnet.com/n3kz/n3kz_questions.html

N3KZ/R Questionnaire

The University of Pennsylvania Repeater Systems

Your Callsign: 　　Your Name:

Your E-Mail address:

Check here □ if you would you like to be notified via e-mail of any updates to this web site or the N3KZ repeater systems.

Your Home Location: City: 　　State: PA

Primary type of operation: Mobile

Primary radio type: Mobile 　　Typical power: Less than 1 watt

Which repeater(s) do you use?

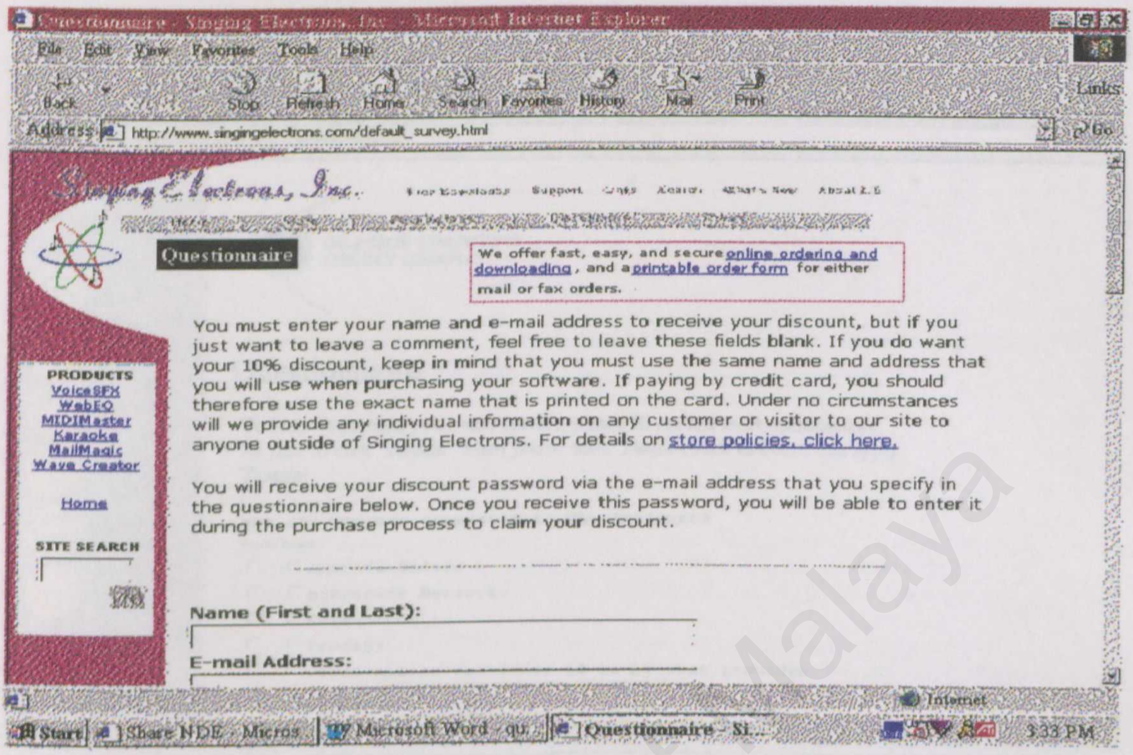
Frequently	Occasionally	Never		
○	○	●	442.000+	Forkston Mountain
○	○	●	442.100+	Big Boulder/Lake Harmony
○	○	●	442.200+	Summerdale/Harrisburg
○	○	●	442.400+	Eagles Peak
○	○	●	442.400+	Center City Philadelphia
○	○	●	442.500+	Camelback Mountain
○	○	●	442.850+	Princeton
○	○	●	443.700+	Greenwich/Cumberland County

Figure 3.6 **http://www.pjrnet.com/n3kz/n3kz_questions.html**

Figure 3.6, is an example of e-questionnaire which taken from the URL http://www.pjrnet.com/n3kz/n3kz_questions.html. This sample is about The University of Pennsylvania Repeater Systems.

This sample used simple web interface. It has user-friendly interface and the facility of submitting answers online. This sample used open-ended and closed questions in its questionnaire.

The weaknesses of this e-questionnaire are this sample does not provide HELP button, sample or example and Email-sending facility. Moreover, this e-questionnaire does not have error detection and system output. It cannot analyze data and generate reports after users have submitted their questionnaires. This system is not a multilingual system.



http://www.singingelectrons.com/default_survey.html

We offer fast, easy, and secure online ordering and downloading, and a printable order form for either mail or fax orders.

You must enter your name and e-mail address to receive your discount, but if you just want to leave a comment, feel free to leave these fields blank. If you do want your 10% discount, keep in mind that you must use the same name and address that you will use when purchasing your software. If paying by credit card, you should therefore use the exact name that is printed on the card. Under no circumstances will we provide any individual information on any customer or visitor to our site to anyone outside of Singing Electrons. For details on store policies, click here.

You will receive your discount password via the e-mail address that you specify in the questionnaire below. Once you receive this password, you will be able to enter it during the purchase process to claim your discount.

Name (First and Last):

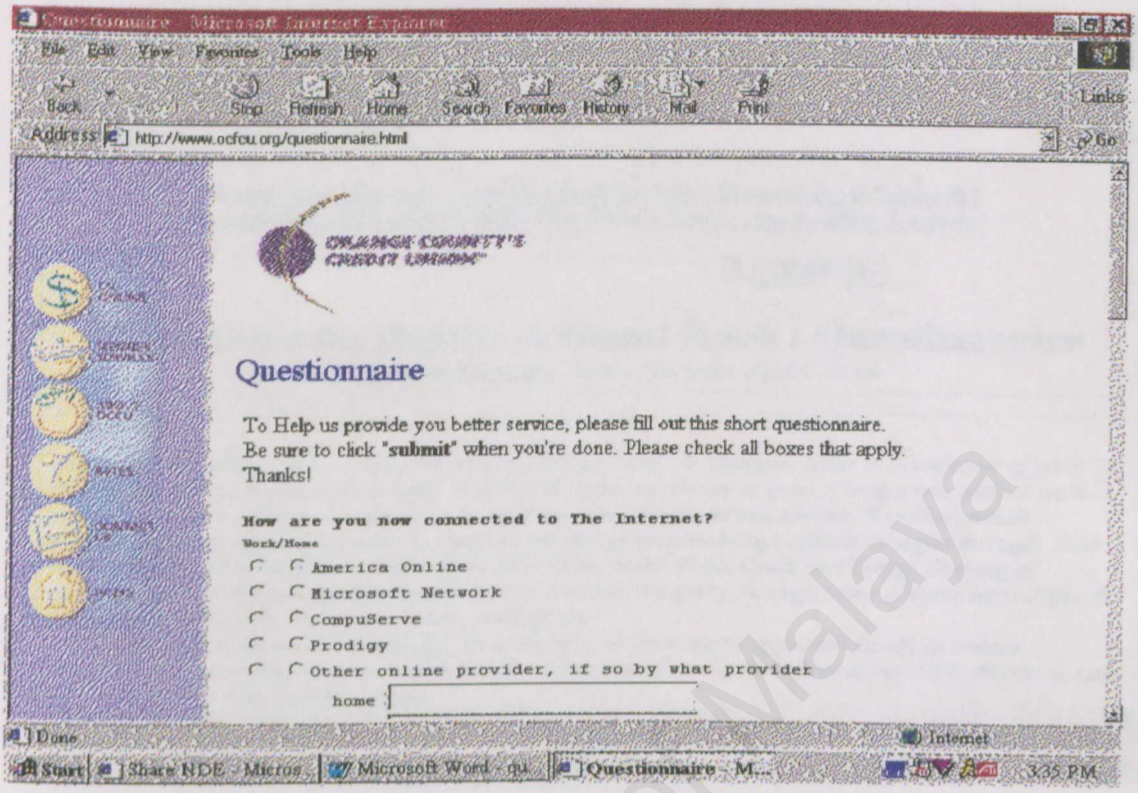
E-mail Address:

Figure 3.7 **http://www.singingelectrons.com/default survey.html**

Figure 3.7, is an example of e-questionnaire which taken from the URL http://www.singingelectrons.com/default_survey.html. This sample is about Singing Electronic, Inc.

This sample also used simple web interface. It has user-friendly interface and email-sending facility. This sample also has the facility of submitting answers online. This sample used open-ended and closed questions in its questionnaire.

The weaknesses of this e-questionnaire are this sample does not provide HELP button and sample or example. Moreover, this e-questionnaire does not have error detection and system output. It cannot analyze data and generate reports after users have submitted their questionnaires. This system is not a multilingual system also.


Questionnaire - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Stop Refresh Home Search Favorites History Mail Print
Links
Address http://www.ocfcu.org/questionnaire.html
Go
ORANGE COUNTY'S CREDIT UNION
Done
Internet
Start Share NDE - Micros Microsoft Word - qu Questionnaire - M... 3:35 PM

Questionnaire

To Help us provide you better service, please fill out this short questionnaire.
Be sure to click **"submit"** when you're done. Please check all boxes that apply.
Thanks!

How are you now connected to The Internet?

Work/Home

○ ○ America Online
○ ○ Microsoft Network
○ ○ CompuServe
○ ○ Prodigy
○ ○ Other online provider, if so by what provider

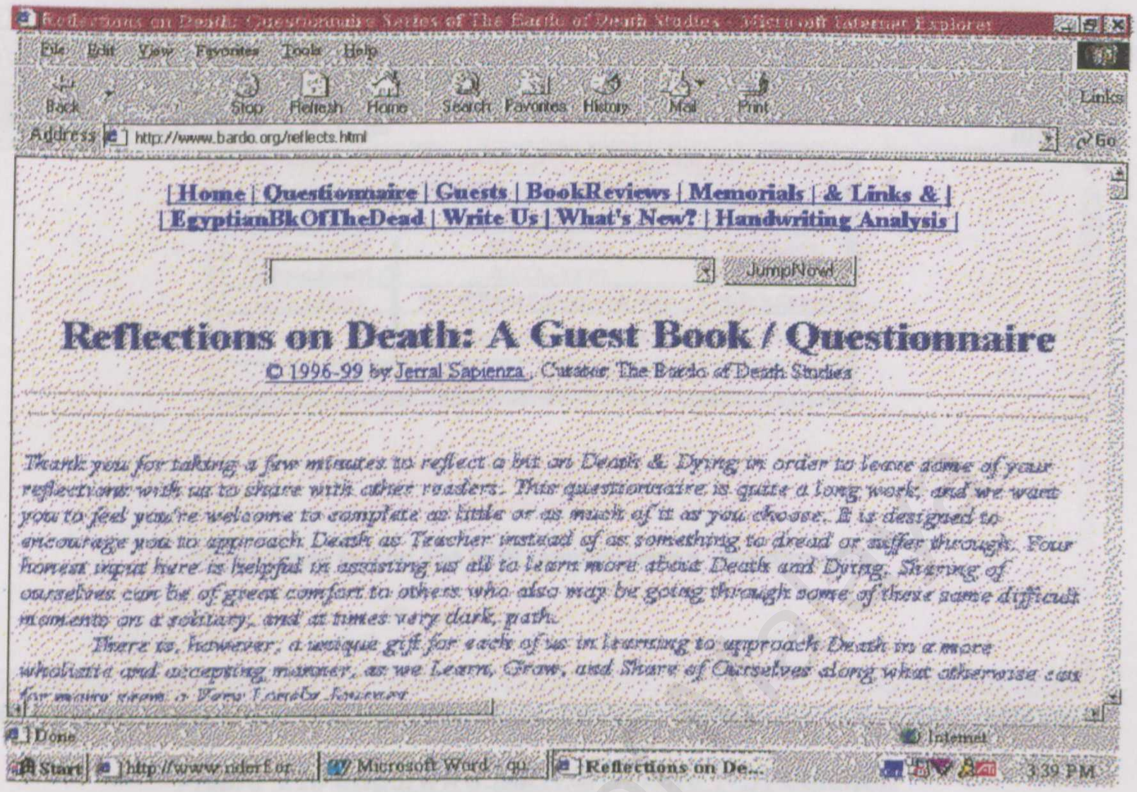
home

Figure 3.8 **http://www.ocfcu.org/questionnaire.html**

Figure 3.8, is an example of e-questionnaire which taken from the URL http://www.ocfcu.org/questionnaire.html. This sample is about Orange County's Credit Union.

This sample used simple web interface. It has user-friendly interface, HELP button and the facility of submitting answers online. This sample used open-ended and closed questions in its questionnaire.

The weaknesses of this e-questionnaire are this sample does not provide sample or example and Email-sending facility. Moreover, this e-questionnaire does not have error detection and system output. It cannot analyze data and generate reports after users have submitted their questionnaires. This system is not a multilingual system.



Reflections on Death: Questionnaire Series of The Bardo of Death Studies - Microsoft Internet Explorer

http://www.bardo.org/reflects.html

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Reflections on Death: A Guest Book / Questionnaire

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Thank you for taking a few minutes to reflect a bit on Death & Dying in order to leave some of your reflections with us to share with other readers. This questionnaire is quite a long work, and we want you to feel you're welcome to complete as little or as much of it as you choose. It is designed to encourage you to approach Death as Teacher instead of as something to dread or suffer through. Your honest input here is helpful in assisting us all to learn more about Death and Dying. Sharing of ourselves can be of great comfort to others who also may be going through some of these same difficult moments on a solitary, and at times very dark, path.

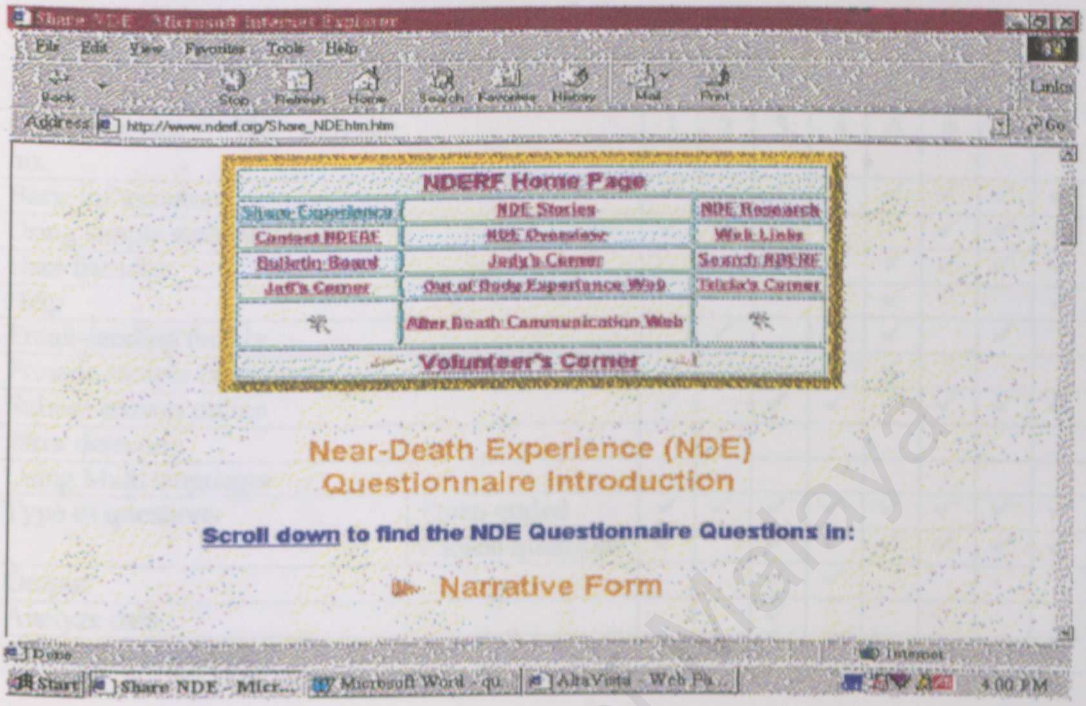
There is, however, a unique gift for each of us in learning to approach Death in a more wholistic and accepting manner, as we Learn, Grow, and Share of Ourselves along what otherwise can for many seem a Very Lonely Journey

Figure 3.9 **http://www.bardo.org/reflects.html**

Figure 3.9, is an example of e-questionnaire which taken from the URL http://www.bardo.org/reflects.html. This sample is about Reflections on Death.

This sample used complex web interface. It has user-friendly interface and email-sending facility. This sample also has the facility of submitting answers online. This sample used open-ended and closed questions in its questionnaire.

The weaknesses of this e-questionnaire are this sample does not provide HELP button and sample or example. Moreover, this e-questionnaire does not have error detection and system output. It cannot analyze data and generate reports after users have submitted their questionnaires. This system is not a multilingual system also.



Near-Death Experience (NDE)
Questionnaire Introduction

Scroll down to find the NDE Questionnaire Questions in:

Narrative Form

Figure 3.10 **http://www.nderf.org/Share NDEhtm.htm**

Figure 3.10, shows an example of e-questionnaire which taken from the URL http://www.nderf.org/Share_NDEhtm.htm. This e-questionnaire is about Near-Death Experience.

From the picture above it shows that the interface that used by this e-questionnaire is simple. This sample uses only open-ended questions in their questionnaires.

The weaknesses of this e-questionnaire are this sample is not user-friendly. It does not provide HELP button, sample or example and Email-sending facility. Moreover, this e-questionnaire does not have the facility of submitting answers online, error detection and system output. It cannot analyze data and generate reports after users have submitted their questionnaires. This system is not a multilingual system.

3.3.1 Analyzing the 10 Existing Electronic Questionnaire System Entirely

The table below shows the comparison of the 10 existing system.

Characteristics \ The web-site no.		1	2	3	4	5	6	7	8	9	10
Basic information		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Using simple web interface		✓	✓	✓	✓		✓	✓	✓		✓
User-friendly				✓	✓	✓	✓	✓	✓	✓	
Help						✓			✓		
Email-sending facility			✓			✓		✓		✓	
Provide sample or example						✓					
Submit answer online		✓		✓	✓	✓	✓	✓	✓	✓	
Error detection											
Using Multi languages											
Type of questions	Open-ended	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Closed questions	✓		✓	✓	✓	✓	✓	✓	✓	
Output				✓	✓						
Analyze data				✓							
Able to generate report											

After analyzing all of the ten questionnaires, I fount out that all of them have basic information that explain their purpose and objectives. This information is important because it gives users a clear picture of the entire questionnaire.

80% of the samples use simple the web interfaces. Most of the samples used only different fonts to represent their entire questionnaire. However, some of the samples used small pictures or images as an attraction to users. Using only font or images and small pictures can cut down the loading time of a browser. Therefore, users do not have to wait for such a long time to look through the questionnaire while loading a page.

User-friendly characteristics can be found only in 7 samples out of the 10. They used simple and understandable language. Moreover, users are provided with a clear button to erase all unsatisfactory answers. The other 3 of the samples do not have this facility.

Only 20% of the samples have HELP facility. This HELP facility is important for these users who have doubts on the questionnaire.

4 out of 10 samples do have email-sending facility. This facility is important for these users who are really interested and want to know more about that particular system. Users can send an email to a support member to get further information about that particular system.

Only 1 of the samples has examples as reference for users. This example is important because it gives users a reference on how to fill in the questionnaire.

2 of the samples do not have the facility of submitting answers online. They request users to print out the questionnaire and summit their answers through the post. This is a really poor system.

There are 100% of the samples that used open-ended questions in their questionnaires. However, 80% of the samples used closed questions in their questionnaires. 8 out of 10 samples use both open-ended and closed questions in their questionnaires. For the incoming New Generation of E-Questionnaires (E-Questionnaire), both methods are available for users. Users are advice to use close form anyway. The main reason of using closed questions is because closed questions have more advantages compared to open-ended questions. These advantages are

1. Easy to analyze.
   By fixing answers to users, system analysts can easily analyze and calculate the percentage of the results.

2. Cut down the respond time.
   Users just have to select the answers that have been provided to them. They do not have to think and type out the answers.

3. Can get answers from users in a shorter time period.
   Users just have to choose the answers that have been provided to them. So it is easy for users to answer questions faster and easier.

20% of the samples show their outputs to users after they have submitted their questionnaires. This is important for users to view their outputs after they have submitted their E-forms.

Only 1 of the samples can analyze data after submission. This is important for users to view the results after they have submitted their questionnaires.

All of the samples do not support multi languages, error detection, and cannot generate reports. These characteristics will be applied in the coming new system "New Generation of E-Questionnaire" or in short E-Questionnaire.

3.4 Analysis of Mr. Ahmad Faizal Ibrahim's System

The purpose of examining Mr. Ahmad Faizal Ibrahim's system is to determine the advantages and the weaknesses of his system. Therefore, the good points from his system can be taken as a reference to enhance and sophisticate the incoming E-Questionnaire system.

As usual, Mr. Ahmad Faizal Ibrahim's system does have basic information that introduces his system and explains the objective and the purpose of his system. His system's interface is simple but user-friendly. His system has HELP facility, which many of the web systems do not have. This is a good way for users who are in doubt to get help from. Mr. Ahmad's system provides online answer submission facility. Moreover, he used bilingual languages in his system. Most of the questions inside his system are close-ended. Outputs can be shown after submitting the questionnaire. This facility is another advantage from Mr. Ahmad's system. Moreover his system can also analyze data after doing the submission.

Mr. Ahmad's system also has its own disadvantages. His system does not have email sending and error detection facilities. His system does not provide an example or a guideline for users as reference. Finally, his system cannot generate reports after users have submitted their questionnaires. For sure, these characteristics will be applied in the coming new system "New Generation of E-Questionnaire" or in short E-Questionnaire later.

3.5 Analysis on the Format and Contents of Password Usage Survey Questions as a case study for E-Questionnaire System

After gathering information through a number of methods such as the Internet, lecturer supply materials and also ideals, reading from books and questionnaires survey examples, discuss with friends and other relevant materials a password usage questionnaire for E-Questionnaire has been developed.

Basically password usage questionnaire can be divided into two sections. They are Section A and Section B. Section A is about Users Password Usage. The questions inside this section are in both open-ended and closed questions format. All of the questions are related to password usage.

Section B is about demographics. Those questions inside this section are all in closed format and related to users personal information.

For further information, please refer to Appendix A: Password Usage Questionnaire.

3.6 Synthesis

Advantages of New Generation E-Questionnaire System (E-Questionnaire)

E-Questionnaire systems have several advantages compared to manual systems and other available questionnaires on the web. These advantages are as follows:

i. *E-questionnaire can display real-time report for every survey question.*
E-Questionnaire system not only provides questionnaires for users to answer but it is also able to display real-time reports using bar chart.

ii. *This system provides a guideline for users to create and publish the survey form.*
Most of the questionnaires on the web do not have this facility. With E-Questionnaire, a user can refer to the guideline that is provided in this system if they are in doubt in any part of the system.

iii. *E-group system support is available on this system.*
System support groups of E-Questionnaire are always ready for users who are in doubt of E-Questionnaires. A user just has to send an email to this E-group and the answer will be posted through emails as soon as possible to the related user.

iv. *This system is a multilingual system.*
Users can use any language to create his or her survey form in E-Questionnaire system.

v. *This system provides Error detection services.*
Error will occur if a user keyed-in wrong information.

vi. *User can choose the type of questions which available in this system.*
The format of the questions for example radio button, textbox, checkbox and so on are all available in this system. What users have to do is just select their type for those questions.

Chapter 4

4. System Requirement

4.1 Questionnaire Methodology

E-Questionnaire System is using two types of questions, open format and closed format. Below are two examples of questions will be asked inside the questionnaire.

Closed format
Are your passwords related to your job or personal life?
○ Yes
○ No

Opened format
What changes would you like to see in order to make password usage more secure and reassuring?

____

____

____

Most of the questions inside the questionnaire are in closed format. The reason of using closed format is because closed format is more suitable than opened format for data analysis.

Moreover, closed format questions can cut down the respond time. Users just have to select the answers that have been provided to them. They do not have to think and type out the answers. Besides, closed format questions can get answers from users in a shorter time period. For example, users just have to choose the answers that have been provided to them. So it is easy for users to answer questions faster and easier. For further reference or information, please refer to *Chapter 2, 2.4 Questionnaire Design*.

4.2 Methodology

There are many types of development model in the software engineering such as Waterfall model, Spiral model and others. During the development of this project, the prototyping model is selected since the prototyping model allows all of parts of a system to be constructed quickly to understand or clarify system needs.

Prototyping consists of building an experimental system rapidly and inexpensively for end users to evaluate. By interacting with the prototype, users can get a better idea of their information requirements. The prototype endorsed by the users can be used as a template to create final system.

The prototype is a working version of an information system or part of the system, but it is meant to be only a preliminary model. Once operational, the prototype will be further refined until it confirms precisely to user's requirements. For many applications, a prototype will be extended many times before a final design is accepted. Once the design has been finished, the prototype can be converted to a polished production system.[13]

4. Revise and enhance the prototype.
   The system builder notes all changes requested by the user and refines the prototype accordingly. After the prototype has been revised, the cycle returns to step3. Step3 and 4 are repeated until the user is satisfied.

When no more iteration is required, the approved prototype then becomes an operational prototype that furnishes the final specifications for the application.

The prototype model is used because

a) Changes can be made early in development.
b) System developed can meet users' needs more easily.
c) It provides a common baseline and frame. Developers and users can communicate better.
d) The developer can understand the system much better.

Advantages of Prototyping

i. Changing the system early in its development.
   Successful prototyping depends on early and frequent user feedback to help modify the system and make it more responsive to actual needs. As with any system effort, early changes are less expensive than changes made late in the project's development.

ii. Scrapping undesirable system.
   A second advantage of using prototyping is the possibility of scrapping a system that is just not what users and analysis had hoped. Once again, the issue of time and money spent arises. A prototype represents much less of an investment than a completely developed system.

iii. Designing a system for users' needs and expectations.
   A third advantage of prototyping is that the system being developed should be a better fit with users' needs and expectations. Many studies of failed information systems indicts the long interval between requirements determination and the presentation of the finished systems while sequestered away from users during this critical period.

Disadvantages of Prototyping

i. Managing the project.
   Although several iterations of the prototype may be necessary, extending the prototype indefinitely also creates problems. It is important that the systems analysis team devises and then carries out a plan regarding how feedback on the prototype will be collected, analyzed, and interpreted. Set up specific time periods during which you and management decision-makers will use feedback to evaluate how well the prototype is performing.

4.3.4 Client Software Requirement

The client software requirement falls on the browser used by the users. It requires system that can run Microsoft Internet Explorer 4.0 or above. Microsoft's Visual InterDev is also considered as ASP development environment. It does provide an editor and lots of tools and utilities.

4.4 Explanation of Hardware and Software Requirement

4.4.1 The Advantages of Windows NT Server

- ***Support More Protocol and File Sharing***

Windows NT Server includes support for more protocols than any other network operating system. Windows NT Server is the only network operating system that supports file sharing via NCP, X-open, SMB, and HTTP.

- ***Easy and Simple Setup and Management***

All of the hardware drives needed to include on the compact disc. One just can even use wizards to custom configure the system so there is no need to answer difficult technical questions.

- ***Integrated Security***

Windows NT Server is the only network operating system that has been certified by the U.S government. All information, whether accessed via NetWare, Windows NT Server, Macintosh or Web-based protocols is subject to this security. Because if its integration with Windows NT Server, the Internet Information Server (IIS) provides the same level of security.

- ***Easy Integration***

Long filenames, dial-in networking and networking protocols are supported. Administrators can also control desktop configurations and give a common look and feel across workstations.

- ***Integrated Web Server***

The Internet Information Server (IIS) is a full-featured Web server that is tightly integrated with Windows NT Server, taking advantages of such services as Performance Monitor and Event Viewer. Windows NT Server also includes the Internet Information Server API (ISAPI), which enables developers to unlock the power of server applications.

- ***Faster Access to Information***

Advances information retrieval speeds the process of finding documents within a large base of heterogeneous information.

- *Complete Communication Services*

Windows NT Server is unsurpassed as a communication server, offering built-in features that can link virtually any client, regardless of operating system, to any information source, such as Web servers, across any communications link.

- *Fast Reliable and Secure*

Windows NT Server provides a fast, reliable, and secure platform for Internet and Intranet applications, applications for healthcare, banking, accounting, manufacturing, and retail industries.

- *Low Cost Dial-Up Connectivity*

More efficient use of dial-up connections through carrier network, such as the Internet, is possible because Remote Access Server includes a new technology, Point to Point Tunneling Protocol (PPTP).

4.4.2 Comparison Between Microsoft and Lotus Solution

Different operating system support different software and its interoperability. Consideration of whether Microsoft or Lotus solution depends mostly on the features that in offer. Group ware product range from Microsoft Exchange to Lotus Notes/Domino. In the following, it shows the Microsoft solution as Active Server Page (ASP) and Lotus Domino as a visual development environment in the web applications:

- *Server Side Scripting*

Active Server Page (ASP) initiates the server while executing the client browsers. Hence, it requires script to be developed in logic that is code by default. The client browsers will initiates the server while the page is called. However, Lotus Domino provides server-side script with its Agent Manager technology. Cross-platform application development metaphor using point and click dialogue interface is code by exception form.

- *Database Driven Pages*

ASP scripts are able to access the back end systems to incorporate data in its the web pages. Through the Active Data Object (ADO), this process is similar with the Lotus Script Data Object (LSDO). From the ODBC, they can access different database for instance Oracle, Sybase, Informix and DB2.

- *Browser Independent*

Not all the information from the browser display is incorporated in the page sources. ASP provides the script called from the server side. Logic can be incorporated into ASP scripts to detect the type and version of the browser requesting a page. Similarly, Lotus Domino also displays browser independent HTML without programmer intervention.

- ***Dynamic Content***

Ability of creating and executing HTML based result of a script, provides dynamic and personalized features to ASP. However, Lotus Domino only able to generate the required page at the time requested.

- ***Content Structure and Integrated Store***

ASP applications are essentially page-based, consists of many files in directories residing in the file system. Internet Information Server (IIS) does not provide the integrated storage mechanism for the web application outside the file system. Any application that needs the storage of user information requires a new database to be created outside the environment. Meanwhile, Lotus Domino resides the structured object store in the organized content and indexing attributes.

- ***Platform Independence***

ASP executes the server as the page is called. As long as the browsers such as Internet Explorer 3.01 and above or Netscape 4.05, ActiveX is possible in a different platform for instance in UNIX or Windows NT. Lotus Domino provides the cross platform support within its application.

4.4.3 Disadvantages of Lotus Notes

Lotus Notes has its own database. The database is not a Relational Database System (RBMS). If the user needs to store 100 records into the system, the user needs to save the records 100 times. Problem will arise when user needs to store few hundreds or thousand of records into the system. This will make the process of saving data tedious and inefficient.

Lotus Notes and Domino required considerable more memory space compare to other application. As a result, the Lotus Notes application frequently hung-up and had to be rebooted.

Lotus Notes has the OLE features to invoke all kind of software application installed in computer. By using this feature, Abstract and Long Description fields are able to invoke word 97 when the New Document Create, Edit Document or Open Document. But this OLE inefficiently implemented because OLE in it can work perfectly by linking and embedding to certain length of word Document such as Abstract field. When the word Document is in great length, only certain length of document can be linked and embedded. This is the bug in Lotus Notes.

4.4.4 ASP Compare to CGI Application

ASP provides all of the functionality of CGI applications in an easier-to-use and more robust environment.

ASP is an easier way for server to access information in a form not readable by the client (such as an SQL database) and then act as a gateway between the two to produce information that the client can view and use.

With CGI, the server creates as many processes as the number of client requests received. The more concurrent requests there are, the more concurrent processes created by the server. However, creating a process for every request is time consuming and requires large amount of server RAM. In addition, this can restrict the resources available for sharing from the server application itself; slowing down performance, and increasing wait times on the web. ASP instead runs the same process as the web server, more handling client requests faster and more efficiently. It is much easier to develop dynamic content and the web application with ASP.

4.4.5 ASP Compare to ISAPA Application

ISAPI applications require all of the programming and layout to be contained in a dll file written in C++. ISAPI applications are thus more difficult to create and maintain. With ASP files and HTML writer can script an external component and format the output. ASP separates the layout and design from the business logic.

4.4.6 ASP Compare to PERL

PERL and other scripting languages are not robust development tools by themselves. ASP provides a familiar framework and objects for building complex application that requires data from relational databases and legacy sources. ASP supports virtually and scripting language to build these applications. Third parties are currently developing additional scripting engines, such as PERL, which will be announced when they are ready.

4.4.7 Why not using Informix 4GL

Informix 4GL enable programmer builds relational database system that solves business problem quickly and easily. It is a non-procedural language and has its own relational database Informix SQL. This Informix 4GL is available for a wide variety of operating system such as UNIX, DOS, and VMS. Any system build with this language will run any of the operating system and all the different computers. Furthermore, this language is portable meaning that an Informix 4GL application, written once, runs on small computers, big computers and everything between. This is one of the main advantages in using this programming language as a development tool.

The Informix SQL have its own limitation, which are its only supports up to 1 gigabyte of data. And the database design structures in row format which in much different compare with other database such as Microsoft SQL, Microsoft Access and etc. Where the Informix database is structured in column format. In future, if the user need to expand the storage in the database or convert to SQL database the build need to write a program to reformat the data and port it to other database.

4.4.8 Microsoft's Internet Information Server (IIS) 4.0

The advantages using IIS:

- Integration with Windows NT Server, because of the tight integration with Windows NT Server, IIS is easy to manage, fast, secure and can be up and running in minutes.
- Comprehensive Web Server Solution, IIS includes a built-in search engine, streaming multimedia capabilities, rich log file analysis tools, and more.
- Easy-to-develop, powerful Web-based application, IIS introduces Active Server Pages, with make creating dynamic content and development of Web-based applications easy.

4.4.9 VBScript and JScript as Scripting Language

After considering several languages that are available, VBScript seems to be the most desirable scripting language. It is because VBScript is the default scripting language for Active Server Page (ASP). Furthermore, it is also much easier to pick up the scripting languages, as most of us have already known Visual Basic. In addition to it, it is easier to implement as well as it does not require any additional software besides Windows NT Server 4.0 and Internet Information Server 4.0. However, JScript will only be used if some functions could not be supported with VBScript.

Jscript is a very good language to use as a client-side programming language. Unlike VBScript, Jscript creates client-side scripts that the majority of recent browsers can recognize. Both Netscape Communicator and Internet Explorer can interpret and execute HTML files that include Jscript.

4.4.10 Use SQL Server 7.0 as Database Server

Below are the reasons why SQL 7.0 is chosen as database server:

- It is the best database solution to be used with Windows NT Server
- It can handle more concurrent users as compared to Microsoft Access
- As this project is designed to handle large amount of data, therefore, SQL Server is most viable solution to accommodate the vast storage requirements
- Through tight integration with Internet Information Server (IIS), SQL Server can be queried and updated via popular Web browsers. This web browser can be downloaded from Internet, which is free and thus save cost.

4.5 Function Requirement

Functional requirements are function or subsystem that are mandatory to the system. The absence of the function requirement will make the whole system incomplete. The following are the functional requirement for the E-Questionnaire.

1. System Login
There are two types of system Login. They are User Login and Client Login. For User Login, users are able to create, update, delete and publish their questionnaires online. Moreover, users can view real-time data for every survey question through a bar chart. Client Login only require when users provide UserId and FormId for respondents to answer their questionnaires. Clients or respondents can also view real-time data for the survey that he or she has answered.

2. Create/Add, Modify, Update, Delete and Publish
Only user, who has signup as a member of E-Questionnaire can create/add, modify, updates, delete and publish survey form.

3. Signup
Those people who want to use the facility of E-Questionnaire are required to signup as a member of the system.

4. Basic Information
The main purpose of having this function is to provide users a clear picture of the entire E-Questionnaire System. It provides users information about the objectives of the E-Questionnaire.

5. Examples and Guideline
This function gives users a reference on how to create their own questionnaires step by step.

6. Last Password
Send related information for those users who have forgotten their Login ID or password.

7. Test Drive
Preview users survey to make sure every step flows the way they intended. User himself can also be a participant by filling in all the fields. By using this way, they themselves can test the survey and get the chance to make any changes before they send it out. But all the result will be stored in the database.

8. Help
This help function is provided to help those users who are doubt on the E-Questionnaire System.

9. Multilingual
Users can use any language to create their own survey form.

10. View Results
This is a record searcher database with relevant information on every respondent. It will create a unique ID for each person and store the latest date clients have visited, the question clients responded to, and their response. This will enable user and client to know how many responses they have.

11. Chart Result
Reporter dynamically displays real-time data for every survey question. Using a bar chart, it will display in percentages how respondents chose which response to the question.

12. Publish
After users have finished generating contents of the survey they may publish the form online. The publisher will format the survey according to the default online publishing standard and generate an URL that is now accessible on the web.

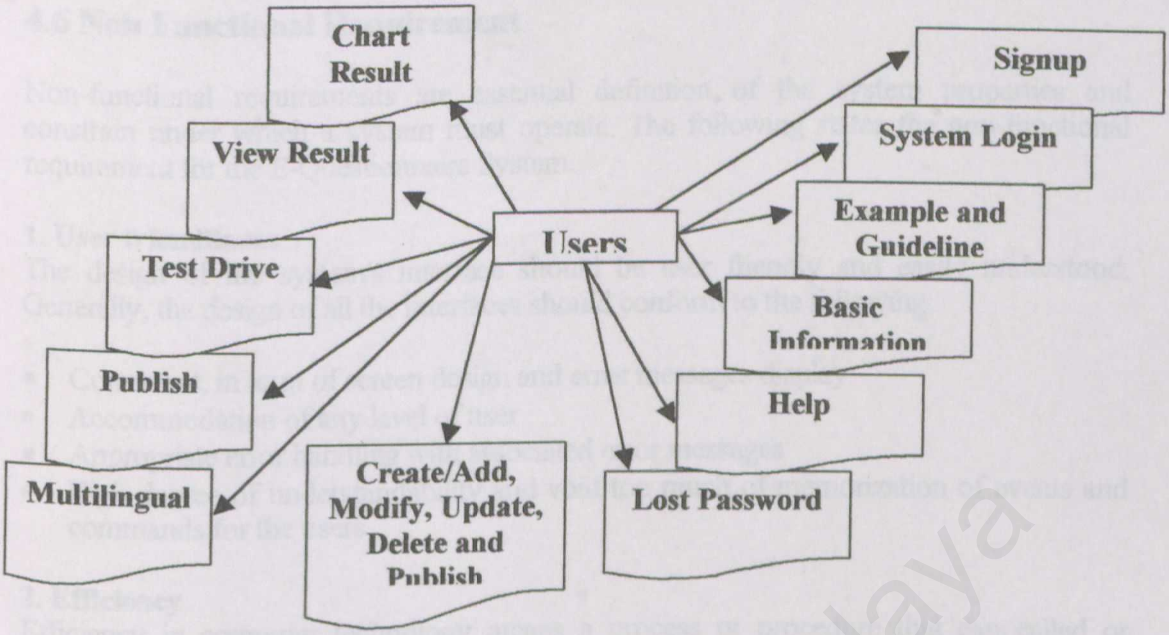


Figure 4.2 **The Diagram Above Shows The Functions That Can Be Used By Users**

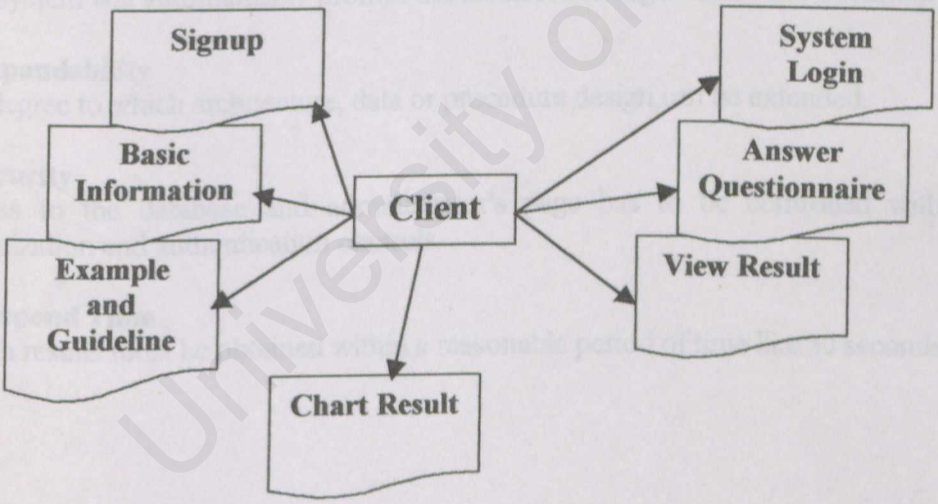


Figure 4.3 **The Diagram Above Shows The Functions That Can Be Used By Clients**

4.6 Non Functional Requirement

Non-functional requirements are essential definition of the system properties and constrain under which a system must operate. The following states the non-functional requirement for the E-Questionnaire System.

1. User friendliness
The design of the system's interface should be user friendly and easily understood. Generally, the design of all the interfaces should conform to the following:

- Consistent, in term of screen design and error messages display
- Accommodation of any level of user
- Appropriate error handling with associated error messages
- High degree of understandability and void too much of memorization of events and commands for the users.

2. Efficiency
Efficiency in computer technology means a process or procedure that can called or accessed in an unlimited of times to produce similar outcomes or output at a creditable pace or speed.

3. Error detection
This system will automatically prompt out an error message when error occurred.

4. Expandability
The degree to which architecture, data or procedure design can be extended.

5. Security
Access to the database and administrator's page has to be controlled with proper authorization and authentication controls.

6. Respond Time
Search results must be obtained within a reasonable period of time like 30 seconds.

Chapter 5

5 System Design

5.1 Introduction

System design is the first step in the development phase, in which requirements are translated into the representation of the software that is accessed before beginning the code generation. This phase uses the information collected earlier to accomplish the logical design of the system. It involves designing accurate data entry procedures and provides accurate input to the system being developed by using techniques of good form and screen design.[13]

The following are three characteristics to achieve a good design and software quality:

- The design must implement all the explicit requirement contained in the analysis phase and it must accommodate all implicit requirement desired.[14]
- The design must be readable and understandable guide for those who will generate code and those who will test and subsequently maintain the system.[14]
- The design should provide a complete picture of the system, addressing the data, functional and behavioral domains form an implementation perspective.[14]

Each of these characteristics is actually a goal to be achieved during the design process.

5.2 System Architecture

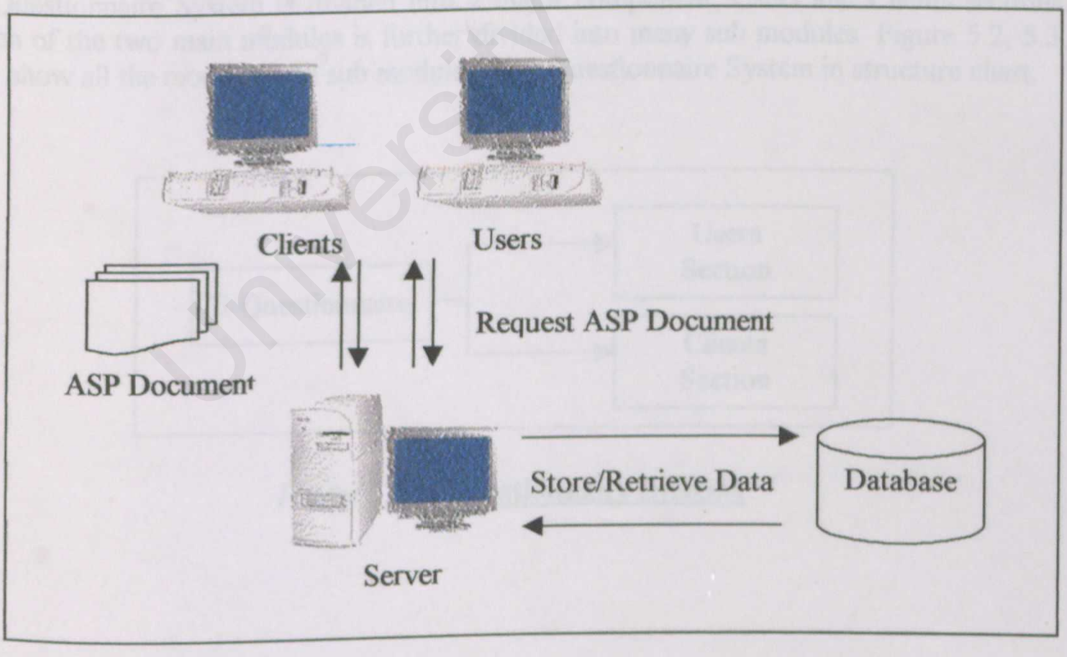


Figure 5.1 **E-Questionnaire System Architecture**

Figure 5.1 shows the overview of E-Questionnaire System architecture. At first, users have to signup as a member of E-Questionnaire. After that, they have right to make their own survey inside this system. All the information that used by the user will then store in the database. After finishing the survey, users can publish it and send the related User ID, Form ID and URL to the related clients. Clients now receive the access information. Clients send request to server asking for the survey form, and then server will retrieve data from database and send the result back to the clients. If clients submit data to server, server will then store the current data to the database.

5.3 Process Design

There are several design methodologies for the process design. E-Questionnaire System designed based on the data flow oriented-design method or structured design. Structure design has its origins in earlier design concepts that stressed on modularity, top-down design and structured programming.

5.3.1 System Structure Chart

Structure chart is used to depict high-level abstraction of a specified system. The use of structure chart is to describe the interaction between independent modules. Major functions from the initial component part of the structure chart, which can be broken into detailed sub-components.

E-Questionnaire System is divided into 2 major component, Users and Clients sections. Each of the two main modules is further divided into many sub modules. Figure 5.2, 5.3, 5.4 show all the modules and sub modules of E-Questionnaire System in structure chart.

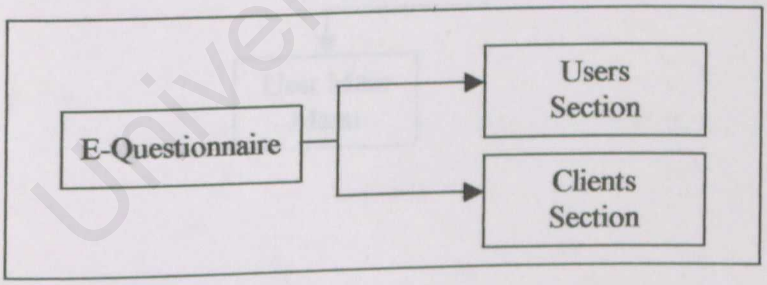


Figure 5.2 **E-Questionnaire Systems**

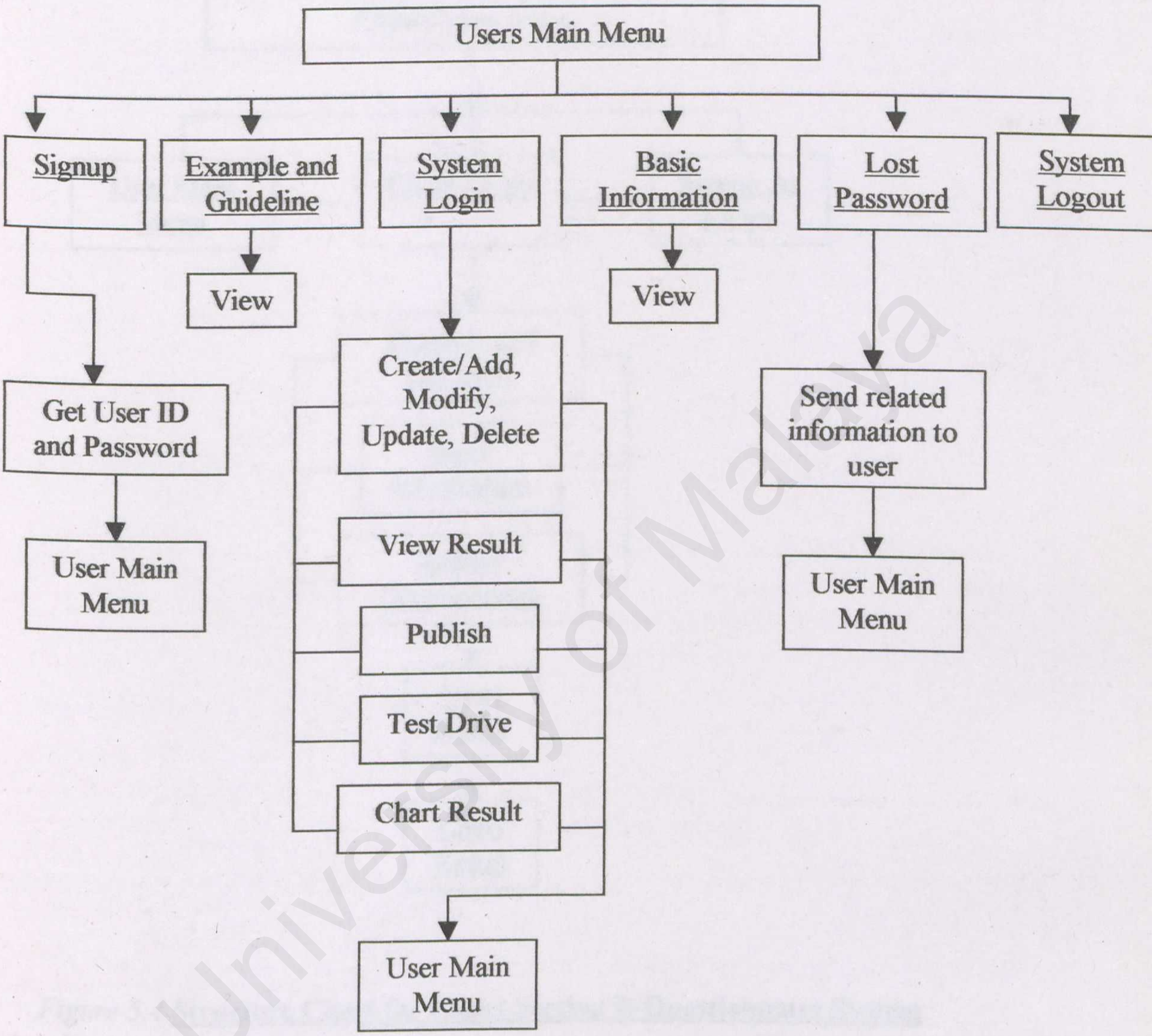


Figure 5.3 **Structure Chart for Users Section E-Questionnaire System**

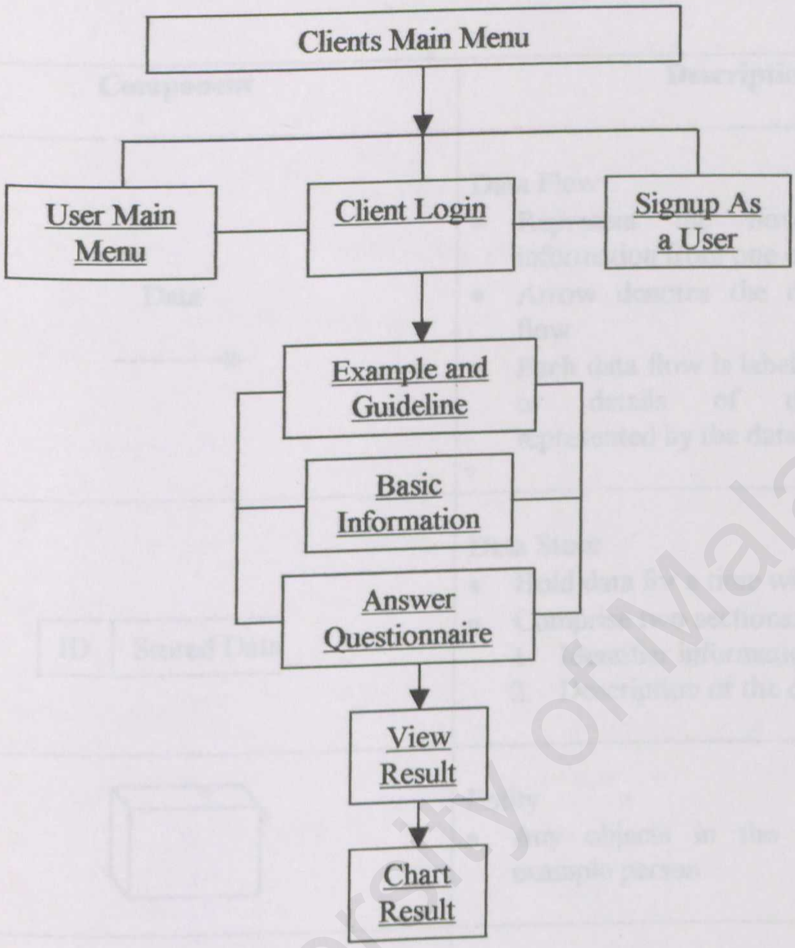
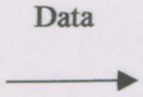
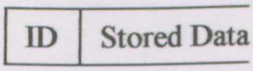
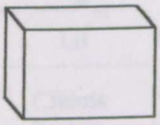
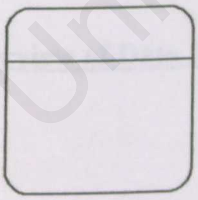


Figure 5.4 **Structure Chart for Client Section E-Questionnaire System**

5.4 Data Flow Diagram (DFD)

Data Flow Diagram (DFD) is a graphically characterization of data process and flaws in a system. DFD depicts the broadest possible overview of system inputs, and outputs, which correspond to data movement through the system.

Most of sub modules in E-Questionnaire System Users Section are dealing with data retrieving. On the other hand, sub modules in E-Questionnaire System Administrators Section deal with data storing. They are very similar and occur in a rather straightforward manner. Therefore, they are represented in one generalize DFD. The following are the DFD for the function in E-Questionnaire. The components of the DFD are explained as follow:

Component	Description
	Data Flow • Represent the flow of data or information from one object to another • Arrow denotes the direction of data flow • Each data flow is labeled with the name or details of the information represented by the data flow
	Data Store • Hold data for a time within the system • Comprise two sections: 1. Identifier information 2. Description of the data stored
	Entity • Any objects in the real world, for example person
	Process • Transform the input data to output data • Represented by rectangle shape • Comprise two or three sections: 1. Top section contains the identifier information 2. Center section contains a description of the process 3. Lower section contains the physical or computer program information

Description of symbols used in Data Flow Diagram [13]

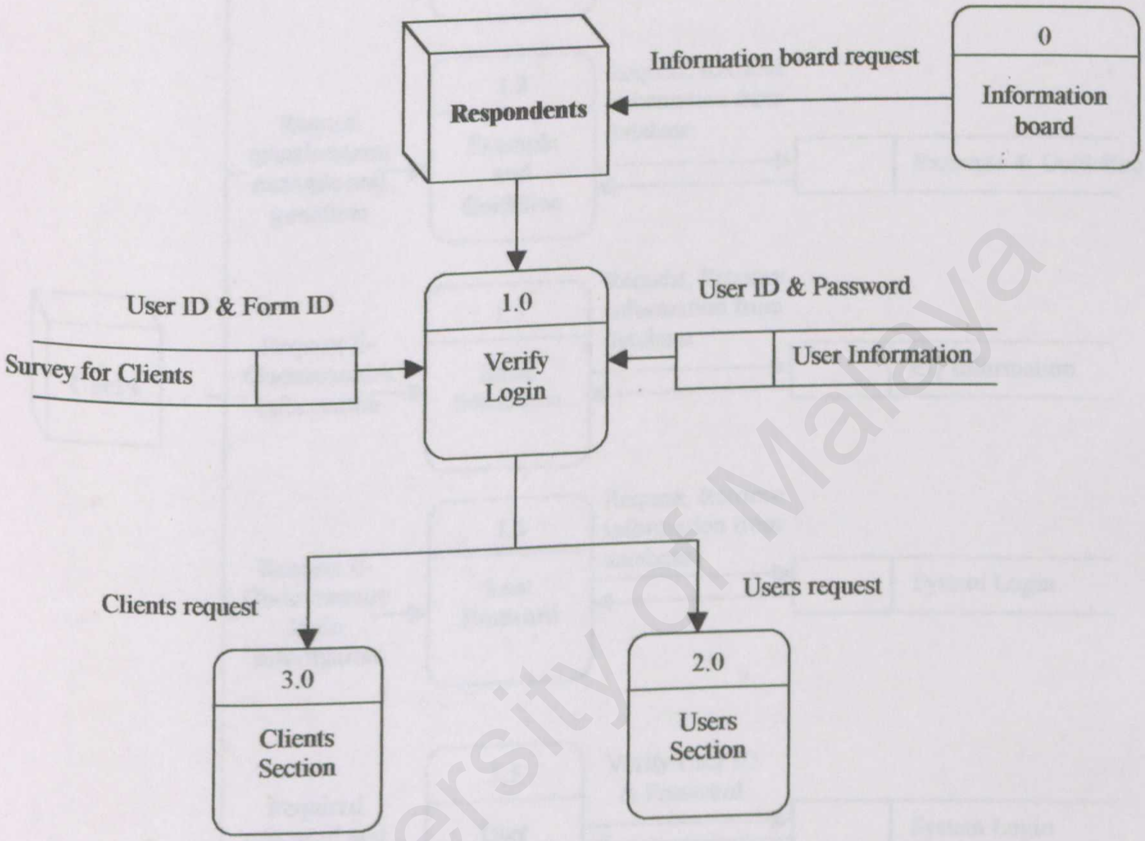


Figure 5.5 **Overview of Data Flow Diagram for E-Questionnaire System**

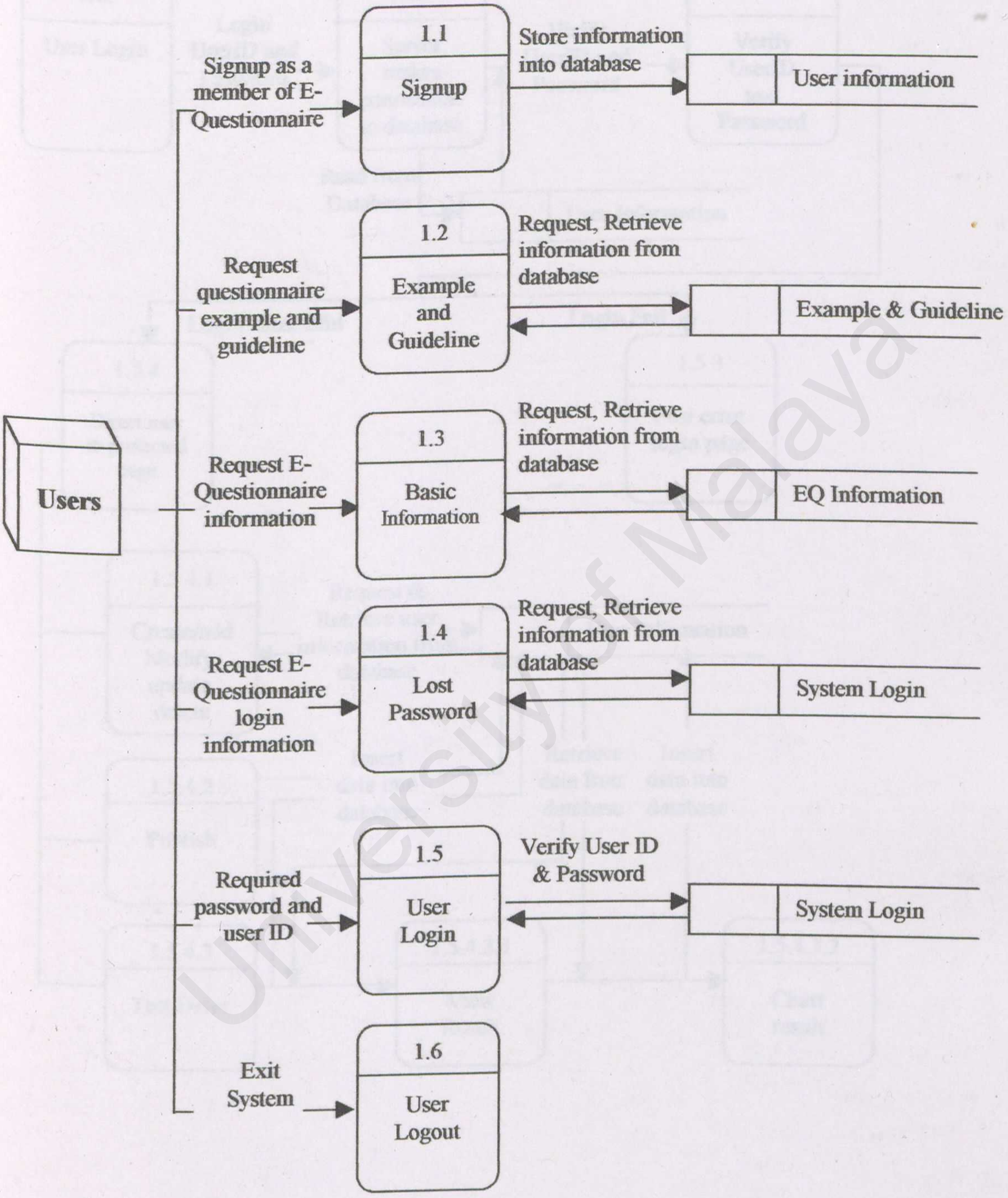

Users
Signup as a member of E-Questionnaire
1.1
Signup
Store information into database
User information
Request questionnaire example and guideline
1.2
Example and Guideline
Request, Retrieve information from database
Example & Guideline
Request E-Questionnaire information
1.3
Basic Information
Request, Retrieve information from database
EQ Information
Request E-Questionnaire login information
1.4
Lost Password
Request, Retrieve information from database
System Login
Required password and user ID
1.5
User Login
Verify User ID & Password
System Login
Exit System
1.6
User Logout

Figure 5.6 **Data Flow Diagram for Users Section**

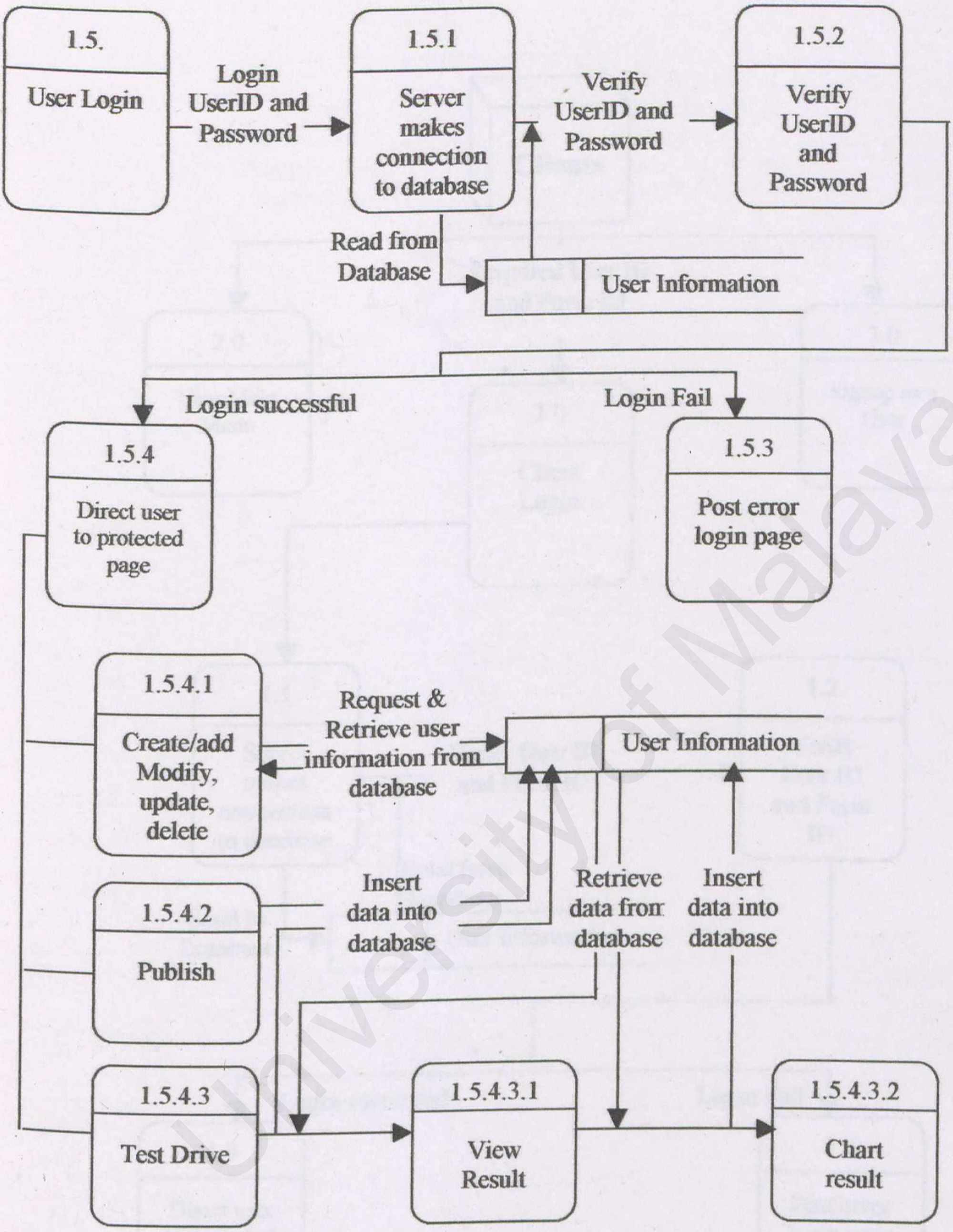

1.5.
User Login
Login UserID and Password
1.5.1
Server makes connection to database
Verify UserID and Password
1.5.2
Verify UserID and Password
Read from Database
User Information
Login successful
Login Fail
1.5.4
Direct user to protected page
1.5.3
Post error login page
1.5.4.1
Create/add Modify, update, delete
Request & Retrieve user information from database
User Information
1.5.4.2
Publish
Insert data into database
Retrieve data from database
Insert data into database
1.5.4.3
Test Drive
1.5.4.3.1
View Result
1.5.4.3.2
Chart result

Figure 5.7 **Data Flow Diagram for User Login Module**

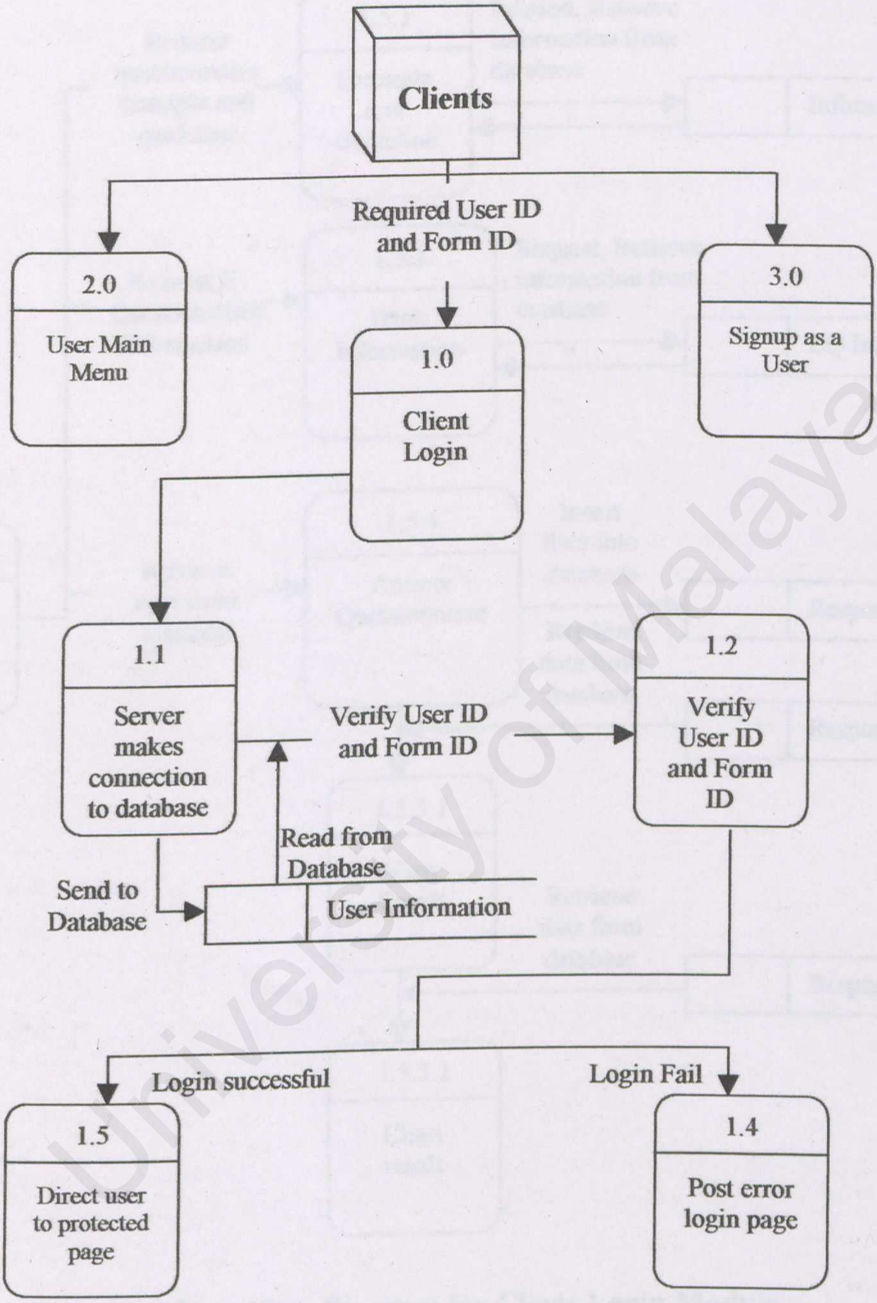


Figure 5.8 **Data Flow Diagram for Clients Section**

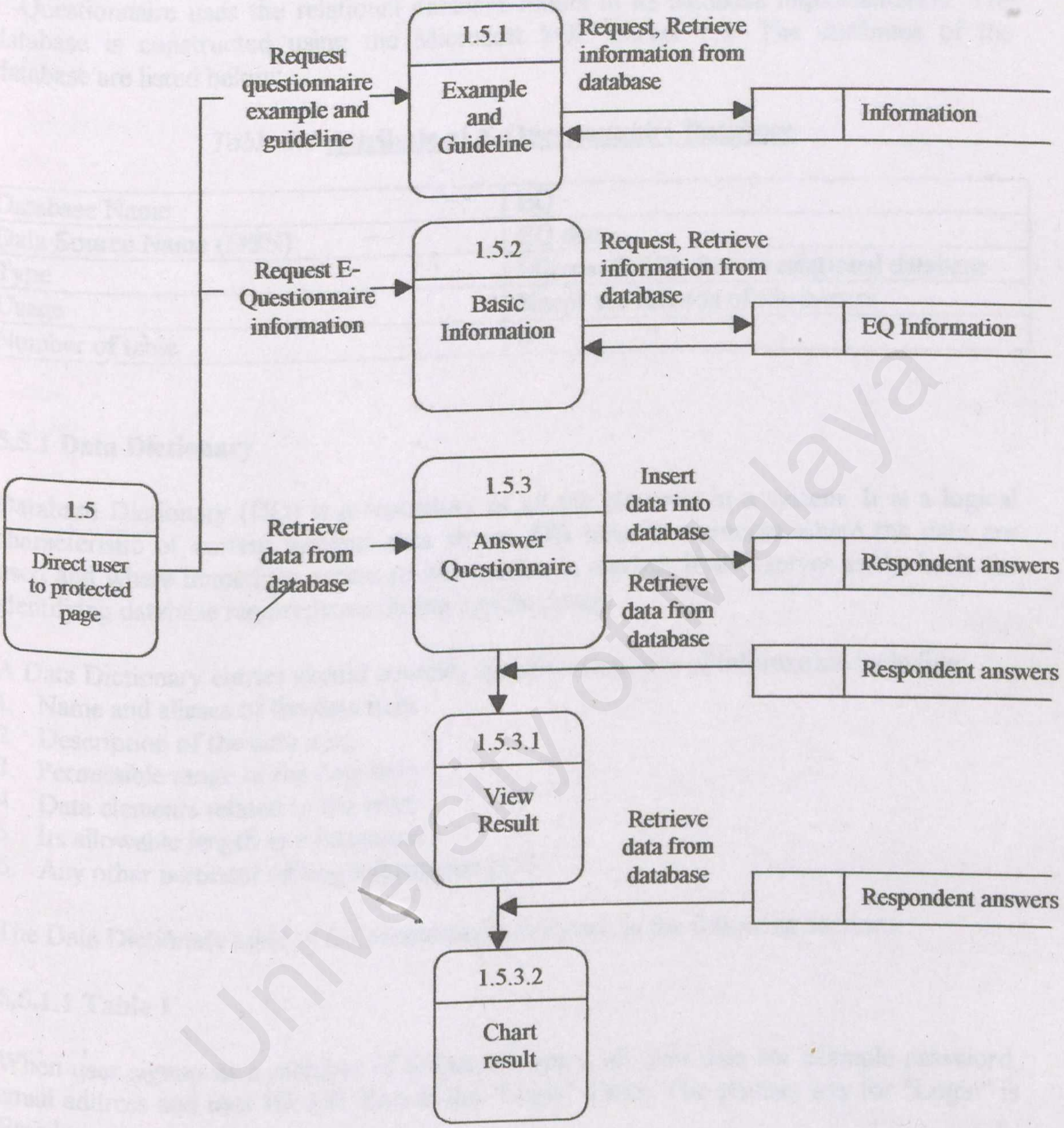

1.5.1
Example and Guideline
Request questionnaire example and guideline
Request, Retrieve information from database
Information
1.5.2
Basic Information
Request E-Questionnaire information
Request, Retrieve information from database
EQ Information
1.5
Direct user to protected page
1.5.3
Answer Questionnaire
Retrieve data from database
Insert data into database
Respondent answers
Retrieve data from database
Respondent answers
1.5.3.1
View Result
Retrieve data from database
Respondent answers
1.5.3.2
Chart result

Figure 5.9 **Data Flow Diagram for Client Login Module**

5.5 Database Design

E-Questionnaire uses the relational database model in its database implementation. The database is constructed using the Microsoft SQL Server 7.0. The attributes of the database are listed below:

Table 5.1 **Attribute of E-Questionnaire Database**

Database Name	EQ
Data Source Name (DSN)	EQ.dsn
Type	Microsoft SQL Server relational database
Usage	Keeps the records of the system
Number of table	5

5.5.1 Data Dictionary

Database Dictionary (DD) is a repository of all the elements in a system. It is a logical characteristic of current systems data stores. DD identifies process where the data are used and where immediate access to information is needed. It also serves as the basic for identifying database requirements during system design.

A Data Dictionary entries should contains specific categories of information including:

1. Name and aliases of the data item
2. Description of the data item
3. Permissible range of the data item
4. Data elements related to the entry
5. Its allowable length in information
6. Any other pertinent editing information [13]

The Data Dictionary table of E-Questionnaire is shown in the following sections.

5.5.1.1 Table 1

When user signup as a member of E-Questionnaire, all their data for example password, email address and user ID will store in the "Login" Table. The primary key for "Login" is Email.

Table Name: Login

Table 5.2 **Database Structure for Login**

Field Name	Data Type	Size	Description
Pass	Text	50	User Password
Email	Text	50	User Email
EDID	Text	50	User ID

5.5 Database Design

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Table Name: Login

Table 5.2 **Database Structure for Login**

Field Name	Data Type	Size	Description
Pass	Text	50	User Password
Email	Text	50	User Email
EDID	Text	50	User ID

5.5.1.2 Table 2

After registration, user can create his or her own survey titles. The Survey titles that crated by the user will be store in this table. FormId is the primary key for "Question" and Email is the foreign key.

Table Name: Question

Table 5.3 **Database Structure for Question**

Field Name	Date Type	Size	Description
Email	Text	50	User Email
Title	Text	255	Survey Title
FormId	AutoNumber	Long Integer	Form ID
dateIn	Date/Time		Activate Date
Publish	Number	Long Integer	Publisher

5.5.1.3 Table 3

After creating the survey title, user can create the type of the question and the options of the survey question. All the information will then store in this table. QuestionId is the primary key for "QuestionEditor". Email and FormId are the foreign keys of the table.

Table Name: QuestionEditor

Table 5.4 **Database Structure for QuestionEditor**

Field Name	Date Type	Size	Description
Email	Text	50	User Email
QuestionName	Text	255	Survey Title
Option1	Text	250	Question's Option
Option2	Text	250	Question's Option
Option3	Text	250	Question's Option
Option4	Text	250	Question's Option
Option5	Text	250	Question's Option
Option6	Text	250	Question's Option
Option7	Text	250	Question's Option
Option8	Text	250	Question's Option
Option9	Text	250	Question's Option
Option10	Text	250	Question's Option
QuestionType	Text	50	Question Type
NON	Number	Long Integer	Control type
DateIn	Date/Time		Activate Date
QuestionId	AutoNumber	Long Integer	Question ID
FormId	Number	Long Integer	Form ID

5.5.1.4 Table 4

"Responses" is a table that store respondents' data. All the answers from the respondents will keep inside this table. Report and graph generation are depend on this table. RespondentID is the primary key for "Responses". QuestionId and FormId are the foreign keys.

Table Name: Responses

Table 5.5 **Database Structure for Responses**

Field Name	Date Type	Size	Description
RespondentID	AutoNumber	Long Integer	Respondent ID
QuestionId	AutoNumber	Long Integer	Question ID
FormId	Number	Long Integer	Form ID
Op1	Number	Long Integer	Respondent No.
Op2	Number	Long Integer	Respondent No.
Op3	Number	Long Integer	Respondent No.
Op4	Number	Long Integer	Respondent No.
Op5	Number	Long Integer	Respondent No.
Op6	Number	Long Integer	Respondent No.
Op7	Number	Long Integer	Respondent No.
Op8	Number	Long Integer	Respondent No.
Op9	Number	Long Integer	Respondent No.
Op10	Number	Long Integer	Respondent No.
DateIn	Date/Time		Activate Date
Publish	Number	Long Integer	Control Publish
QType	Number	Long Integer	Question Type.
TotalResp	Number	Long Integer	Total Respondents

5.5.1.5 Table 5

"ResponsesT" is a table that only stores text data. All the answers that in text area and text field that respondents answered will store inside this table. Report generation is depending on this table. RespondentID is the primary key for "Responses". QuestionId and FormId are the foreign keys.

Table Name: ResponsesT

Table 5.6 **Database Structure for ResponsesT**

Field Name	Date Type	Size	Description
QuestionId	AutoNumber	Long Integer	Question ID
FormId	Number	Long Integer	Form ID
OpenQuestion	Memo		Text Area
OpenText	Text	50	Text Field
RespondentID	AutoNumber	Long Integer	Respondent ID
Qtype	Number	Long Integer	Question Type.

5.5.2 Relationships Between The Tables

The relationships between table1 until table5 are shown as below.

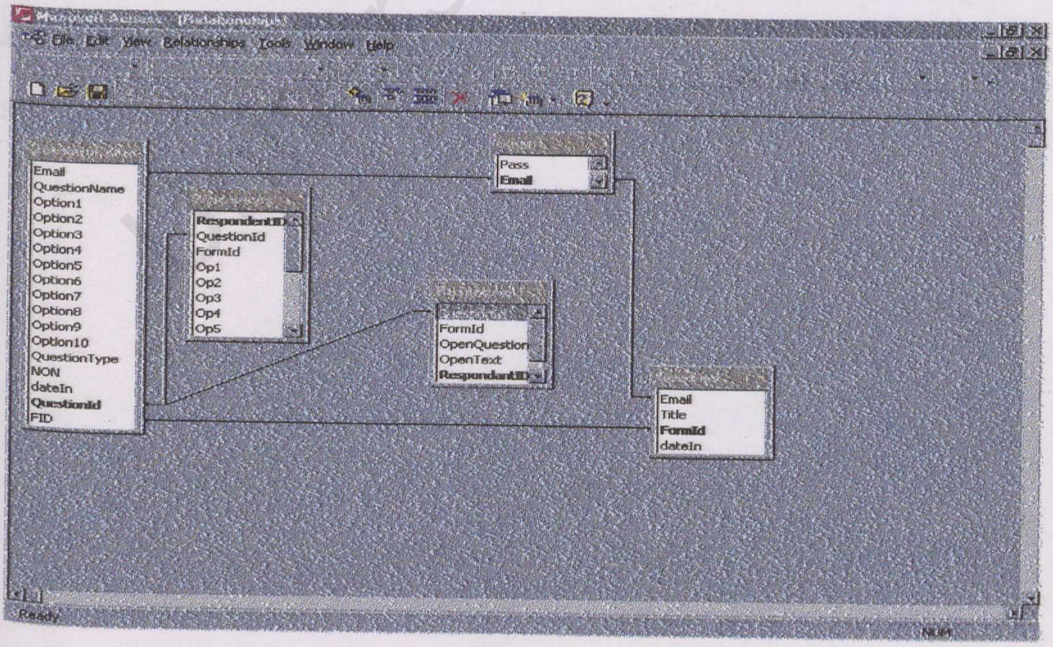


Figure 5.10 **The Relationships Between The Tables**

5.6 User interface design

The user interface for the E-Questionnaire on the web is like a typical the web page. The user will not be aware of the processing done in the client side and server side. The web page created has links, which enables users to link to other pages quickly. Buttons are placed in the web page to let users execute commands with ease. Besides that, the application is browser independent, thus the user will be able to use any browser to access the web page.

5.6.1 E-Questionnaire Screen Design

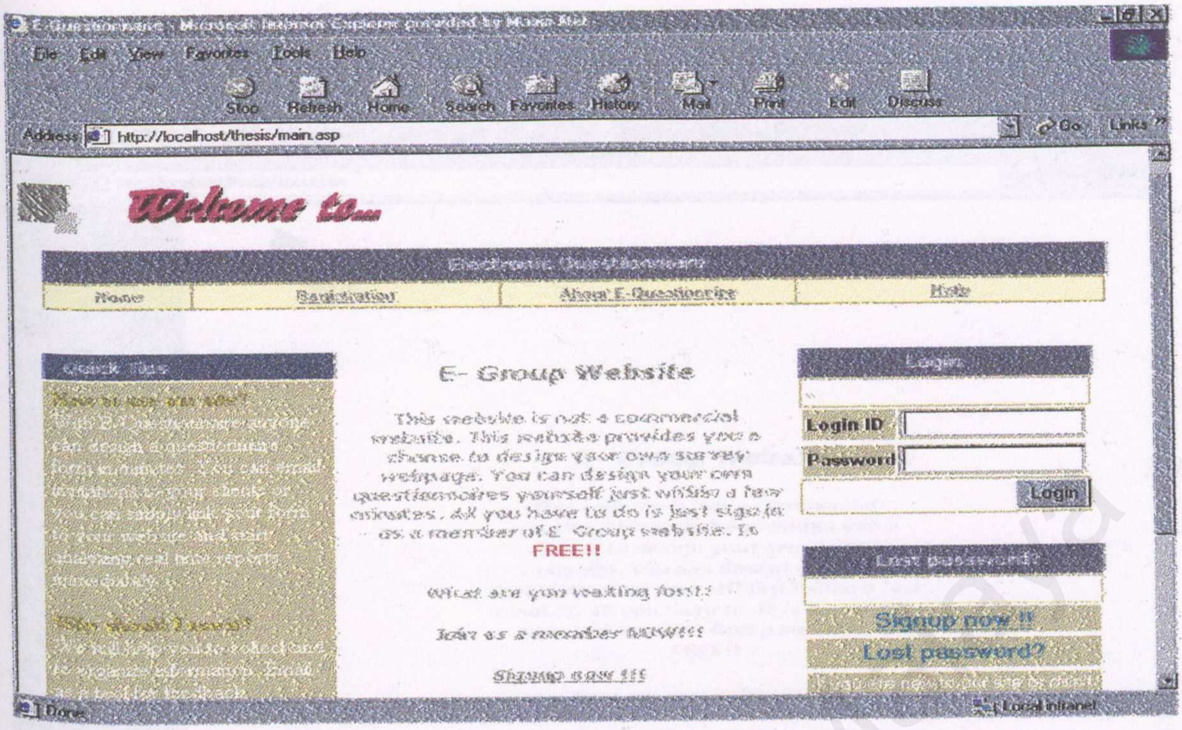
Screen design on E-Questionnaire is presented in form of web document on the browser. Therefore, the form of web document containing components like text, graphic, input fields, buttons, and so on, which normally can be found on the web document. Since E-Questionnaire is developed using ASP thus this web-based application is supported by Visual Basic that can convert SQL database into HTML dynamically, as requested by the users.

5.6.2 General Consideration When Designing E-Questionnaire User Interface

- Be consistent, that mean use a consistent format for menu selection and data display. Use of consistent label, standard abbreviation is also necessary.
- Offer meaningful feedback such as displaying appropriate error messages when users have keyed-in something wrongly.
- Reduce the command that must be memorized in order to carry out any operations.
- Combo boxes will be used instead of text boxes to minimize any complex logic operations.

5.6.3 E-Questionnaire System Interface Design

Some of the user interfaces of the E-Questionnaire system are shown as follow:


E-Questionnaire - Microsoft Internet Explorer provided by Maxis Net
File Edit View Favorites Tools Help
Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address
Go Links
Done
Local intranet

http://localhost/thesis/main.asp

Welcome to...

Electronic Questionnaire

Home	Registration	About E-Questionnaire	Help

Quick Tips

How to use our site?
With E-Questionnaire anyone can design a questionnaire form in minutes. You can email [illegible] to your clients or you can simply link your form to your website and start analyzing real time reports immediately.

Why should I survey?
The tool helps you to collect and to organize information. Email [illegible] a tool for feedback

E- Group Website

This website is not a commercial website. This website provides you a chance to design your own survey webpage. You can design your own questionnaires yourself just within a few minutes. All you have to do is just sign in as a member of E Group website. Is FREE!!

What are you waiting for!!!

Join as a member NOW!!!

Signup now !!!

Login

Login ID

Password

Login

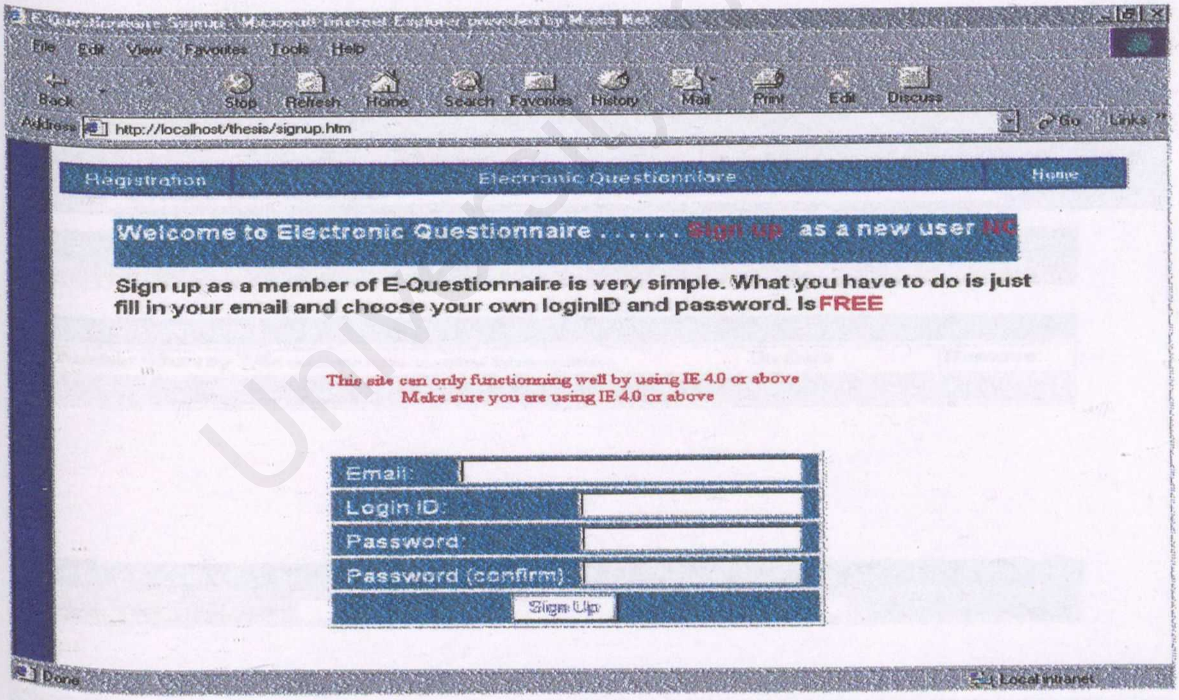
Lost password?

Signup now !!

Lost password?

If you are new to our site [illegible]

Figure 5.11 **E-Questionnaire Main Page**


E-Questionnaire Signup - Microsoft Internet Explorer provided by Maxis Net
File Edit View Favorites Tools Help
Back Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address
Go Links
Done
Local intranet

http://localhost/thesis/signup.htm

Registration	Electronic Questionniare	Home

Welcome to Electronic Questionnaire .... Sign up as a new user NC

Sign up as a member of E-Questionnaire is very simple. What you have to do is just fill in your email and choose your own loginID and password. Is FREE

This site can only functionning well by using IE 4.0 or above
Make sure you are using IE 4.0 or above

Email:

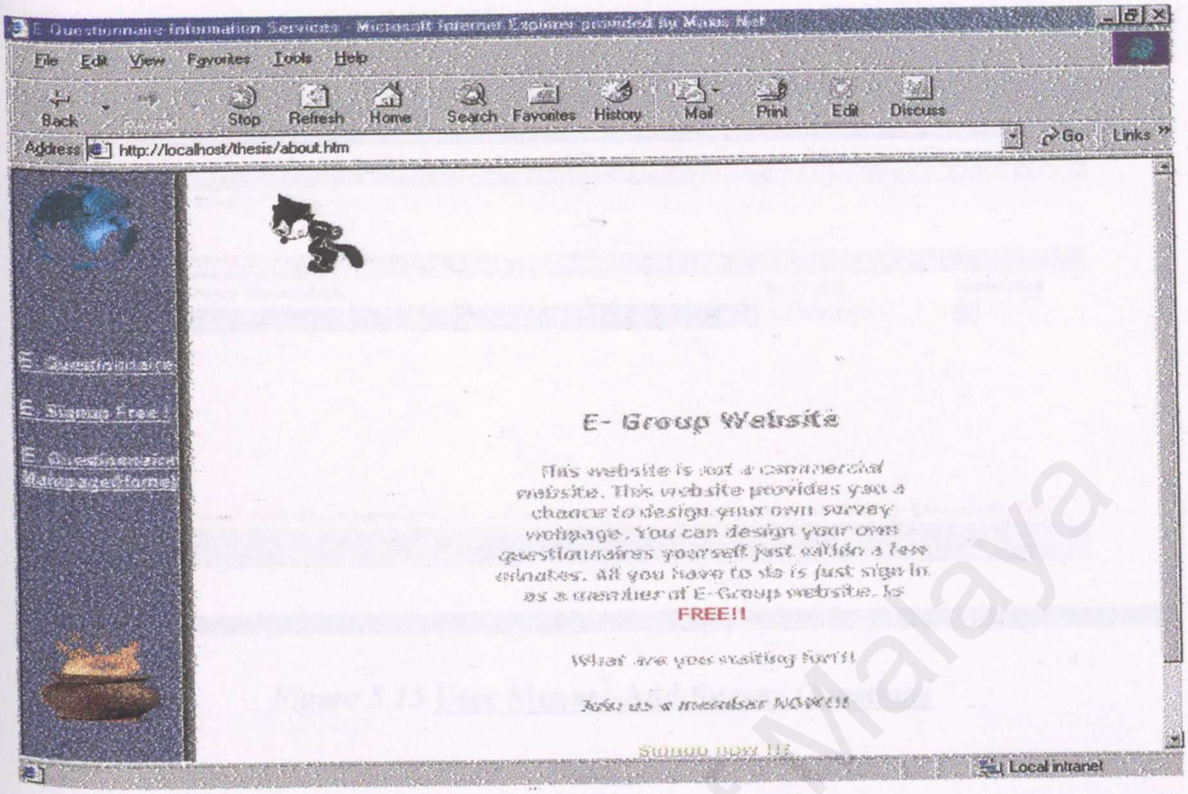
Login ID:

Password:

Password (confirm):

Sign Up

Figure 5.12 **User Signup**


E-Questionnaire Information Services - Microsoft Internet Explorer provided by Maxis Net
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://localhost/thesis/about.htm
Go Links
E. Questionnaire
E. Signup Free!
E. Questionnaire Mainpage(Home)
Local intranet

E- Group Website

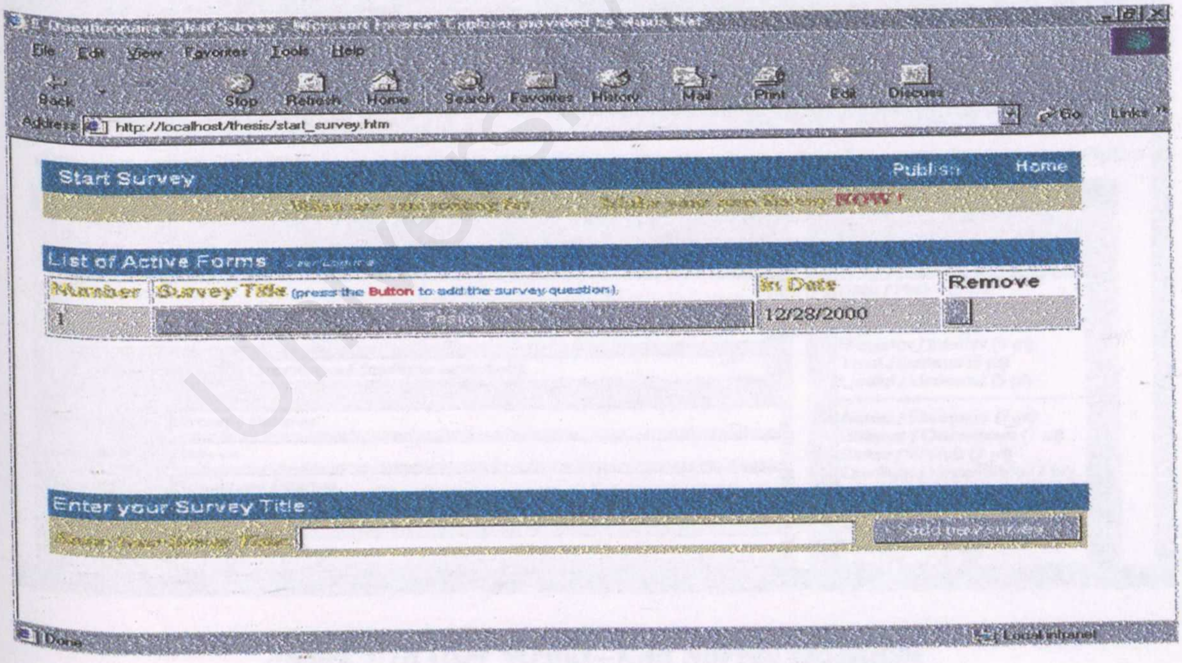
This website is not a commercial website. This website provides you a chance to design your own survey webpage. You can design your own questionnaires yourself just within a few minutes. All you have to do is just sign in as a member of E-Group website. Is FREE!!

What are you waiting for!!!

Join as a member NOW!!!

Signup now !!!

Figure 5.13 **Example and Guideline**


E-Questionnaire - Start Survey - Microsoft Internet Explorer provided by Maxis Net
File Edit View Favorites Tools Help
Back Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://localhost/thesis/start_survey.htm
Go Links
Publish
Home
Done
Local intranet

Start Survey

What are you waiting for Make your own Survey NOW!

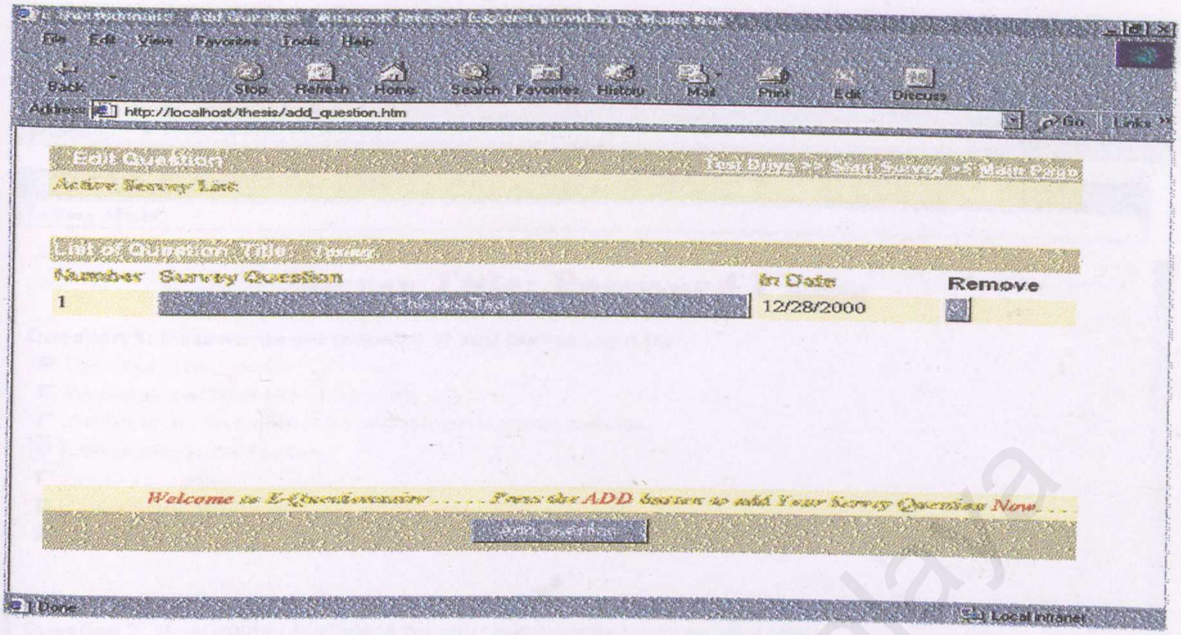
List of Active Forms

Number	Survey Title (press the Button to add the survey question).	In Date	Remove
1	Testing	12/28/2000	□

Enter your Survey Title:

Enter Your Survey Title: [ ] add new survey

Figure 5.14 **User Menus--Add Survey Titles**



http://localhost/thesis/add_question.htm

Edit Question

Test Drive >> Start Survey >> Main Page

Active Survey List:

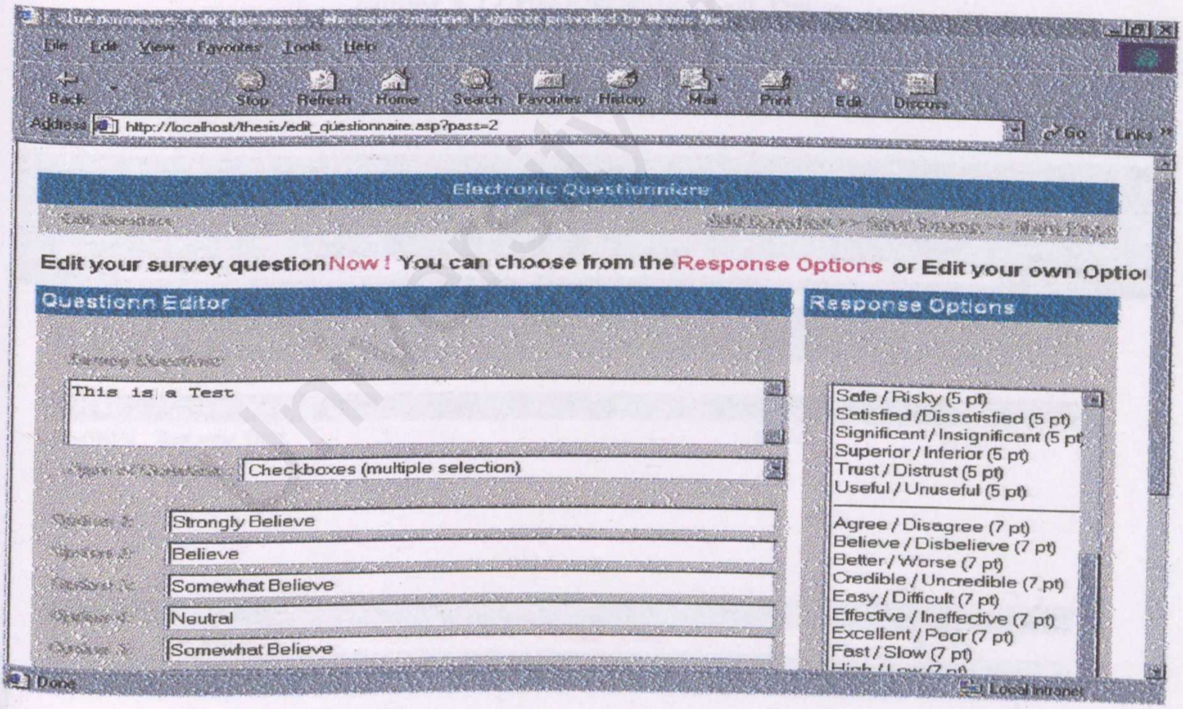
List of Question Title: Testing

Number	Survey Question	In Date	Remove
1	This is a Test	12/28/2000	☐

Welcome to E-Questionnaire ..... Press the ADD button to add Your Survey Question Now. . .

Add Question

Figure 5.15 **User Menus--Add Survey Questions**



http://localhost/thesis/edit_questionnaire.asp?pass=2

Electronic Questionniare

Edit Question

Add Question >> Start Survey >> Main Page

Edit your survey question Now ! You can choose from the Response Options or Edit your own Optio

Questionn Editor

Survey Question:

This is a Test

Type of Question: Checkboxes (multiple selection)

Option 1: Strongly Believe

Option 2: Believe

Option 3: Somewhat Believe

Option 4: Neutral

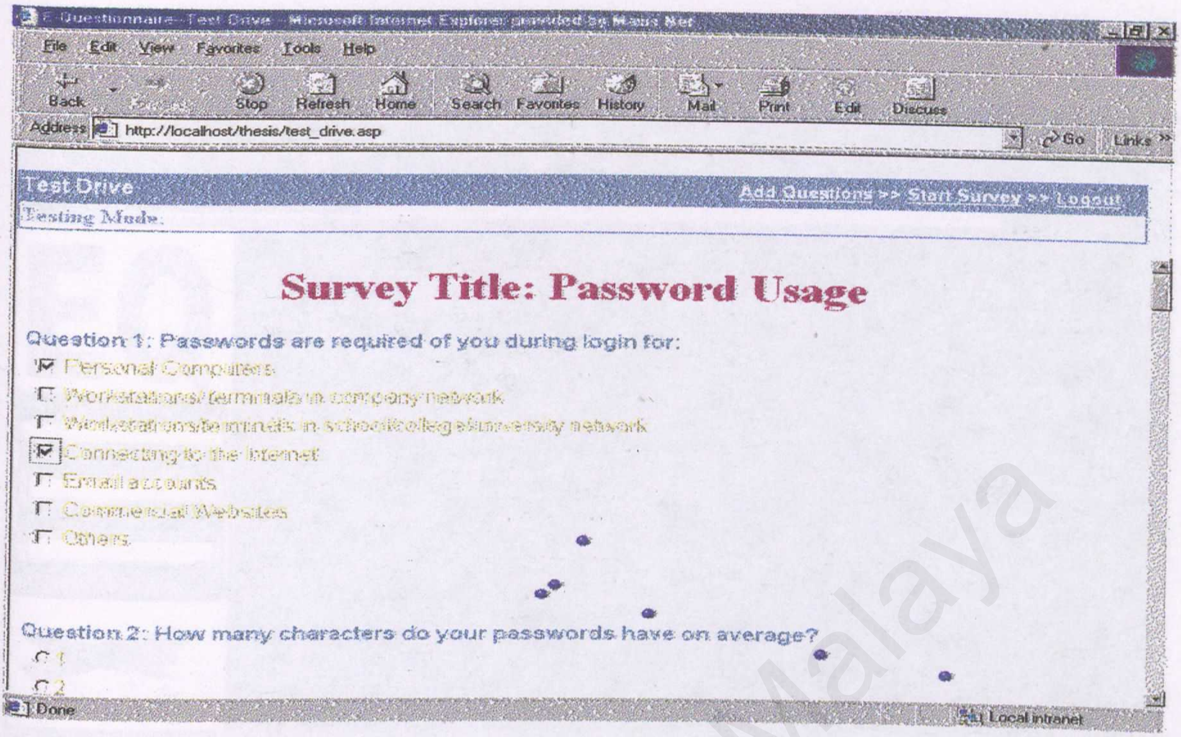
Option 5: Somewhat Believe

Response Options

Safe / Risky (5 pt)
Satisfied /Dissatisfied (5 pt)
Significant / Insignificant (5 pt)
Superior / Inferior (5 pt)
Trust / Distrust (5 pt)
Useful / Unuseful (5 pt)

Agree / Disagree (7 pt)
Believe / Disbelieve (7 pt)
Better / Worse (7 pt)
Credible / Uncredible (7 pt)
Easy / Difficult (7 pt)
Effective / Ineffective (7 pt)
Excellent / Poor (7 pt)
Fast / Slow (7 pt)
High / Low (7 pt)

Figure 5.16 **User Menus--Edit Survey Questions**


E-Questionnaire--Test Drive - Microsoft Internet Explorer provided by Maxis Net
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://localhost/thesis/test_drive.asp
Go Links
Done
Local intranet

Test Drive Add Questions >> Start Survey >> Logout

Testing Mode:

Survey Title: Password Usage

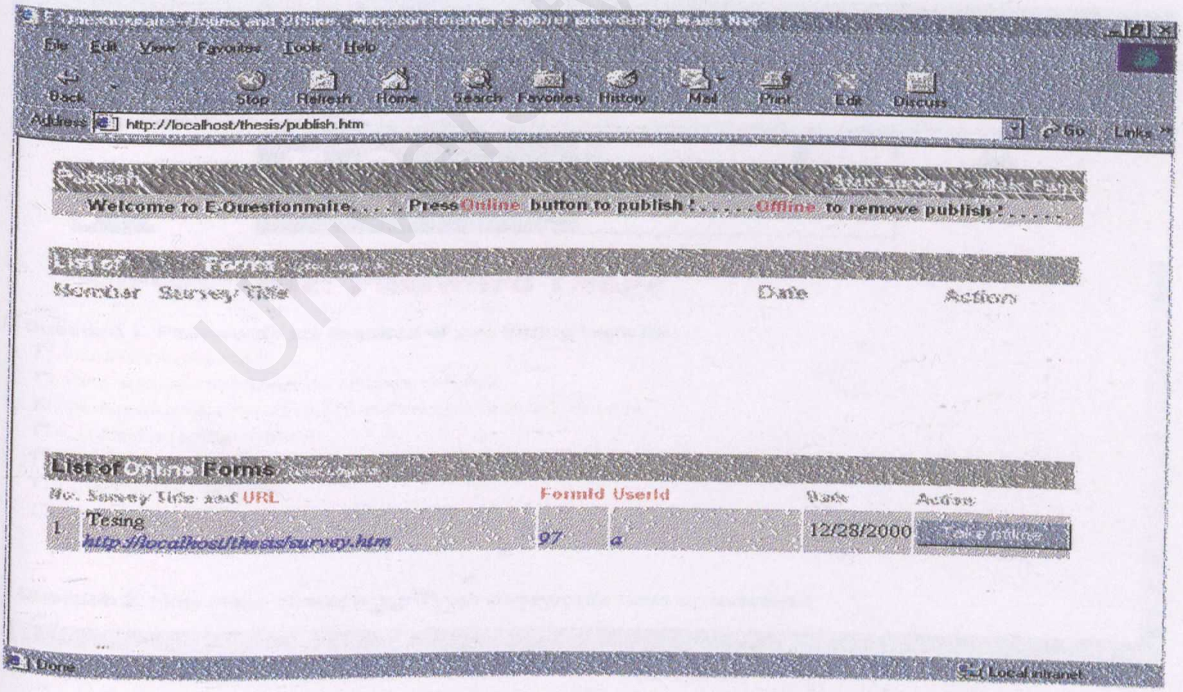
Question 1: Passwords are required of you during login for:

☑ Personal Computers
□ Workstations/terminals in company network
□ Workstations/terminals in school/college/university network
☑ Connecting to the Internet
□ Email accounts
□ Commercial Websites
□ Others

Question 2: How many characters do your passwords have on average?

○ 1
○ 2

Figure 5.17 **User Menus--Test Drive**


E-Questionnaire--Online and Offline - Microsoft Internet Explorer provided by Maxis Net
File Edit View Favorites Tools Help
Back Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://localhost/thesis/publish.htm
Go Links
Done
Local intranet

Publish Start Survey >> Main Page

Welcome to E-Questionnaire. . . . . Press Online button to publish ! . . . . . Offline to remove publish ! . . . . .

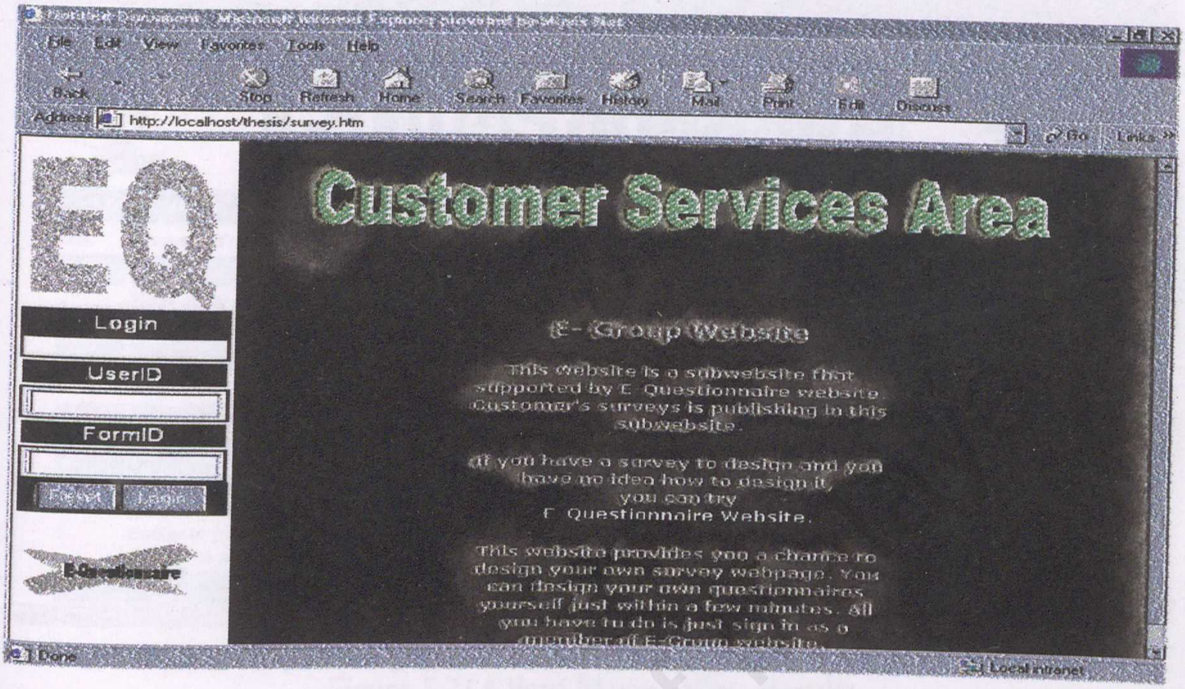
List of Forms

Number Survey Title Date Action

List of Online Forms

No.	Survey Title and URL	FormId	UserId	Date	Action
1.	Tesing http://localhost/thesis/survey.htm	97	a	12/28/2000	Take offline

Figure 5.18 **User Menus--Publish**


Untitled Document - Microsoft Internet Explorer provided by Maxis Net
File Edit View Favorites Tools Help
Back Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address
Go Links
EQ
Login
UserID
FormID
Reset Login
E-Questionnaire
Done
Local intranet

http://localhost/thesis/survey.htm

Customer Services Area

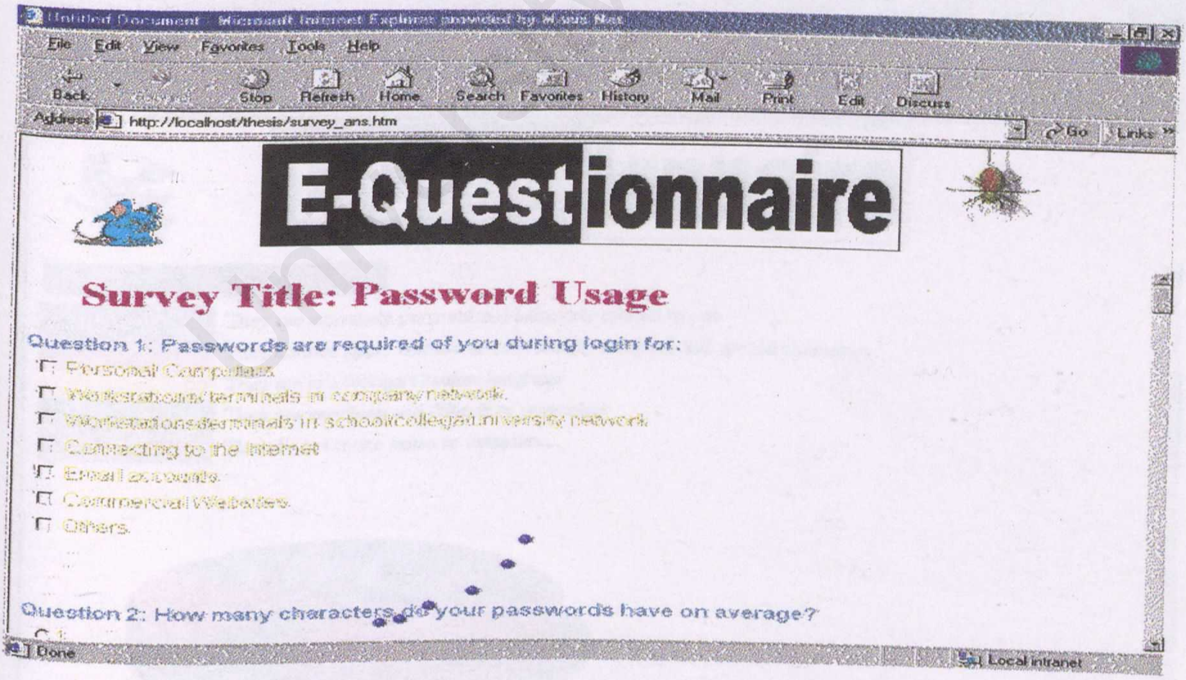
E-Group Website

This website is a subwebsite that supported by E-Questionnaire website. Customer's surveys is publishing in this subwebsite.

If you have a survey to design and you have no idea how to design it, you can try E-Questionnaire Website.

This website provides you a chance to design your own survey webpage. You can design your own questionnaires yourself just within a few minutes. All you have to do is just sign in as a member of E-Group website.

Figure 5.19 **Client Menu--Main Page**


Untitled Document - Microsoft Internet Explorer provided by Maxis Net
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address
Go Links
E-Questionnaire
Done
Local intranet

http://localhost/thesis/survey_ans.htm

Survey Title: Password Usage

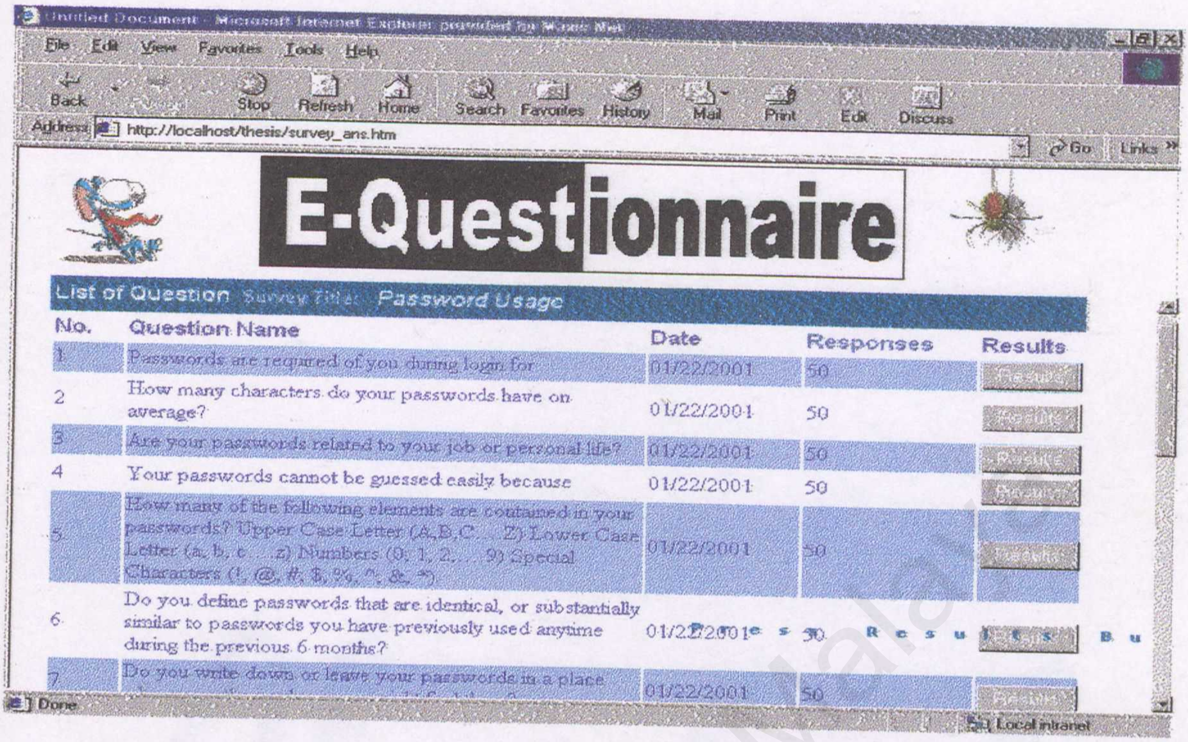
Question 1: Passwords are required of you during login for:

- □ Personal Computers
- □ Workstations/terminals in company network.
- □ Workstations/terminals in school/college/university network.
- □ Connecting to the Internet
- □ Email accounts.
- □ Commercial Websites.
- □ Others.

Question 2: How many characters do your passwords have on average?

○ 1

Figure 5.20 **Client Menu--Answer Survey Questions**


Untitled Document - Microsoft Internet Explorer provided by Maxis Net
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address
Go Links
Done
Local intranet

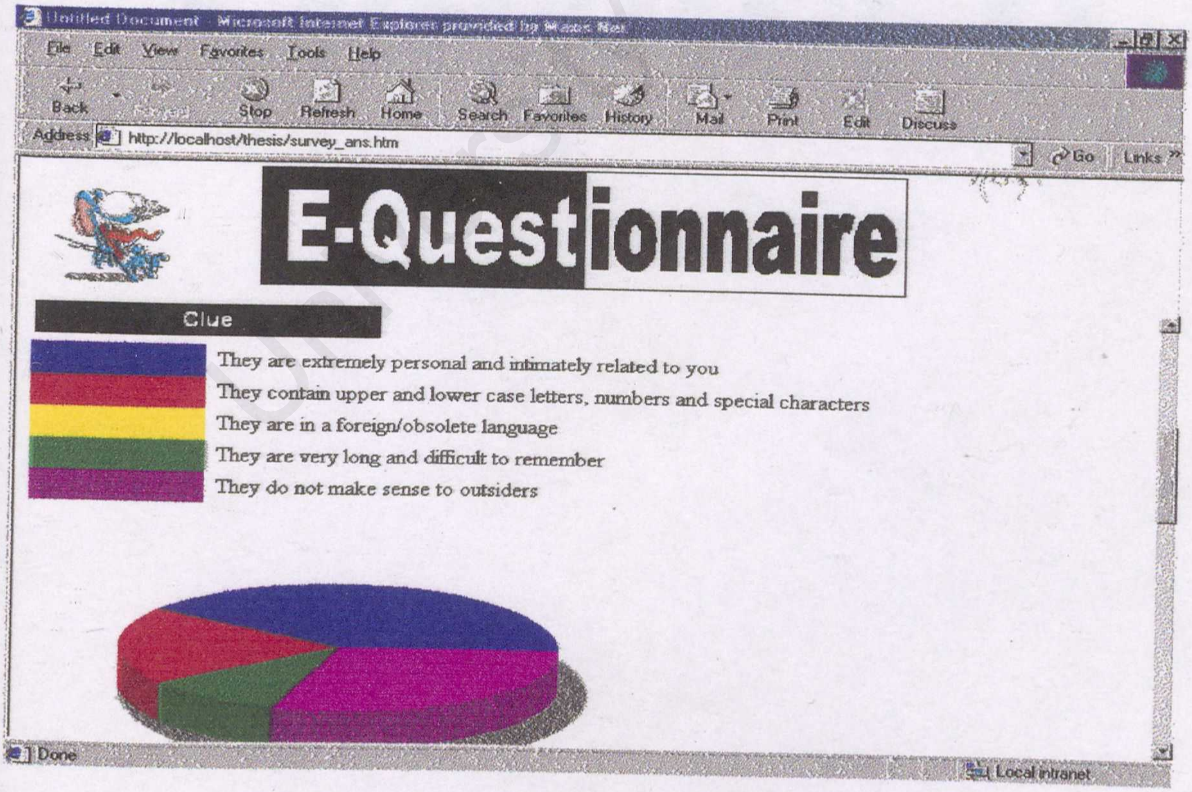
http://localhost/thesis/survey_ans.htm

E-Questionnaire

List of Question Survey Title: Password Usage

No.	Question Name	Date	Responses	Results
1	Passwords are required of you during login for	01/22/2001	50	Results
2	How many characters do your passwords have on average?	01/22/2001	50	Results
3	Are your passwords related to your job or personal life?	01/22/2001	50	Results
4	Your passwords cannot be guessed easily because	01/22/2001	50	Results
5	How many of the following elements are contained in your passwords? Upper Case Letter (A,B,C ... Z) Lower Case Letter (a, b, c ... z) Numbers (0, 1, 2, ... 9) Special Characters (!, @, #, $, %, ^, &, *)	01/22/2001	50	Results
6	Do you define passwords that are identical, or substantially similar to passwords you have previously used anytime during the previous 6 months?	01/22/2001	50	Results
7	Do you write down or leave your passwords in a place	01/22/2001	50	Results

Figure 5.21 **Client Menu--View Results**


Untitled Document - Microsoft Internet Explorer provided by Maxis Net
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address
Go Links
Done
Local intranet

http://localhost/thesis/survey_ans.htm

E-Questionnaire

Clue

🟦	They are extremely personal and intimately related to you
🟥	They contain upper and lower case letters, numbers and special characters
🟨	They are in a foreign/obsolete language
🟩	They are very long and difficult to remember
🟪	They do not make sense to outsiders

Figure 5.22 **Client Menu--Chart Results**

Chapter 6

6. System Implementation And Testing

System implementation is a process that converts the system requirements and designs into program codes. In a software project, the requirements analysis, system design and implementation phases do not have a clear boundary. Each phase tends to overlap one another. This phase at times involves some modifications to the previous design.

6.1 Development Environment

Development environment has certain impact on the development of a system. Using the suitable hardware and software will not only help to speed up the system development but also determine the success of the project. After implementing the system, the requirement of hardware and software that was stated in the previous chapter (Chapter 4) can be finalized. The final list of the hardware and software tools used to develop the entire system is listed below.

6.1.1 Actual Hardware Requirements

The hardware used to develop the system are as listed below:

- 200MHz Pentium Processor
- 512K Pipeline Burst Cache
- 32MB RAM
- 40x CD-ROM Drive
- 2.1 GB Hard Disk
- Other standard desktop PC components

6.1.2 Actual Software Tools Requirements

6.1.2.1 Software Tools for Design and Report Writing

There are a lot of software tools, which can be used in designing and writing report. The design process involves the drawing of structure chart, data flow diagram and others that form the foundation of the software development. The purpose of this graphically logical design is to provide an overall view of system and interconnection between the modules. Visio Professional and Microsoft Word are the software that used to design and write report.

6.1.2.2 Software Tools for Development

During the E-Questionnaire system development, a vast array of software tools was used. Table below depicts the software used to develop the system.

Table 6.1 **Software/Software Tools Used For E-Questionnaire System**

Software	Purpose	Description
Microsoft Windows NT Server 4.0	System Requirement	Operating System (OS)
Internet Information Server 4.0	System Requirement	Web Server Host
Microsoft SQL Server 7.0	Database	Build the database to store and manipulate the data
Microsoft Visual InterDev	System Development	Coding the web pages
Active Server Pages (ASP)	System Development	Coding the web pages
Hyper Text Markup Language (HTML)	System Development	Coding the web pages
Dynamic Hyper Text Markup Language (DHTML)	System Development	Coding the web pages
Internet Explore 4.0 or above	System Development	Viewing the web pages
Macromedia Dreamweaver 3.0	User Interface Design	Designing the web pages
Adobe Photoshop 5.0	User Interface Design	Image design and creation
Microsoft Photo Editor	User Interface Design	Image design and creation

6.2 Approaches to The Development of The System

There are two approaches in coding, namely top-down and bottom-up. The bottom-up coding is based on coding some complete lower level modules and leaving the high-level modules merely as skeletons that are used to call the lower modules, whereas the top-down approach is the reverse.

E-Questionnaire was developed modularly using both the top-down and bottom-up approaches. Developing E-Questionnaire with top-down approach involves building the high-level software modules that are refined into functions and procedures. The advantages of using bottom-up approach in E-Questionnaire System are:

1. Testing can begin on some of the modules while others are still being coded.
2. Critical functions can be coded first to test their efficiency.

6.3 System Development

System development is the process of creating programs that are needed to satisfy the requirement of the system.

6.3.1 System Development for E-Questionnaire

The system development for E-Questionnaire System consists of the following steps:

I. Review the System Documentation.
II. System Design Phase.
III. Coding Phase.
IV. Testing Phase
V. Documentation

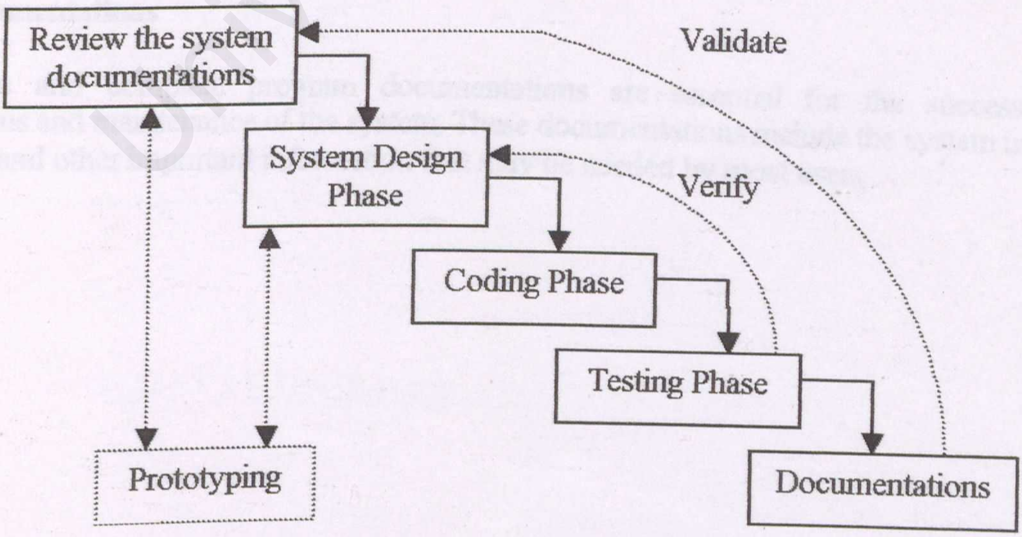


Figure 6.1 **E-Questionnaire Development Cycle**

I. Review the System Documentations

The first step of system development is to review the system documentations that has already been prepared during the previous Chapters. This step is important to determine the objectives and the scopes for the system. Moreover it gives a better understanding and overview of the entire system to be developed in future.

II. System Design Phase

After reviewing the system documentations, the system design phase begin. This phase accomplished the needs of the system by developing a logical solution to the programming problems. The logical solution for a program is solving the problems step-by-step.

III. Coding Phase

Coding the program is the process of writing the program instructions that implement the program design. Design specification must be translated into a machine-readable format. The coding step performs this task. If design is performed in a detailed manner, coding can be accomplished mechanically.

IV. Testing Phase

This is the phase that thoroughly tests the system program to ensure that the program can function correctly. The methods of testing the program will be discussed in the following sections.

V. Documentations

Accurate and complete program documentations are essential for the successful operations and maintenance of the system. These documentations include the system user manual and other important information that may be needed by most users.

6.3.2 Flow Chat for E-Questionnaire System

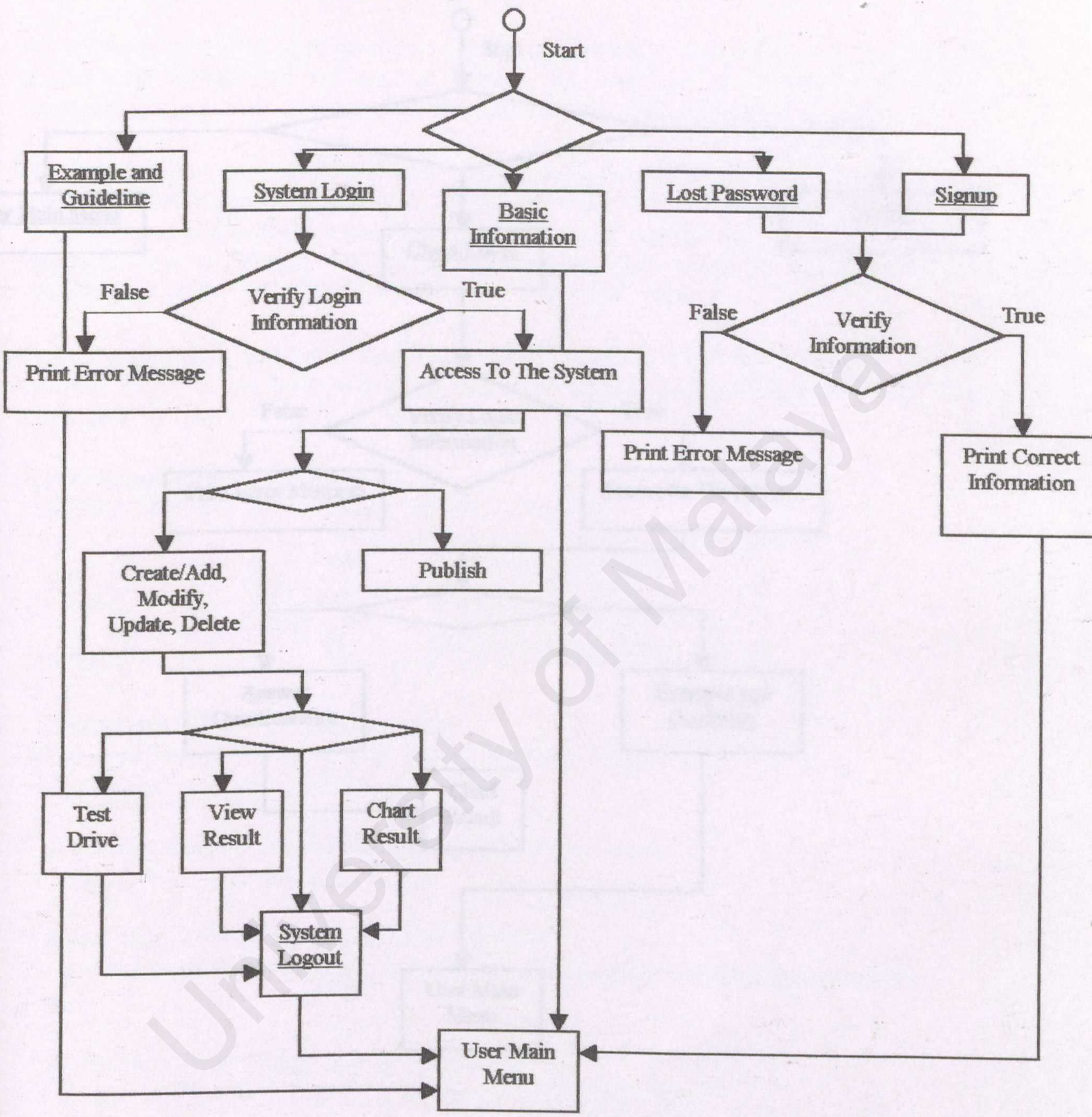


Figure 6.2 E-Questionnaire Flow Chat for User Section

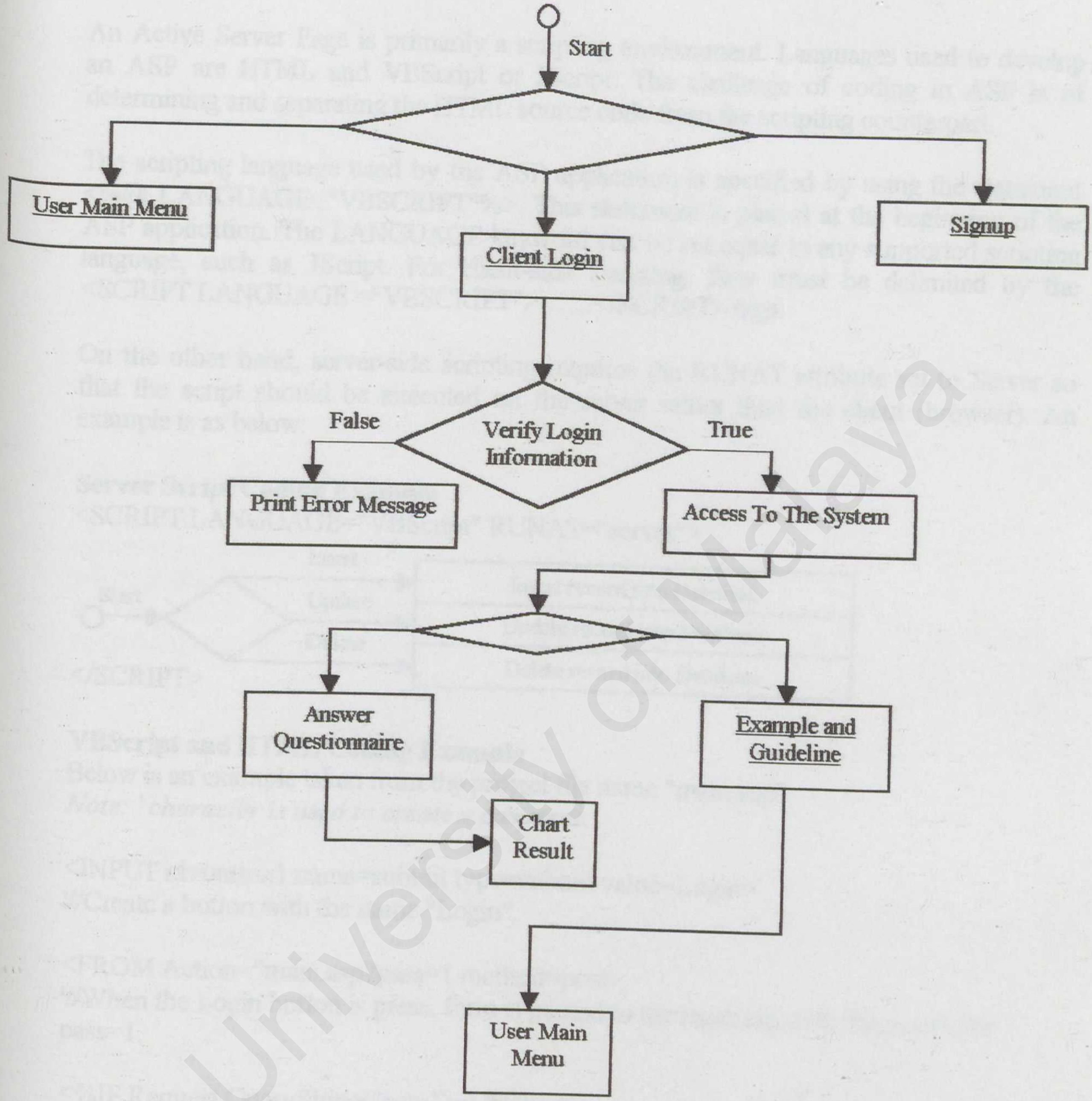


Figure 6.3 **E-Questionnaire Flow Chat for Client Section**

6.3.3 Web Pages Coding

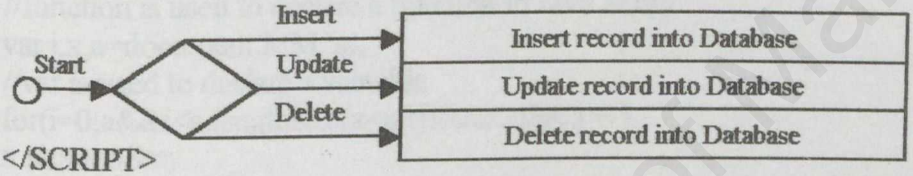
An Active Server Page is primarily a scripting environment. Languages used to develop an ASP are HTML and VBScript or JScript. The challenge of coding in ASP is of determining and separating the HTML source code from the scripting counterpart.

The scripting language used by the ASP application is specified by using the statement <%@ LANGUAGE="VBSCRIPT"%>. This statement is placed at the beginning of the ASP application. The LANGUAGE keyword can be set equal to any supported scripting language, such as JScript. For client-side scripting, they must be delimited by the <SCRIPT LANGUAGE ="VBSCRIPT">……</SCRIPT> tags.

On the other hand, server-side scripting requires the RUNAT attribute set to Server so that the script should be executed on the server rather than the client (browser). An example is as below:

Server Script Coding Example

<SCRIPT LANGUAGE="VBScript" RUNAT="server">


Start
Insert
Update
Delete
Insert record into Database
Update record into Database
Delete record into Database

</SCRIPT>

VBScript and HTML Coding Example

Below is an example taken from the project file name "main.asp"

Note: ' character is used to create a comment.

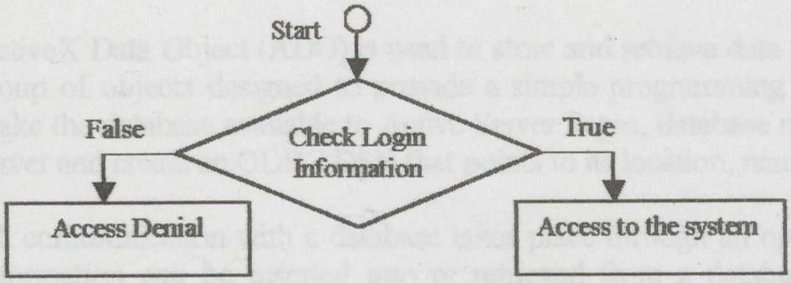
```
<INPUT id=button1 name=submit type=submit value=Login>
'//Create a button with the name "Login".

<FROM Action="main.asp?pass=1 method=post>
'//When the Login button is press, form is passed to the main.asp with the parameter
pass=1.

<%IF Request.QueryString("pass")=1 THEN%>
'//If the parameter pass=1 then the program will execute this way.

dim passwd
dim e_mail
'//Dim is use to declare a variable.

passwd=trim(Request.Form("upasswd"))
e_mail=trim(Request.Form("uemail"))
'//Request.Form("NAME") is use to get the input from a field
'//Trim is use to remove all spaces from text except for single spaces between words
```

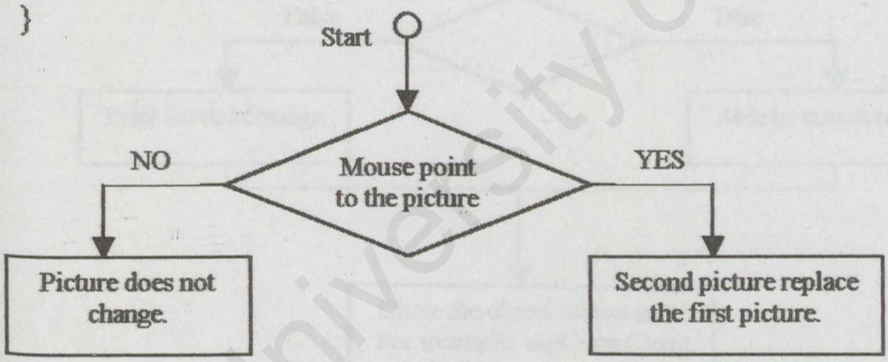


```
<%END IF%>
```

Java Script Coding Example

Note: The character used to create a comment for Java Script is different from VBScript.
Note: // is used to create a comment for Java Script.

```
<SCRIPT LANGUAGE="JavaScript">
function MM_swapImgRestore() {
//function is used to declare a function in Java Script
var i,x,a=document.MM_sr;
//var is used to declare a valuable
for(i=0;a&&i<a.length&&(x=a[i])&&x.oSrc;i++)
x.src=x.oSrc;
}
```


Start
NO
Mouse point to the picture
YES
Picture does not change.
Second picture replace the first picture.

```
</SCRIPT>
```

Preparation of a HTML and ASP document involves endless cycle of testing and modifying of the ASP source codes, loading the file in the browser for viewing and validating and then going back to make further changes where necessary.

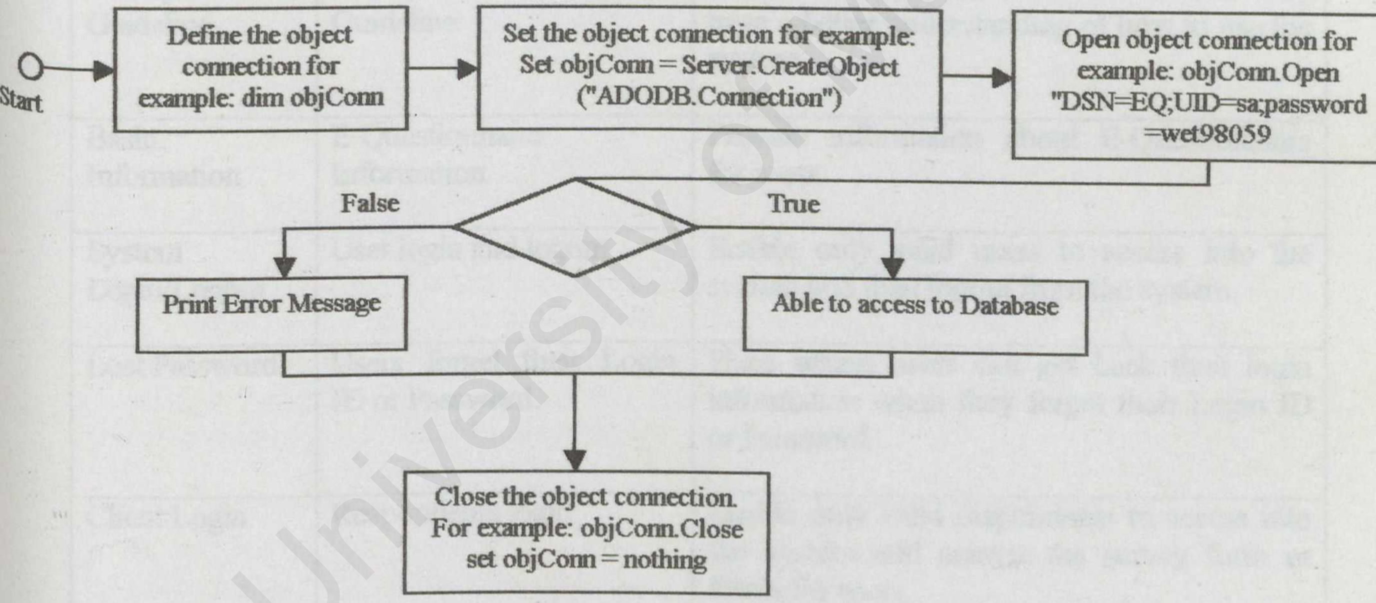
6.3.4 Database Connection

ActiveX Data Object (ADO) is used to store and retrieve data from a database. ADO is a group of objects designed to provide a simple programming interface to databases. To make the database available to Active Server Pages, database must be placed on the Web server and create an ODBC DSN that points to its location, named EQ.dsn.

All communication with a database takes place through an open connection. Before any information can be inserted into or retrieved from a database, a connection with the database must be opened. The ADO Connection object serves the purpose. Below are a few steps to follow in order to open a database connection.

1. Create an instance of the Connection object to open a connection with the database.
2. Call the Open method of the Connection object to actually open the connection.

Below is an example for E-Questionnaire Database Connection:


Start
Define the object connection for example: dim objConn
Set the object connection for example: Set objConn = Server.CreateObject ("ADODB.Connection")
Open object connection for example: objConn.Open "DSN=EQ;UID=sa;password =wet98059
False
True
Print Error Message
Able to access to Database
Close the object connection. For example: objConn.Close set objConn = nothing

6.3.5 Development Tool - Microsoft Visual InterDev

This tool enables easy performance of the many complex programming and database tasks required in the creation of a web site, as well as the incorporation of HTML formatting and layouts, graphics and other multimedia components.

When working on a web site with Visual InterDev and performing tasks like adding files to the site or editing any of the existing files, this tool creates a second copy of the files on the local computer. This is called the working copy. Whenever these working copies are saved, Visual InterDev updates the file on the web server as well.

6.3.6 Description of the System Modules and functionality

Basically E-Questionnaire can be categorized into 6 modules. The table below shows the description on each module and also its functionality.

Table 6.2 **Modules function description**

Module	Description	Functionality
Sign Up	Users sign up. For user to get his or her Password and User ID.	For users to get his authentication where those users can use this system. Users are allowed to user the system when they have signed up as a member of the system.
Example and Guideline	Example and System Guideline	Provide information for users so that they have a better understanding of how to use the system.
Basic Information	E-Questionnaire Information	Provide information about E-Questionnaire for users.
System Login/Logout	User login and logout	Enable only valid users to access into the system and then logout from the system.
Lost Password	Users forget their Login ID or Password.	Place where users can get back their login information when they forget their Login ID or Password.
Client Login	Respondents login	Enable only valid respondents to access into the system and answer the survey form or forms for users.

6.4 Testing

Many programmers view testing as a way to demonstrate how their program perform properly. However, the idea of demonstrating correctness is really the reverse of that testing is all about. We test a program to demonstrate the existence of a fault. Because our objective is to find faults, we consider a test successful only when a fault is discovered. Fault identification is the process of determining what fault or faults caused the failure, and fault correction or removal is the process of making changes to the system so that the fault are removed.

6.4.1 Types of fault

When no obvious fault exists, program is tested to isolate more faults by creating conditions where the code does not react as planned. Therefore, it is important to know kind of faults to seek

.

Faults can be categorized as below:
1. Algorithmic faults
2. Syntax faults
3. Documentation faults

6.4.1.1 Algorithmic Fault

Algorithmic faults occur when a component's algorithm or logic does not produce the proper output for given input because something is wrong with the processing steps. These faults are easy to spot by reading through the program (call desk checking) or by submitting input data from each of the different classes of data that we expect the program to receive during its regular working.

Typical algorithmic faults include:
1. Testing for the wrong condition.
2. Forgetting to initialize variables or set loop invariants.
3. Forgetting to test for a particular condition (such as when division by zero might occur).

6.4.1.2 Syntax Fault

Syntax faults can be checked while parsing for algorithmic faults. This will ensure that the construct of programming language is used properly. Microsoft Interdev does not come with a compiler to catch syntax faults before a web page is published. Therefore, syntax faults within web pages can only be traced after the web pages have been published.

6.4.1.3 Documentation Fault

When the documentation does not match what the application does, the application has documentation faults. Usually, documentation is derived from system design and provides a clear description of what the programmer would like to program to do, but the implementation of these functions is faulty. Such faults can lead to other faults later.

6.5 Test Planning

The purpose of having test planning is to help in designing and organizing tests, so that testing is carried out appropriately and thoroughly.

A test plan has the following steps:

1. Establishing test objectives
At the beginning, we have to know what we are going to test on. So we have to establish our test objectives.

2. Designing test cases
After establishing test objectives, we begin to design the test cases that are used to test the system.

3. Writing test cases
After designing, we have to start writing the test cases.

4. Testing test cases
At the same time, we also test the test cases.

5. Executing tests
After all testing have been done, we execute our tests on the system.

6. Evaluating test results
After executing tests, we evaluate the test results.

6.6 Testing The System

Testing is a process of exercising or evaluating a system by manual or automatic means to verify that it has satisfied requirements or to identify differences expected and actual results. Testing is probably the least understood part of a software development project. A bug is any unexpected, questionable, or undesired aspect or behavior displayed, facilitated or caused by the software being tested. Testing can uncover different classes of errors in a minimum amount of time and with a minimum amount of effort. The strategies used for testing are unit testing, integration testing and system testing.

6.6.1 Unit Testing

Unit testing verifies that the component functions properly with the types of input expected from studying the component's design. The first step is to examine the program code by reading through it, trying to spot algorithm, data and syntax faults. This is followed by comparing the code with specifications and with the design to make sure that all relevant cases have been considered. Next, the browser is used to view the web pages or result and then eliminate remaining syntax faults if necessary. Finally, test cases are developed to show that the input is properly converted to the desired output.

The first stage of testing E-Questionnaire System is unit testing. Unit testing involves testing each component on its own, isolated from the other components in the application. The following steps specify how unit testing is carried out for this application:

1. The code of the program is examined by reading through it to spot for algorithmic faults and syntax faults.
2. The web page is published to eliminate remaining faults.
3. Test cases are developed to ensure that the input is properly converted into the desired output.

Examining the code

In this stage, the codes of the program are read to identify faults. After that, a code walk-through is carried out. In a walk-through, the code and the accompanying documentation are presented to the review team. Then, the team will comment on their correctness. For this project, the review team members consist of my course mates. Walk-through is conducted in an informal manner. This method is useful to identify faults that have been left out by the programmer.

Choosing these cases

To test a component, input data and condition are chosen. Then the component is allowed to manipulate the data, and output is observed. The input is selected so that the output demonstrates something about the behavior of the code. A test point or test case is a particular choice of input data to be used in testing a program. A test is a finite collection of test cases.

To perform tests on the components, we must first determine the test objectives. Then, we select test cases and define a test designed to meet the specific objective. Some data are purposely chosen to be improper. This is to check that the code handles incorrect data gracefully.

Test Thoroughness

To test a code thoroughly, we can choose test cases using at least one of several approached based on the data manipulated by the code:

1.Statement testing: Every statement in the component is executed at least once in some test.

2.Path testing: Every distinct path through the code is executed at least once in some test.

6.6.1.1 Unit Testing Example

There were too many unit test cases involved. Therefore, only a few will be shown as example.

Unit Test Case Example 1

Each table in server database has at least associated with two trigger programs. Unit testing was carried out on each trigger program once it was completed. Table below shows the test case for unit testing on the Survey Deleting trigger program.

Table6.3 **Test Case For Survey Deleting Trigger Program**

Step	Test Procedure	Expected Output	Test Result Analyzing
1	Add a new survey form with the name for example Password Usage into Question table.	The record is inserted permanently.	Record is inserted successfully.
2	Press the Delete button to delete the Password Usage survey.	The record is deleted permanently from Question table. Record with the Form ID that same with Password Usage survey form in QuestionEditor table is also deleted permanently.	Records with the Form ID same as Password Usage is deleted permanently from Question and QuestionEditor tables. Objective of delete cascading is achieved.

Unit Test Case Example 2

The Update Record module in the E-Questionnaire application will update Responses table in the server database. Unit Testing was carried out to ensure that the table was updated successfully. Table below shows the test case for unit testing on the function of updating the records.

Table6.4 **Test Case For Updating Records**

Step	Test Procedure	Expected Output	Test Result Analyzing
1	Insert a new Survey Question for example: Are your passwords the same as your user-IDs? With the options Yes/No and the question type radio buttons into database.	The records are inserted permanently.	Records are inserted successfully.
2	Press the button of the Survey Question and change the question type to single select box. Press the Test Drive link to view the output.	The type of the question change to single select box and the records are updated permanently.	The question type has changed to the single select box. The records are also updated successfully. Objective of updating the records into Responses table is achieved.

6.6.2 Integration Testing

When the individual components are working correctly and meet the objectives, these components are combined into a working system. In other words, integration testing is the process of verifying that the system components work together as described in the system and program design specifications.

Integration testing is used on E-Questionnaire System for constructing its program structure while at the same time conducting tests to uncover errors associated with interfacing. The objective is to take unit-tested modules and build a program structure that has been dictated by design. This testing will ensure that the interfaces such as the module calling sequence in E-Questionnaire System are systematized and link to the correct document.

In E-Questionnaire System, an incremental integration strategy approach is used. E-Questionnaire main system is constructed and tested in small segments, where errors are easier to isolate and correct; interfaces are more likely to be tested completely.

The User section for E-Questionnaire System consists of six modules. Each module consists of many sub modules and each sub module contains many sub functions. For instance, "Add Survey Questions" is one of the modules, it can be further divided into many sub functions. Each of these sub functions for example adding survey title into database, deleting the survey record from database and so on are all tested followed by its module. Each of these modules, sub modules, functions and sub functions are reviewed and checked separately to ensure that it is error free.

6.6.2.1 Module Testing

A module is a collection of dependent components. A module encapsulates these related components. Module testing enables each module to be tested independently.

Module Test Case Example 1

After all of the trigger programs for certain table were developed, module testing was carried out to ensure the module functioning as expected. Table below shows the test case for module testing on the trigger programs for Login table.

Table 6.5 **Test Cases For Integrating Trigger Programs For Login Table**

Step	Test Procedure	Expected Output	Test Result Analyzing
1	Press the Sign Up link to sign up as a member of the system.	Link to the correct web page.	The correct web page was successfully shown.
2	Add new records for example: Email: lypor@yahoo.com User ID: lypor Password: abc Into Login table.	The records are inserted permanently.	Records are inserted successfully.
3	Press the Home button to go back to the main page of the system.	Link to the correct web page.	The correct web page was successfully shown.
4	Used the User ID and Password just now to login into the system.	Link to the correct web page that users can make their survey forms.	The correct web page was successfully shown. Users can make their survey forms after logging their User ID and Password. Objective of integrating all trigger programs for Login table is achieved.

Module Test Case Example 2

After completing the Publisher module, module testing on Client Login was carried out to ensure that all the clients could access into Client Login. Table below shows the test case for Client login module.

Table 6.6 **Test Cases For Client Login Module**

No	Test Procedure	Expected Output	Test Result Analyzing
1	Clients have inserted the correct Client Login for example: Login ID: lypor Form ID: 127 Then click the Login button.	Search from database for the validation of the Client Login. Link to the correct web page when the login information is correct.	The correct web page was successfully shown.
2	Clients have inserted the wrong Client Login for example: Login ID: por Form ID: 17 Then click the Login button.	Search from database for the validation of the Client Login. Error Message will be shown.	Clients cannot access into the correct web page. Error message "Invalid Login ID or Password" was shown. Objective of integrating all the login function in Client Login module for E-Questionnaire application is achieved.

6.6.2.2 Sub-System Testing

This phase involves testing collections of modules that have been integrated into sub-systems. Sub-systems may be independently designed and implemented. The most common problem that rose in E-Questionnaire system is sub-system interface mismatches. The sub-system test process was therefore concentrated on the decision of interface errors by rigorously exercising these interfaces.

Sub-System Test Case Example 1

After user has successfully login into E-Questionnaire System, he or she can now add his or her own survey question or questions. Table below shows the test case for creating a survey form with survey questions.

Table 6.7 **Test Cases For Sub-System Creating Survey Form With Survey Questions**

Step	Test Procedure	Expected Output	Test Result Analyzing
1	Type in the name of the survey form for example Password Usage. Click the Add New Survey button to add Survey Title.	The record is inserted permanently.	Record is inserted successfully.
2	Press the button of the survey title.	Link to the correct web page.	The correct web page was successfully shown.
3	Press the "Add Question" button to add the survey question.	Link to the correct web page.	The correct web page was successfully shown.
4	Type in the survey question and choose the question type as well as the response options. *Example:* *Question:* Are your passwords related to your job or personal life? *Type Of Question:* Radio Button *Options:* Yes / No Click the "Save Your Question" button to save the survey question.	The record is inserted permanently. Link to the correct web page after saving the survey question.	Record is inserted successfully. The correct web page was successfully shown.
5	Step number four is repeating until all the survey questions have saved.	All the record is inserted permanently. Link to the correct web page after saving every survey question.	All record is inserted successfully. The correct web page was successfully shown every time the survey question is saved.
6	Press the Results button to view the report.	Retrieved correct records. Correct graph can be shown with labels.	All records successfully retrieved. Graph with correct labels was shown. Objective of integrating all the modules in the sub-system for creating a complete survey form is achieved.

Sub-System Test Case Example 2

After user has finished creating his questionnaires, he can now post the URL, Form ID as well as User ID to those clients that he wants them to answer the survey form for him. Table below shows the test case for clients to answer a survey form.

Table 6.8 **Test Cases For Client To Answer A Survey Form**

Step	Test Procedure	Expected Output	Test Result Analyzing
1	Client inserted the correct Client Login for example: Login ID: lypor Form ID: 127 Then click the Login button.	Search from database for the validation of the Client Login. Link to the correct web page when the login information is correct.	The correct web page was successfully shown.
2	After client have finished answering the survey questions The Submit button was clicked.	The record is inserted permanently. Link to the correct web page when client pressed the submit button.	Record is inserted successfully. The correct web page was successfully shown.
3	Client pressed the Report button to view the survey report.	Correct record retrieved from database. Correct information was shown.	Correct record successfully retrieved. The information show bar the graph is correct. Objective of integrating all the modules in the sub-system for client answering a survey form is achieved.

6.6.3 System Testing

The last testing procedure done is system testing. Testing the system is very different from unit testing and integration testing. The objective of unit testing and integration testing is to ensure that the code has implemented the design properly. In other words, the code is written to do what the design specifications intended. In system testing, a very different objective is to be achieved, that is to ensure that the system does what the users want it to do.

E-Questionnaire System is tested whether it meets specific performance efficiency objectives in Performance Testing. Data Integrity Testing is used to verify that the data is stored in a manner where it is not compromised under updating, restoration or retrieval processing in E-Questionnaire System.

The following system testing was carried out

1. Recovery Test

Recovery test address responses to the presence of faults or loss of data, power, devices or services. One of these was carried out by shutting down the server and activate the E-Questionnaire application.

The test result showed that E-Questionnaire application could still function properly by retrieving records from the database.

2. Stress Test

Stress test is to determine whether a program fulfill the requirements defined for it. Equally important is to make sure that program works, as it should, even under extreme condition.

One of these tests was carried out by activating ten accesses simultaneously. The test result showed that the system is able to activate ten accesses simultaneously without any problem.

3. Security Testing

Verify the protection mechanism in the system against improper penetration.

4. Performance Testing

Performance Testing addresses the non-functional requirements of the application. The types of performance tests carried out for this application are

I. Volume tests

The fields and records are checked to see if they can accommodate all expected data.

II. Security tests

This test ensures that the application fulfills the security requirements.

III. Timing tests
System performance is timed to ensure that it meets user's requirement.

IV. Human factor tests
Display of the web page and messages are examined to determine user friendliness.

V. Browser independence tests
This test is carried out to ensure that the application works properly in Internet Explorer.

5. Usability Test
This test is an attempt to find human-factor, or usability problems. The following is a list illustrating the kinds of considerations that have been tested and the test result analyzing with the help from the five non-computer base testers and five computer base testers.

Table 6.9 **Usability Testing And Analyzing**

No	Consideration	Test Result Analyzing
1	Has each user interface been tailored to the intelligence, educational background and environmental pressures of the end user?	100% of the non-computer base testers do not facing any problem in using the system. Could be concluded that the system is not only tailored to the intelligence end user.
2	Are the outputs of the program meaningful, no abusive, devoid of "computer gibberish" and so on?	100% of the testers agreed that all the outputs of the program are meaningful and properly labeled. Could be concluded that all the output are meaningful.
3	Are the error diagnostics straightforward or does one need a computer science background to comprehend them?	100% of the testers understand the error messages that are prompted by the system. Could be concluded that the error messages are easy to understand.
4	Does the total set of user interfaces exhibit considerable conceptual integrity: an underlying consistency and uniformity of syntax, conventions, semantics, format, styles, and abbreviations?	All of the testers agreed that the user interfaces of the system are consistent. Could be concluded that the testers are satisfied with the consistency of the user interfaces.
5	Is the program easy to use?	100% of the testers agreed that the system is easy to use. Could be concluded that the system is easy to use.

Chapter 7

7. System Evaluations and Conclusion

All of the objectives stated in the introduction have been successfully achieved. However, due to project boundaries, there are some limitations in the E-Questionnaire System.

E-Questionnaire System is developed to achieve the following objectives:

1. *To achieve paperless administration.*
2. *Easy to access.*
3. *To reduce manpower in distributing and collecting forms.*
4. *To reduce expenses and time.*
5. *To avert data from missing.*
6. *To reduce processing error due to lower level of human intervention.*
7. *To have well-managed information.*
8. *Provide an easy-to-use and user-friendly graphical user interface.*

For further information, please refer to *Chapter 1.3 Aims and Objectives.*

7.1 System Strength

Below are the strength of E-Questionnaire System that had achieved the objectives stated above.

7.1.1 Password Protected Site

E-Questionnaire System is a password-protected site. There are two types of authorizer, the users and the clients. Users are required to sign up as a member of the system before they can obtain their User ID and password in order to gain access into the system and utilize the facilities. As for the clients, their access to the system can only be made possible after obtaining their Form ID and User ID from the authorized users. Unauthorized users or clients are prohibited from accessing any records stored in the database. This is to ensure that the system is secure and also prevents intruders from intentionally or unintentionally causing vast damages to the system.

7.1.2 Simple and User-Friendly Interface

User-Interface in E-Questionnaire System is easy to understand and user-friendly. Furthermore, the web pages are designed to suit a wide spectrum of user. The learning curve is foreseen to be short and a user should be able to use the system with ease within minutes. The users can handle the system with the Example and Guidelines provided in this system.

7.1.3 Reliable System with Effective Error Recovery

This is a reliable system as it caters for almost any possible errors encountered. Server side scripting will generate appropriate feedback to user when an error occurs. For example, a password validation failure or a user login ID failure is handled by the system and a user-friendly message will then be generated to inform the user that he has inserted the wrong password or user ID. At the same time, the system would recover from the error and continue to be used.

7.1.4 Able to Provide Database Maintenance

Users are able to do housekeeping for database maintenance. They can create, add, modify, update, delete and publish their survey forms. Besides that, they can also keep track on the records and view the reports. These features allow the users to view the total respondents of their surveys and also the choices picked by those respondents. As for clients, they also have the chance to view the total respondents of their surveys and also the choices picked by other respondents

7.1.5 Edit Questions

Users can edit or update their survey questions either by typing the tags in or choose from the drop down menu. From the library, users are able to choose the kind of responses they like to use. For Example, "Yes/No" option asks the user to choose between two options, while "Agree/Disagree" option lets the user to choose between five or seven options. Users may type in what they want if the responses options they want to measure are not available in the library. Thus, this proves again that the system is very user friendly.

7.1.6 Test Drive or Preview Section

Most of the websites do not have this kind of facility. With E-Questionnaire, users can preview their survey to make sure every step flows the way they intended. Moreover, users can test their survey by filling in all the fields as if they were participants. This is a way that users can test their surveys and get the chance to make any changes before they send their surveys out.

7.1.7 Publisher or Taking Survey Online

After users finish generating the contents of the surveys, they may publish the form online. The publisher will format the survey according to default online publishing standard and generate an URL, User ID and Form ID that can be accessed by clients through the web.

7.1.8 Report Generating

E-Questionnaire System is able to generate reports. Users and clients are able to view their reports based on the questions on the survey forms. These reports are in text form and also in bar graph.

7.1.9 System Transparency

System transparency refers to the condition where the users or clients do not need to know where the database resides, how is the system structure, its database management system or anything related to the building of the system. For example, the information retrieval and publishing the survey forms. This is to ensure that the users and clients are not confused.

7.1.10 Relatively Fast Response

Each web page is designed to be lightweight. These pages are loaded in a reasonable amount of time to ensure that the users and clients need not wait too long to view the pages. Heavy graphic is avoided.

7.1.11 Easy Accessibility

This system is a web-based application and can be accessed easily using the Web browser. The Web browser needed, especially Internet Explorer 4.0 or above, could be downloaded free from Microsoft's Website.

7.2 System Limitations

Due to project boundaries, there are some limitations in E-Questionnaire System. The limitations are as stated below:

7.2.1 Browser Limitation

E-Questionnaire system can only run in Internet Explorer 4.0 and above. E-Questionnaire system requires a browser that can understand VBScript, the default supporting language for ASP. User uses browsers that do not support these features will not be able to use the functions available in this system.

7.3 Project Problems and Solutions

7.3.1 Problem and Solution during Project Studies and Analysis

A lot of system analysis need to be done on technologies and programming concepts before starting to develop E-Questionnaire System. This basic knowledge is needed as a foundation in building an application of this nature involves studies in fields such as the Internet and other similar available systems. The following are some of the major problems encountered from beginning to the completion of the system development.

7.3.2 Difficulties in Choosing a Development Technology, Programming Language and Tools

There are many software tools available to develop a web-based database system currently as stated in the earlier chapters. Choosing a suitable technology and tool was a critical process as all tools have their strengths and weaknesses. In addition, the availability of the required tools for development is also a major consideration. A tough decision arises in choosing from Active Server Pages technology, CGI or Java.

In order to solve this problem, advises and views were sought from project supervisor, course mates and even seniors engaging in similar project. Furthermore, surfing the Internet and visiting the library helped to clarify some doubts.

7.3.3 Operating System

The operating system needed to run this project is Windows NT 4.0. However, Windows 98 was preinstalled in the computer that is used for system development.

The problem here is the use of the file system. Windows 98's file system is FAT 32. Windows NT 4.0 cannot support FAT 32 but only FAT 16 or NTFS file system. So, there was a need to format the selected system partition using NTFS/FAT 16. As I have no experience in this area, it is one of the major problems that I encountered during the system development process.

This difficulty is solved with the assistance of my friends. Those who had experienced this problem before taught me how to format the system partition using FAT 16.

7.3.4 Handling New Operating System

As a beginner in a new operating system, it took quite some time for me to learn the features in Windows NT and what it is capable of doing.

7.3.5 Determining Scope of the System

During the development of the system, I have confused and misunderstand of the scope of my system. As a result, my system began irrelevant. Luckily with the help of my supervisor and moderator, the entire problems were solved.

7.3.6 Inexperience in the Chosen Programming Language

Since there was no prior knowledge of programming in ASP and HTML, there was an uncertainty on how to organize the codes in a web page. These new programming languages and concepts were never taught before and to implement such an application requires a fair grasp of the language.

Although it took me quite some time to learn this new technology, choosing to program in ASP proved to be a wise move. Most of the problems faced were manageable through surfing the Internet for related materials and referring to books available in the market. Discussion with friends using the same technology was a great help. A more efficient step was through trial and error during the coding phase.

7.4 Future Enhancement

Future enhancement can be done to make the system more advance and easy to use. A system development knows no boundaries as new requirements and better implementation methods continue to arise and evolve. There are several enhancements that could extend after developed the system.

7.4.1 Extent the Ability of Browser

As stated, E-Questionnaire System requires Internet Explorer 4.0 or above for execution. In future, E-Questionnaire System can be turned to fulfill other browser requirements such as Netscape Navigator for execution. This is because Netscape has a sizeable share in the browser market besides Internet Explore and Netscape has a lot of users in the world.

7.4.2 Attractive Homepage

E-Questionnaire will become better publicized if its homepage is enhanced to be more attractive and interactive by adding more meaningful and user-friendly images, 3D images, animation images and sounds.

7.4.3 More Modules and Functions

Adding more modules and functions, for example, Forum and Chatting Services can enhance E-Questionnaire System. Moreover, 3D chart result can be used to attract more users using the system.

7.5 Conclusion

Overall, the E-Questionnaire System has achieved and fulfilled the objectives and requirements as an online web-based questionnaire system as determined during system analysis. Anyone who needs to create and publish online forms or surveys for their homepage or website can use this system. This system will help users to create and maintain online feedback forms or survey from any PC connected to the Internet with a web Browser.

There were a lot of knowledge gained throughout the development of this system. This includes knowledge in web application development, Internet environment, Internet technologies, programming and concepts as well as database server as web server. Programming using ASP, VBScript, JScript and HTML proved to be a valuable experience. Interface design using Macromedia Dreamweaver provides a good start into web page design. Even though programming skills and techniques are important in development, good software engineering techniques must also be applied. Here, theories and knowledge gained throughout the course of computer science studies like system analysis, design and software engineering were literally put into practice.

Finally, there are much more rooms for improvement in this system, especially in terms of implementing a more satisfactory system. With the first step taken, enhancements could still be made with more features added for future version.

In a nutshell, with project of this nature offered by the faculty, there exist much opportunity to be explored, especially in the field of Internet environment, be it for E-Questionnaire System or in any other fields.

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   Copyright © 1996, 1992 by Houghton Mifflin Company.
   Published by Houghton Mifflin Company. All rights reserved.

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Appendices

Appendix A

Password Usage Questionnaire

SECTION A: USERS PASSWORD USAGE

□ *Can choose more than 1 answer*
○ *Permit 1 answer only*

1. Passwords are required of you during login for:
□ Personal Computers
□ Workstations/ terminals in company network
□ Workstations/terminals in school/college/university network
□ Connecting to the Internet
□ Email accounts
□ Commercial Websites
□ Others ______________________________

2. How many characters do your passwords have on average?
○ 1
○ 2
○ 3
○ 4
○ 5
○ 6
○ 7
○ 8
○ >8

3. Are your passwords related to your job or personal life?
○ Yes
○ No

4. Your passwords cannot be guessed easily because
□ They are extremely personal and intimately related to you
□ They contain upper and lower case letters, numbers and special characters
□ They are in a foreign/obsolete language
□ They are very long and difficult to remember
□ They do not make sense to outsiders

5. How many of the following elements are contained in your passwords?
✓ Upper Case Letter (A,B,C….Z)
✓ Lower Case Letter (a, b, c….z)
✓ Numbers (0, 1, 2,….9)
✓ Special Characters (!, @, #, $, %, ^, &, *)

○ Only 1
○ Between 1 and 3
○ Exactly 3
○ > 3

6. Do you define passwords that are identical, or substantially similar to passwords you have previously used anytime during the previous 6 months?
   - ○ Yes
   - ○ No

7. Do you write down or leave your passwords in a place where unauthorized persons might find them?
   - ○ Yes
   - ○ No

8. Have you ever shared or revealed your passwords to anyone other than an authorized user?
   - ○ Yes
   - ○ No

9. When you realized or thought that your passwords are compromised, you change them
   - ○ As soon as possible
   - ○ When you have time
   - ○ Do not bother to change them

10. How often do you log out or enable the password-protection feature of the screen saver when you leave your personal computer, workstation or terminal unattended?
    - ○ Always
    - ○ Sometimes
    - ○ Never

11. How often do you change your password?
    - ○ Less than 1 month
    - ○ Between 1 month to 3 months
    - ○ More than 3 months
    - ○ Never

12. How often are your user-IDs suspended or temporarily disabled after unsuccessful attempts to enter passwords?
    - ○ Very often
    - ○ Sometimes
    - ○ Never

13. Are your passwords the same as your user-IDs?
    - ○ Yes
    - ○ No

14. Do you always change the supplied default password, if ever you are given one, to a personal password?
   ○ Yes
   ○ No

15. Have you ever forgotten or misplaced your passwords?
   ○ Yes …please go to question 16
   ○ No …please go to question 17

16. If YES, when you contact your System Administrator, are they prompt to assist you?
   ○ Yes
   ○ No

17. If you have forgotten or misplaced your passwords how do you contact your System Administrator?
   □ Over the phone
   □ E-mail
   □ Personal contact

18. How secure do you think password usage is?
   ○ Very Secure
   ○ Secure
   ○ Moderately Secure
   ○ Neutral
   ○ Moderately Insecure
   ○ Insecure
   ○ Very Insecure

19. Do you think encryption should be applied to passwords?
   ○ Yes
   ○ No

20. What changes would you like to see in order to make password usage more secure and reassuring?

____

____

____

SECTION B: DEMOGRAPHICS

1. Sex ○ Male ○ Female

2. Age Group
○ Less than 20 years old
○ 20-29
○ 30-39
○ 40-49
○ 50 and above

3. Current Status
○ Under-Graduate Students
○ Post-Graduate Students
○ Lecturer
○ Private/ public servant
○ Others

4. Highest education level
○ Degree Qualification (current processing)
○ Degree Qualification
○ Postgraduate Degree
○ Ph.D.
○ Other

Thank You For Completing This Survey !

Appendix B

Soalselidik terhadap Penggunaan Katalaluan

Bahagian A: Kegunaan Katalaluan Pengguna

□ Dibenarkan memilih lebih daripada 1 pilihan
○ Hanya benarkan 1 pilihan

1. Katalaluan anda diperlukan semasa anda login untuk:
□ Komputer Peribadi
□ Tempat kerja/ terminal pada rangkaian syarikat
□ Tempat kerja/ terminal pada sekolah/kolej/rangkaian university
□ Berhubungan dengan Internet
□ Akaun Email
□ Laman Web Komersil
□ Lain-lain ______________________________

2. Secara puratanya, berapakah aksara yang terdapat dalam katalaluan anda?
○ Kurang daripada 6
○ Tepat 6
○ Lebih daripada 6

3. Adakah katalaluan anda berkaitan dengan perkerjaan anda atau kehidupan anda?
○ Ada
○ Tidak

4. Katalaluan anda tidak dapat diteka dengan mudah kerana
□ Ia adalah berkenaan dengan hal peribadi anda dan berekait rapat dengan anda
□ Ia terdiri daripada huruf besar, huruf kecil, nombor dan aksara lain
□ Ia terdiri daripada bahasa yang lain/ kuno
□ Ia terlalu panjang dan sukar diingati
□ Ia tidak memberi makna kepada orang lain

5. Berapa banyakkah unsur-unsur dibawah terkandung di dalam katalaluan anda?
✓ Perkataan huruf besar (A,B,C….Z)
✓ Perkataan huruf kecil (a, b, c….z)
✓ Nombor (0, 1, 2,….9)
✓ Aksara lain (!, @, #, $, %, ^, &, *)

○ Hanya 1
○ Di antara 1 and 3
○ Tepat 3
○ Ledih daripada 3

6. Adakah anda menggunakan katalaluan yang sama atau lebih kurang sama dengan katalaluan yang pernah anda gunakan pada sepanjang 6 bulan yang lalu?
○ Ya
○ Tidak

7. Adakah anda menulis atau meletak katalaluan anda di tempat yang mana orang lain dapat mencarinya?
   - ○ Ya
   - ○ Tidak

8. Adakah anda pernah berkongsi atau mendedahkan katalaluan anda kepada orang lain selain daripada pengguna yang sah?
   - ○ Ya
   - ○ Tidak

9. Apabila anda mengetahui atau berpendapat bahawa katalaluan anda dicurigai, anda akan menukarnya
   - ○ Secepat mungkin
   - ○ Bila ada masa
   - ○ Tidak menghiraukan

10. Berapa kerapkah anda 'logout' ataupun mengaktifkan pelindung-katalaluan "screen saver" apabila meninggalkan komputer peribadi tempat kerja/ terminal tanpa dijaga?
    - ○ Selalu
    - ○ Kadangan
    - ○ Tak pernah

11. Berapa kerapkah anda menukar katalaluan anda?
    - ○ Kurang daripada 1 bulan
    - ○ Di antara 1 hingga 3 bulan
    - ○ Lebih daripada 3 bulan
    - ○ Tidak pernah menukar

12. Berapa kerapkah identiti pengguna anda tergantung ataupun dihentikan buat sementara waktu selepas percubaan untuk memasukan katalaluan gagal?
    - ○ Selalu
    - ○ Kadangan
    - ○ Tak pernah

13. Adakah katalaluan anda sama seperti 'user-ID' anda?
    - ○ Ya
    - ○ Tidak

14. Sekiranya anda diberi satu katalaluan, adakah anda akan menukarkan kepada satu katalaluan yang peribadi?
    - ○ Ya
    - ○ Tidak

15. Pernahkah anda lupa atau salah letak katalaluan anda?
    - ○ Ya …sila pergi ke soalan no.16
    - ○ Tidak …sila pergi ke soalan no.17

16. Sekiranya Ya, apabila anda menghubungi sistem pentadbir anda, adakah mereka membantu anda dengan segera?
    - ○ Ya
    - ○ Tidak

17. Sekiranya kamu lupa atau salah letak katalaluan anda, bagaimanakah anda menghubungi sistem pentadbir anda?
    - □ Melalui telefon
    - □ Email
    - □ Berhubung secara persendirian

18. Pada pendapat anda, sejauh manakah penggunaan katalaluan itu selamat?
    - ○ Sangat selamat
    - ○ Sederhana selamat
    - ○ Tak selamat
    - ○ Sangat tak selamat

19. Pada pendapat anda, adakah enkripsi perlu digunakan pada katalaluan?
    - ○ Ya
    - ○ Tidak

20. Apakah perubahan yang anda ingin lihat supaya penggunaan katalaluan lebih selamat dan menyakinkan?

    ____

    ____

    ____

BAHAGIAN B: DEMOGRAFI

1. Jantina ○ Leleki ○ Perempuan

2. Julat Umar
    - ○ Kurang daripada 20 tahun
    - ○ 20-29
    - ○ 30-39
    - ○ 49-49
    - ○ 50 atau lebih

3. Status kini
    - ○ Pelajar-pelajar sarjana muda
    - ○ Pelajar-pelajar sarjana
    - ○ Pensyarah
    - ○ Pekerja swasta atau awam
    - ○ Lain-lain

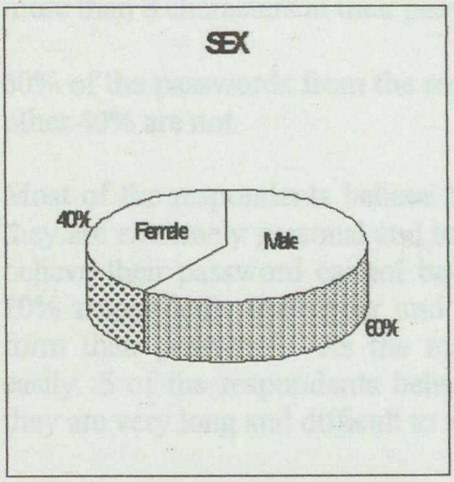
4. Tahap pendidikan yang tertinggi

○ Kelayakan ijazah sarjana muda (diproses sekarang)
○ Kelayakan ijazah sarjana muda
○ Ijazah sarjana
○ Ph.D.
○ Lain-lain

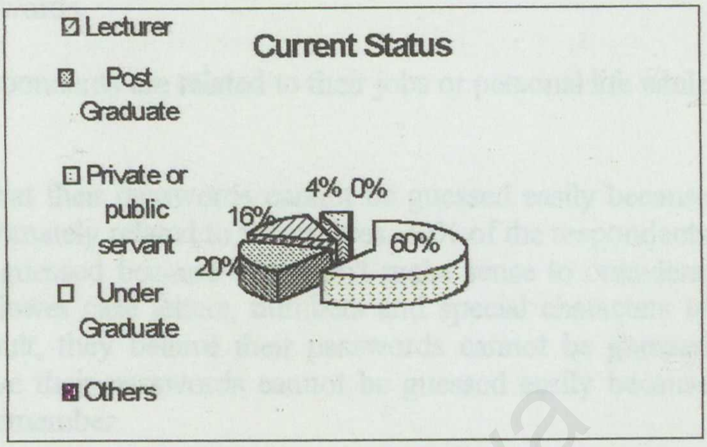
Terima Kasih Kerana Menjawab Soalselidik Ini !

Appendix C

Analyze Password Usage Survey (Case Study) Result



Respondents' sex in percentage



Percentage showing the respondents current status

50 respondents have been chosen randomly to answer the Password Usage questionnaire. 20 of the respondents are females and 30 of them are males. 70% of the respondents are in the range of 20-29 years old and 30% of them are in the range of 30-39 years old. 30 of the respondents are undergraduate students and still in the process of degree qualification. 10 of the respondents are postgraduate students. 7 out of 10 postgraduate students have degree qualification and 3 of them have postgraduate degree qualification. 8 respondents are lecturers and all of them have postgraduate degree qualification. 2 of the respondents are from private or public servant status and he has a degree qualification.

Table C1: ***Password requirement for respondents***

Password required of users during login for	***Number of respondents***
Personal Computer	20
Workstations / terminals in company network	30
Workstations / terminals in school / college / university network	30
Connecting to the Internet	35
Email accounts	40
Commercial Websites	8
Others	8

From the table above, 20 of the respondents use passwords during login for personal computer. 30 of the respondents use passwords when they login into workstations or terminals in company network and other 30 use passwords when they login into workstations or terminals in school or college or university network. 35 out of the 20 respondents use passwords during login for connecting to the Internet. 40 respondents need passwords for logging in their email accounts. 8 respondents use passwords during login for commercial websites and 8 more need passwords login for other purposes.

34 respondents use exactly 6 characters when they are selecting their passwords. 7 of the respondents use exactly 7 characters in their passwords. While other 9 respondents use more than 8 characters in their passwords.

60% of the passwords from the respondents are related to their jobs or personal life while other 40% are not.

Most of the respondents believe that their passwords cannot be guessed easily because they are extremely personal and intimately related to themselves. 30% of the respondents believe their password cannot be guessed because they don't make sense to outsiders. 20% respondents use upper and lower case letters, numbers and special characters to form their passwords. As the result, they believe their passwords cannot be guessed easily. 5 of the respondents believe their passwords cannot be guessed easily because they are very long and difficult to remember.

Table C2 **Elements that contained inside respondents' passwords**

Elements
Upper Case Letter (A, B, C…Z)
Lower Case Letter (a, b, c…z)
Numbers (0, 1, 2…9)
Special Character (!, @, #, $, %, ^, &, *,..)

20 respondents use only one element for their passwords. 18 of the respondents use between 1 and 3 elements for their passwords. Only 5 respondent's password contains exactly 3 elements. 7 of the respondents' passwords contain more than 3 elements.

66% of the respondents define passwords are identical, or substantially similar to passwords that they have previously used anytime during the previous 6 months. For the rest of the respondents they do not agree this statement.

90% of the respondents do not write down or leave their passwords in a place where unauthorized persons might find them. 5 of the respondents do write down or leave their passwords in a place where unauthorized persons might find them.

16 out of 50 of the respondents shared or revealed their passwords to anyone other than an authorized user while others not.

82% of the respondents will change their passwords as soon as possible when they realized or thought that their passwords are compromised. 9 of the respondents will only change their passwords when they have time.

52% of the respondents always logout or enable the password-protection feature of the screen saver when they leave their personal computers, workstations or terminals unattended. 34% of the respondents sometimes logout or enable the password-protection feature when they leave their personal computers. Other 14% of the respondents never do so when they leave their personal computers.

27 of the respondents change their passwords between 1 month to 3 months. 13 respondents change their passwords more than 3 months. 10 of the respondents never change their passwords.

One of the respondents his user-IDs very often suspended or temporarily disable after unsuccessful attempts to enter passwords. 40% of the respondents sometimes have this kind of problems but 58% of the rest of the respondents do not have this kind of problems.

All of the respondents do not have the passwords that same as their user-IDs.

70% of the respondents do change the supplied default password if they are given one for their personal computer. While still have 30% of the respondents are using the default password.

50% of the respondents do forgotten or misplaced his or her passwords and the other half are not. For those who are forgotten or misplaced his or her passwords, 80% of their system administrators do prompt to assist them when they contact their system administrators. The other 20% of their system administrators do not prompt to assist them when they contact their system administrators.

Table C3 **Ways of contact System Administrators for respondents**

The way of contact	Number of respondents
Over the phone	26
Email	41
Personal Contact	17

26 respondents contact their system administrator over the phone when they have forgotten or misplaced their passwords. 41 of the respondents use email to contact their system administrator and 17 of them contact their system administrator through personal contact.

One of the respondents thinks that password usage is very secure. 13 of the respondents think that password usage is moderately secure. 6 respondents think that password usage is neutral.15 respondents think that password usage is insecure. 4 respondents think that password usage is sometimes insecure and 11 respondents think that password usage is very insecure.

80% of the respondents think that encryption should be applied to passwords. 20% of the respondents think that encryption should not applied to passwords

One of the respondents suggests using smart card rather than password to make password usage more secure and reassuring. The other respondent suggests that only authorized persons be allowed to save user-IDs or passwords on their personal computers. The other respondent suggests using encryption. One respondent suggests using software such as key lock to protect other users changing or saving user-IDs or passwords in shared personal computers. Two of the respondents suggest using software that can remind users to change their passwords after a period of time. One of the respondents suggests that reverse actions should not be allowed when key-in user-IDs or passwords. User-IDs and passwords should be deleted if reverse actions are allowed. The other user suggests that passwords must have a minimum password length for example 6 characters or more. One of the respondents says self-discipline is the best method to make password usage more secure and reassuring. The other respondents do not have any idea about how to make password usage more secure and assuring.

Appendix D

E-Questionnaire User Menu

E-Questionnaire is a set of Active Server Pagers (ASP) templates. All templates required to run the application are located in a single directory on Internet Server. It is recommended to use IE 4.0 or better when accessing E-Questionnaire System. Depends on the setup, the URL might be different from the URL that used in this system.

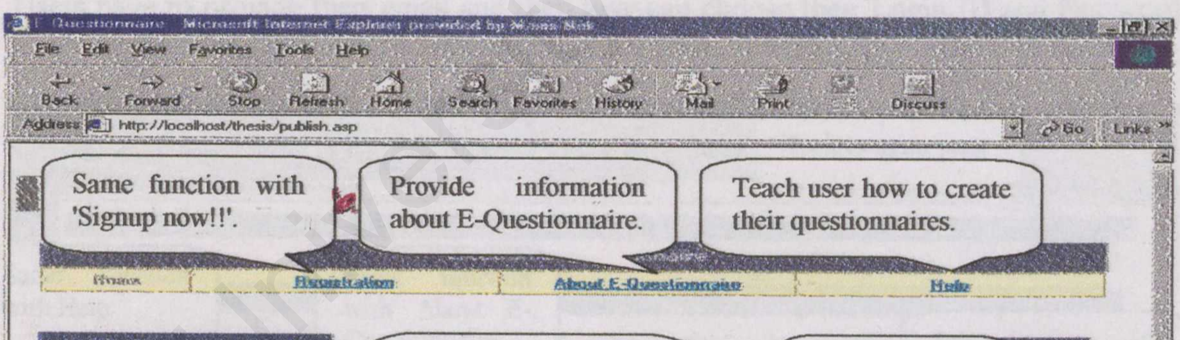
Below are the URLs that used to access E-Questionnaire System:
http://202.185.109.139/LipYee/thesis (Users Section)
http://202.185.109.139/LipYee/thesis/survey.htm (Clients Section)

Users Section

The first thing to do is to access into the E-Questionnaire System with the following URL *http://202.185.109.139/LipYee/thesis*

Main Interface:

The interface above is the main page for User Section in E-Questionnaire System. This main interface has six functions: Registration, About E-Questionnaire, Help, Login, Signup now and Lost Password. Those functions will be discussed at the following sections.


File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Discuss
Address http://localhost/thesis/publish.asp
Go Links
Home
Registration
About E-Questionnaire
Help
Quick Tips
Login
Lost password?
Signup now !!
Lost password?
Local intranet

Same function with 'Signup now!!'.

Provide information about E-Questionnaire.

Teach user how to create their questionnaires.

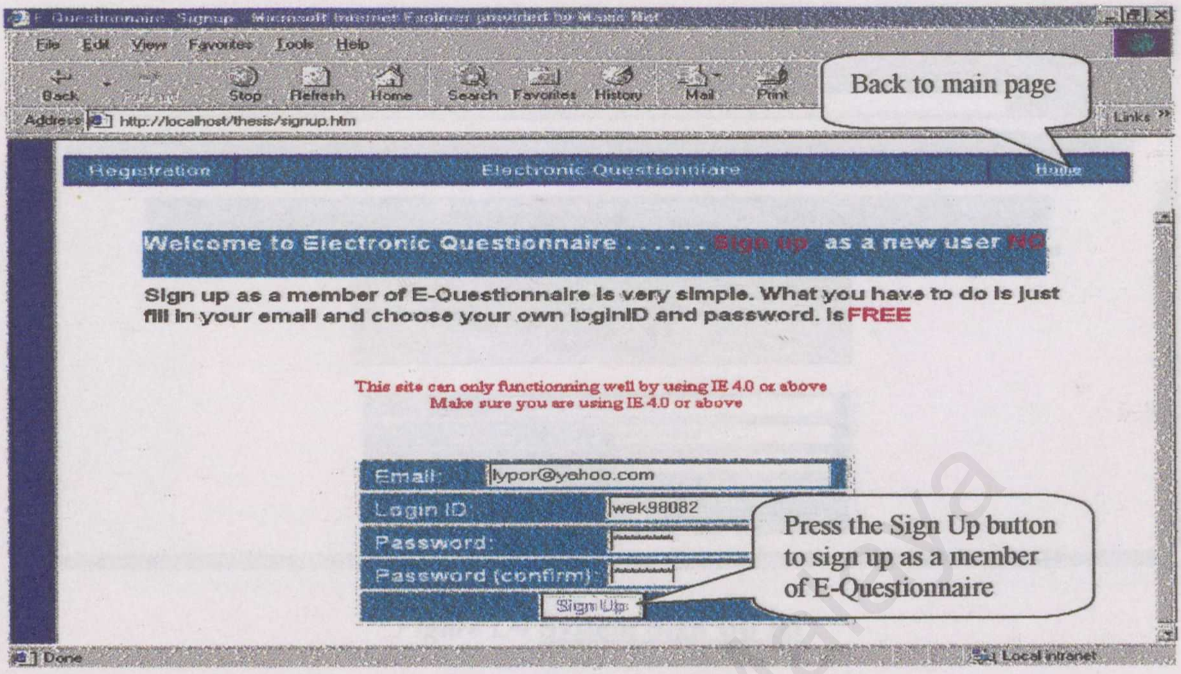
Those users who want to use E-Questionnaire are required to signup as a member of the system.

Only authorized user can login to the system.

For authorized user how have forgotten their login information.

Figure D1 **Main Interface for User Section**

Signup & Registration



File Edit View Favorites Tools Help
Back Stop Refresh Home Search Favorites History Mail Print
Address http://localhost/thesis/signup.htm
Links
Registration
Electronic Questionnaire
Home
Done
Local intranet

Welcome to Electronic Questionnaire . . . . . . Sign up as a new user NO

Sign up as a member of E-Questionnaire is very simple. What you have to do is just fill in your email and choose your own loginID and password. Is FREE

This site can only functionning well by using IE 4.0 or above
Make sure you are using IE 4.0 or above

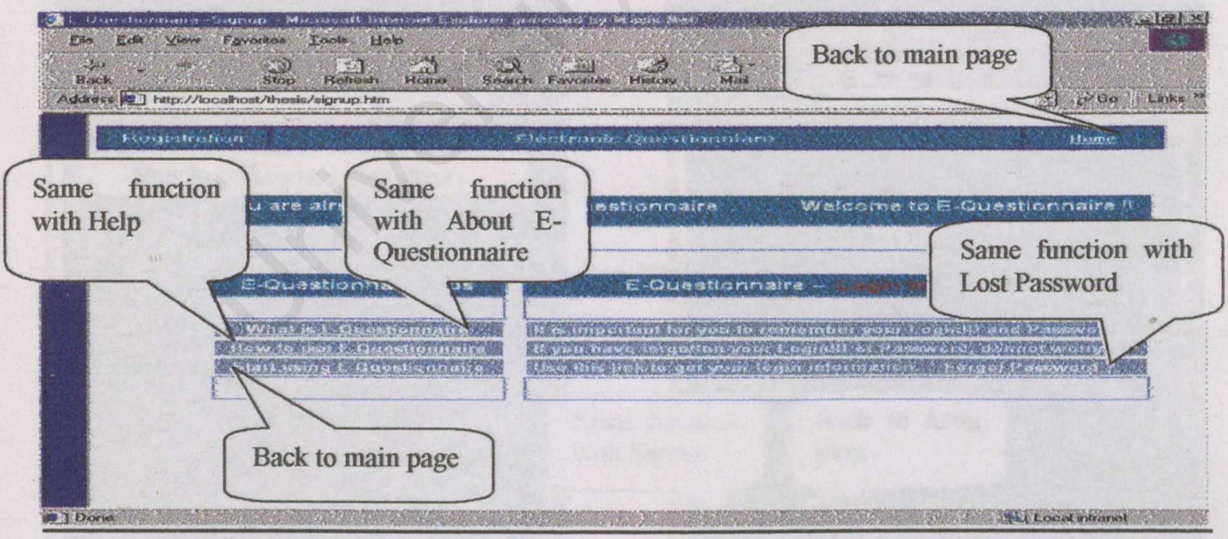
Email: lypor@yahoo.com
Login ID: wek98082
Password:
Password (confirm):
Sign Up

Back to main page

Press the Sign Up button to sign up as a member of E-Questionnaire

Figure D2 **System Sign Up I**

Signup and Registration are two links that users can get the system login authentication. Users have to provide their email and then they can choose their Login ID and Password to access to the system. After filling all the information, the Sign Up button is pressed.



File Edit View Favorites Tools Help
Back Stop Refresh Home Search Favorites History Mail
Address http://localhost/thesis/signup.htm
Go Links
Registration
Electronic Questionnaire
Home
Done
Local intranet

u are alr… …estionnaire Welcome to E-Questionnaire !!

E-Questionna… …s

E-Questionnaire – Login In…

Back to main page

Same function with Help

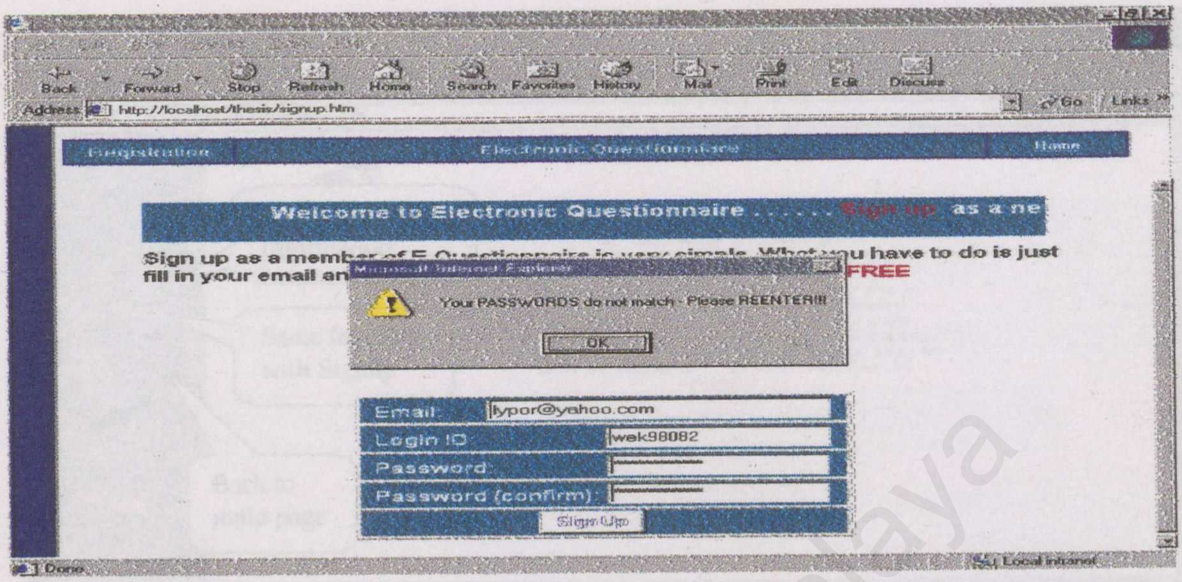
Same function with About E-Questionnaire

Same function with Lost Password

Back to main page

Figure D3 **System Sign Up II**

Figure D3 will be shown if the user has sign up successfully. If the user has key in wrong information during the sign up process, an error message will be prompted. Figure D4 shows the unsuccessful sign up process.



Address: http://localhost/thesis/signup.htm

Welcome to Electronic Questionnaire ...... Sign up as a ne

Sign up as a member of E-Questionnaire is very simple. What you have to do is just fill in your email an FREE

Microsoft Internet Explorer

Your PASSWORDS do not match - Please REENTER!!!

OK

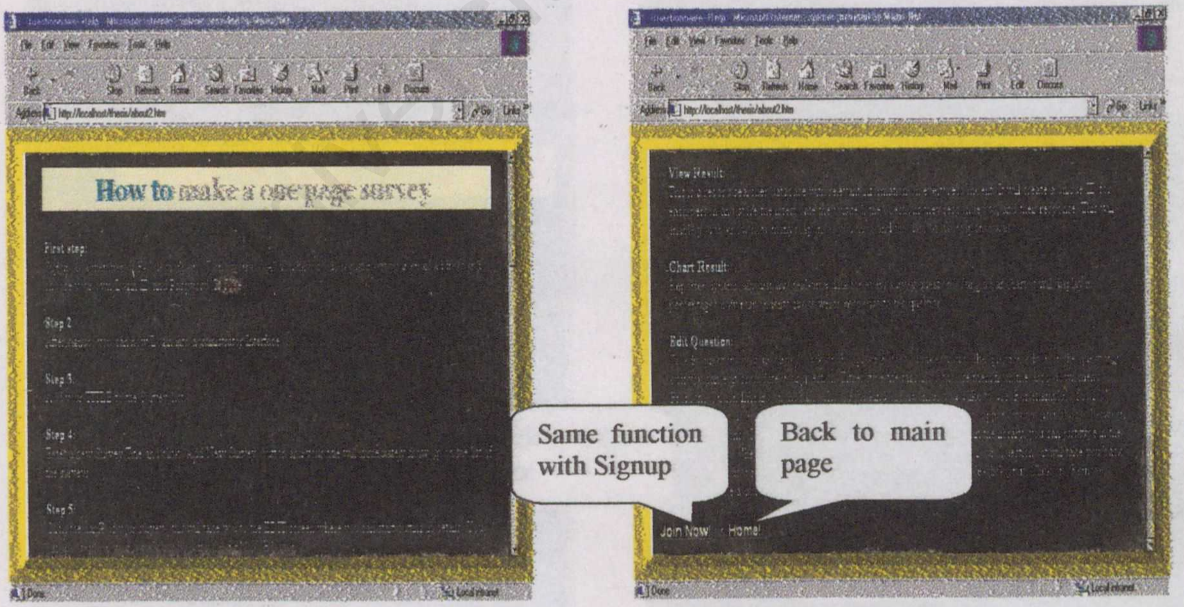
Email:	lypor@yahoo.com
Login ID:	wek98082
Password:	**********
Password (confirm):	**********

Sign Up

Figure D4 **System Sign Up III**

Help

This function gives users a reference on how to create their own questionnaires step by step.



http://localhost/thesis/about2.htm

How to make a one page survey

First step:

Step 2

Step 3

Step 4

Step 5

View Result:

Chart Result:

Edit Question:

Join Now | Home!

Figure D5 **System Help**

About E-Questionnaire

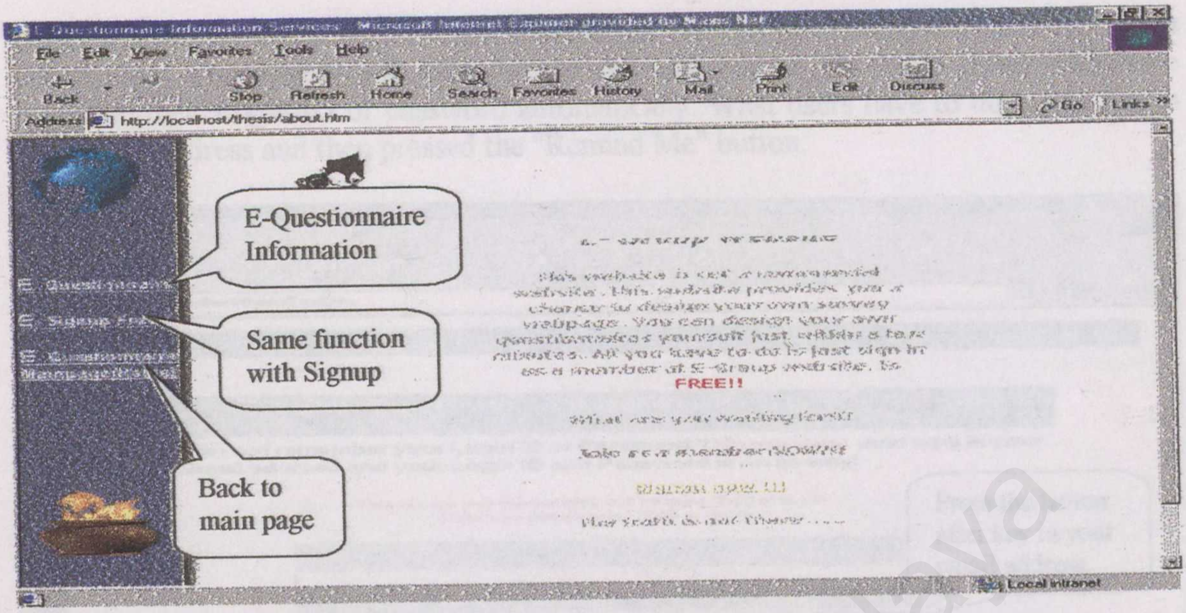

File Edit View Favorites Tools Help
Back Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://localhost/thesis/about.htm
Go Links
E-Questionnaire Information
Same function with Signup
Back to main page
FREE!!
Local intranet

Figure D6 **About E-Questionnaire I**

Figure D6 shows the main page of About E-Questionnaire. If user wanted to know any information about E-Questionnaire system, he can use the "E-Questionnaire" link. Figure D7 shows the interface of the "E-Questionnaire".

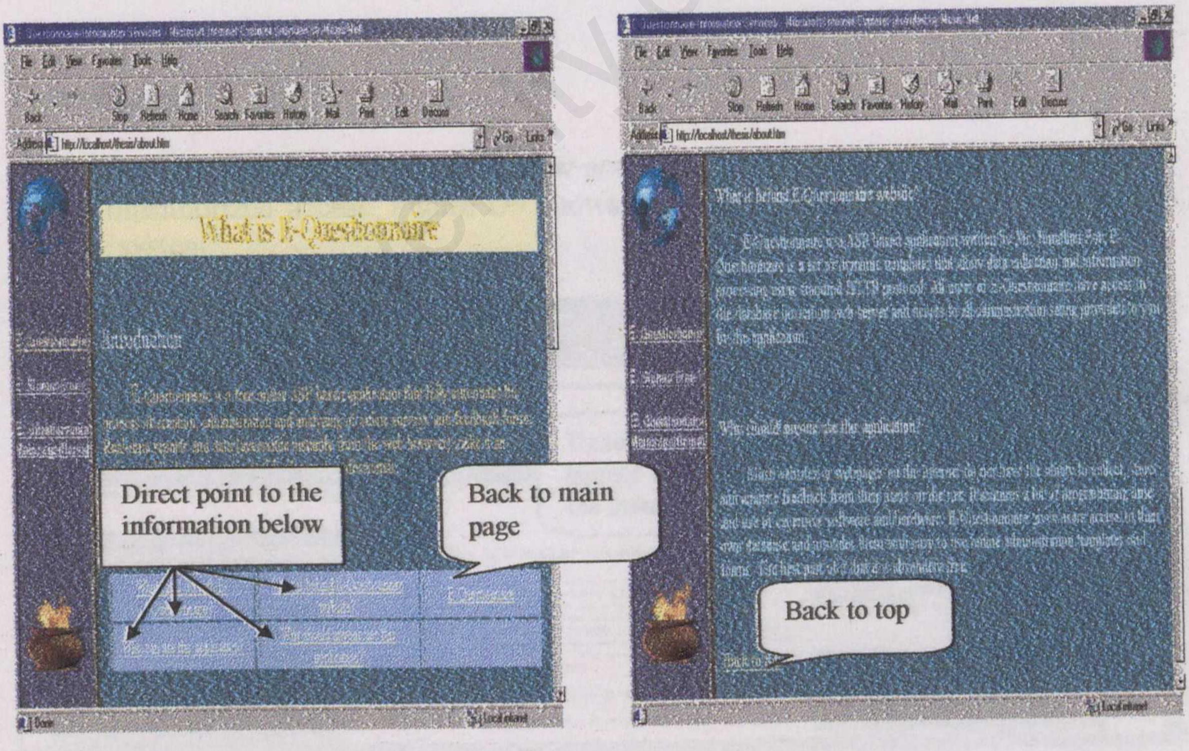
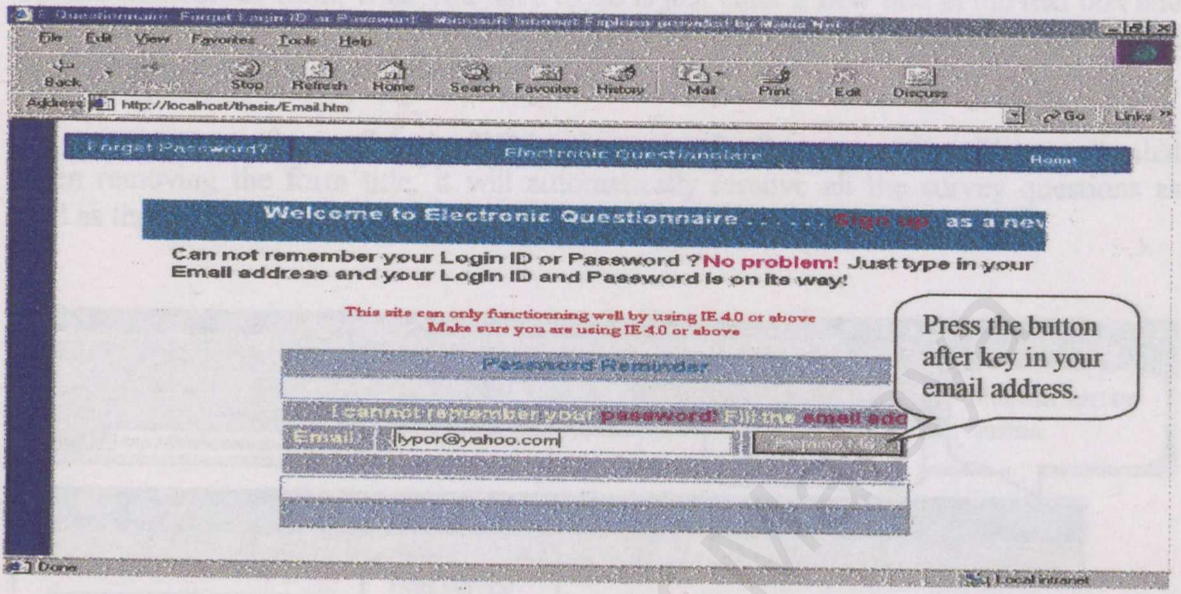


Figure D7 **About E-Questionnaire II**

Lost Password

Users who have forgotten their login information can use this link to get back their login information. The system will send the related information for those users who have forgotten their Login ID or password automatically. What users have to do is just key in their email address and then pressed the "Remind Me" button.



Address: http://localhost/thesis/Email.htm

Welcome to Electronic Questionnaire . . . . . Sign up as a nev

Can not remember your Login ID or Password ? No problem! Just type in your Email address and your Login ID and Password is on its way!

This site can only functionning well by using IE 4.0 or above
Make sure you are using IE 4.0 or above

Password Reminder

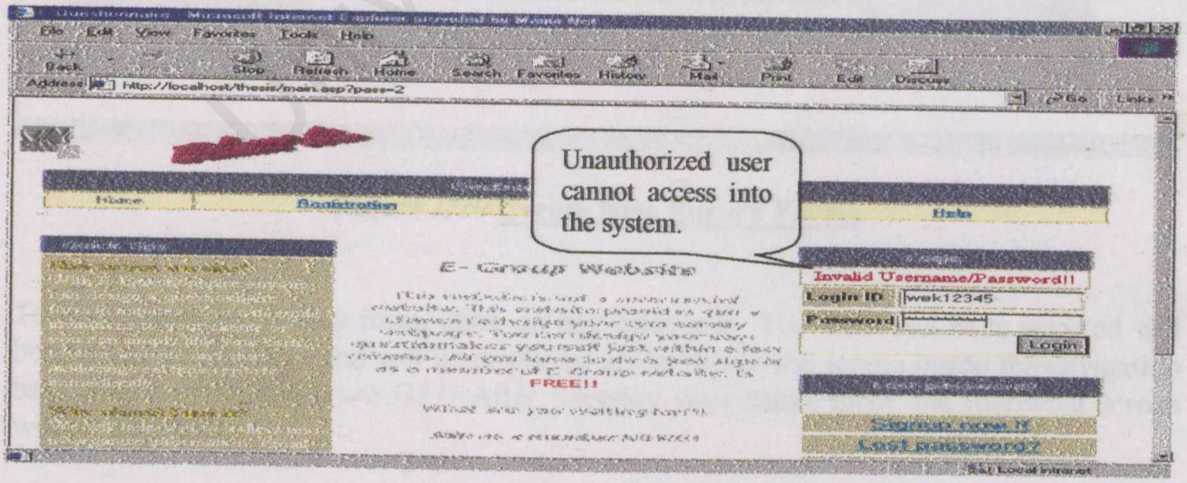
I cannot remember your password! Fill the email add

Email: lypor@yahoo.com

Figure D8 **Lost Password**

System Login

With the access information, you can now access into the system. The system will deny all the unauthorized access. Figure D9 shows an unauthorized user who tries to access into the system.



Address: http://localhost/thesis/main.asp?pass=2

E-Group Website

FREE!!

Invalid Username/Password!!

Login ID: wek12345

Password:

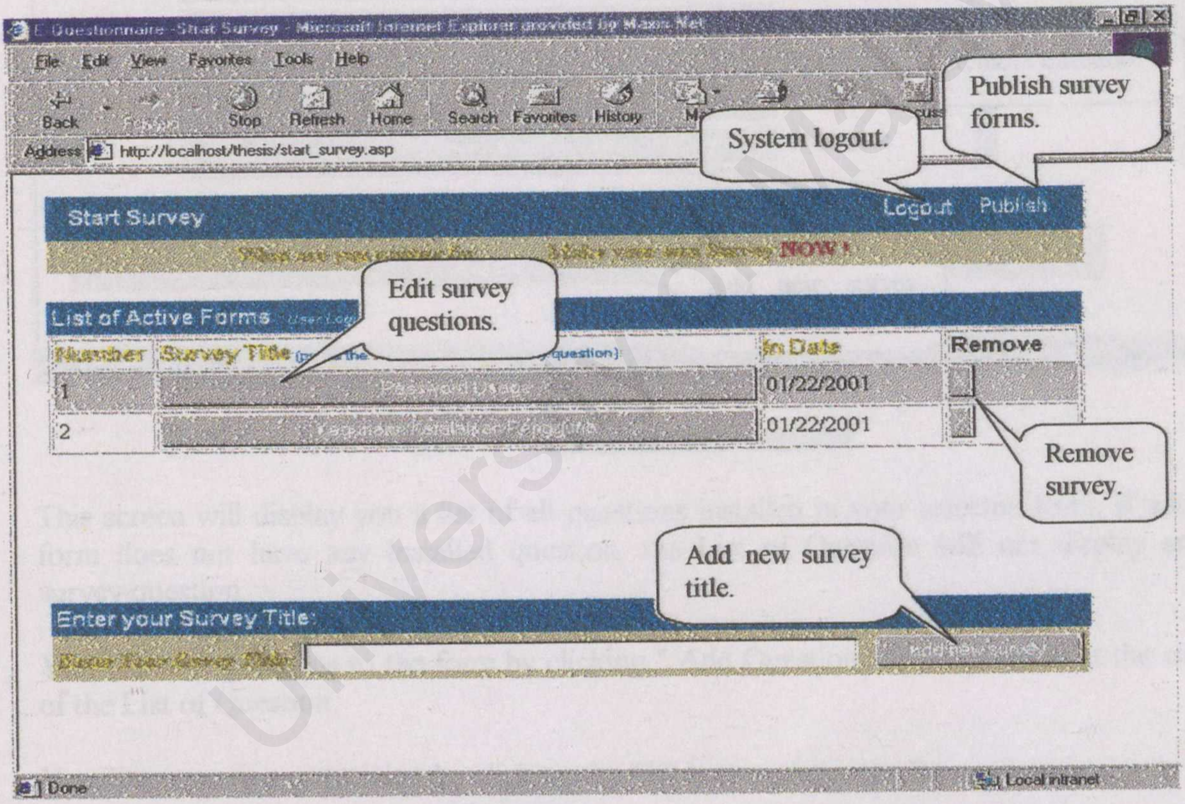
Figure D9 **Invalid Access for User**

Create Survey Forms

Below is the interface that displays the list of all survey forms in your account. There are Logout and Publish links on the top of the navigation bar. Logout link is for user to logout the system. Publish link will be discuss in the following section.

To add new survey form, what you have to do is just enter a new title in the text box and click "add new survey" button. Your new title will be displayed at the end of the List of Active Forms which shown at the Figure D10.

To remove survey form, click the "X" button under the Remove option. Please note that when removing the form title, it will automatically remove all the survey questions as well as the results.



Address http://localhost/thesis/start_survey.asp

Start Survey

List of Active Forms

Number	Survey Title	In Date	Remove
1	Password Usage	01/22/2001	
2	[illegible]	01/22/2001	

Enter your Survey Title:

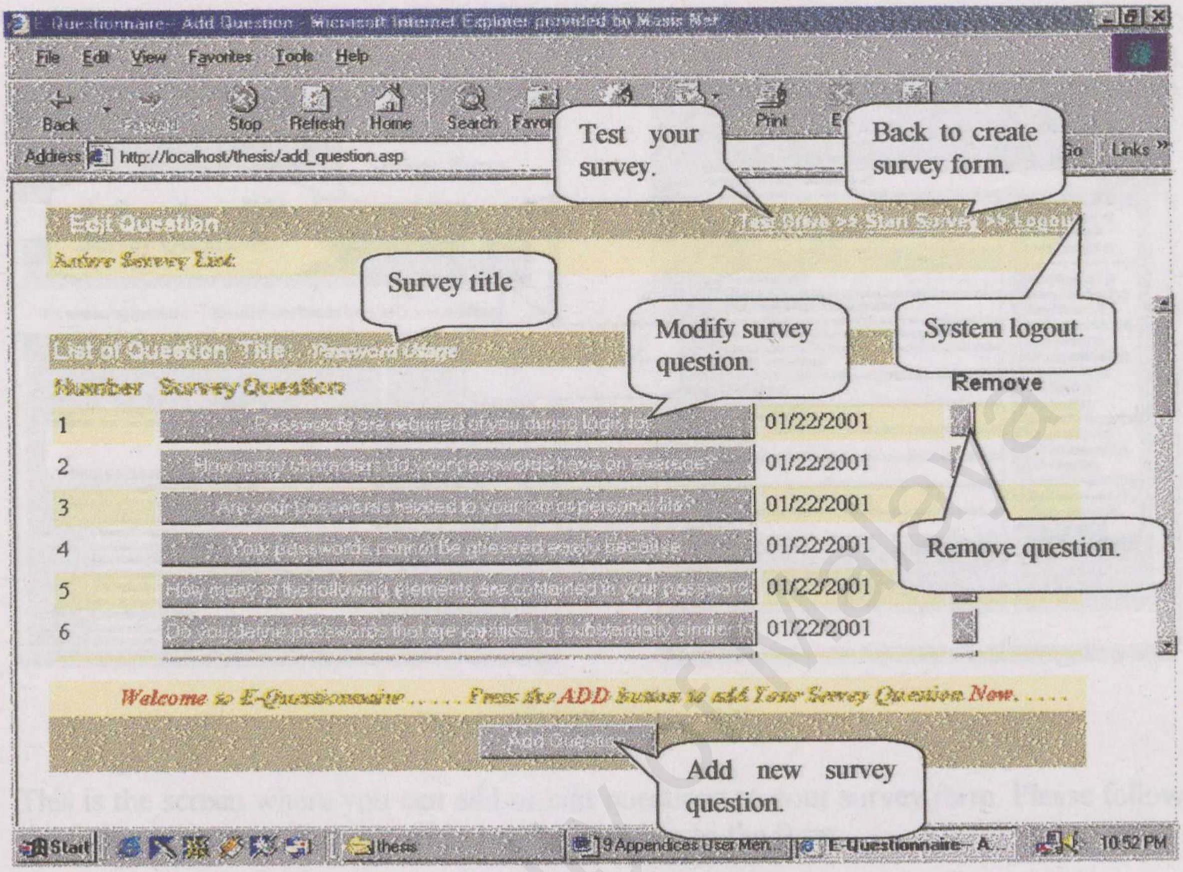
Enter Your Survey Title:

E Questionnaire - Start Survey - Microsoft Internet Explorer provided by Maxis.Net
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History
Logout Publish
add new survey
Done
Local intranet
Publish survey forms.
System logout.
Edit survey questions.
Remove survey.
Add new survey title.

Figure D10 **Create New Survey Forms**

To edit questions for any form, click on any form title. The form you have selected will become an active form and will be displayed at the top of the screen inside the navigation bar. *(Please refer to Figure D11)* After selecting your active form, the following screen will be displayed.

Edit Survey Questions



E-Questionnaire - Add Question - Microsoft Internet Explorer provided by Maxis Net

Address http://localhost/thesis/add_question.asp

Edit Question

Test Drive >> Start Survey >> Logout

Active Survey List:

List of Question Title : Password Usage

Number	Survey Question		Remove
1	Passwords are required of you during login for	01/22/2001	
2	How many characters do your passwords have on average?	01/22/2001	
3	Are your passwords related to your job or personal life?	01/22/2001	
4	Your passwords cannot be guessed easily because	01/22/2001	
5	How many of the following elements are contained in your password	01/22/2001	
6	Do you define passwords that are identical, or substantially similar, to	01/22/2001	

Welcome to E-Questionnaire . . . . . Press the ADD button to add Your Survey Question Now. . . . .

File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites Print
Go Links
Test your survey.
Back to create survey form.
Survey title
Modify survey question.
System logout.
Remove question.
Add Question
Add new survey question.
Start thesis 9 Appendices User Men... E-Questionnaire - A... 10:52 PM

Figure D11 **Edit Survey Questions**

This screen will display you a list of all questions installed in your selected form. If your form does not have any installed question, the List of Question will not display any survey question.

You can add questions to the form by clicking " Add Question" button located at the end of the List of Question.

You can remove any question by clicking the "X" button under the Remove option.

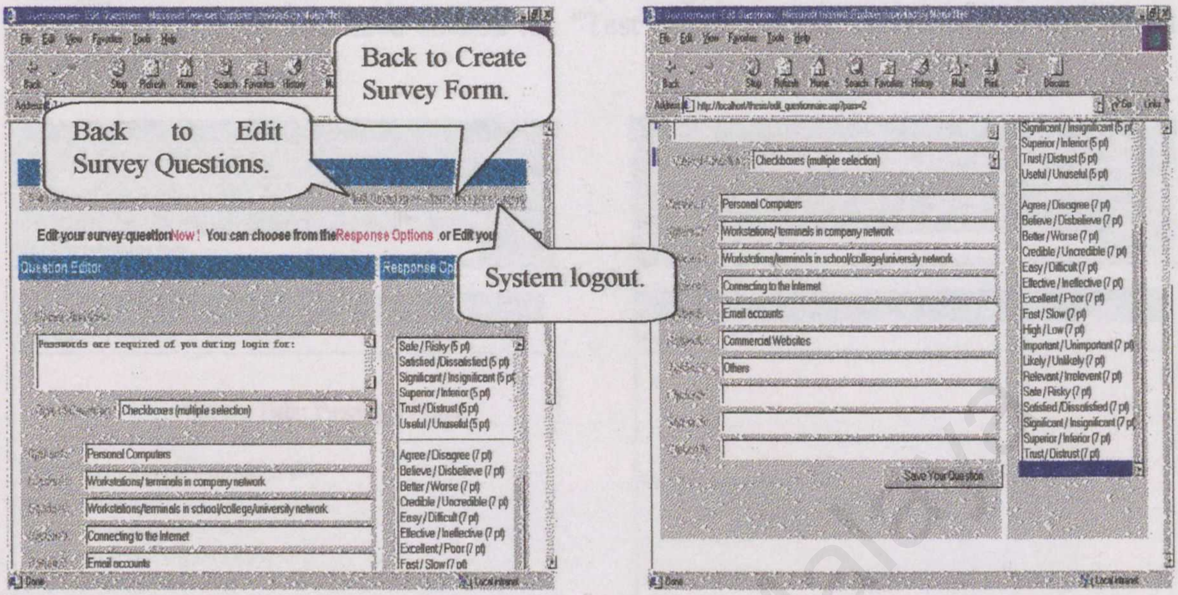
Quick Tip:

1. Add New Question → Click "Add Question" button at the button of the screen.
2. Remove Question → Click "X" button in the Remove column on the right side of the screen.

The Test Drive function will be discussed in the following section.

Question Editor

After clicking the "Add Question" button, the following screen will be displayed.



Back to Create Survey Form.

Back to Edit Survey Questions.

System logout.

Edit your survey questionNow! You can choose from theResponse Options .or Edit you

Question Editor

Passwords are required of you during login for:

Checkboxes (multiple selection)

Personal Computers

Workstations/ terminals in company network

Workstations/terminals in school/college/university network

Connecting to the Internet

Email accounts

Commercial Websites

Others

Save Your Question

http://localhost/thesis/edit_questionnaire.asp?pass=2

Response Op
Safe / Risky (5 pt)
Satisfied /Dissatisfied (5 pt)
Significant / Insignificant (5 pt
Superior / Inferior (5 pt)
Trust / Distrust (5 pt)
Useful / Unuseful (5 pt)
Agree / Disagree (7 pt)
Believe / Disbelieve (7 pt)
Better / Worse (7 pt)
Credible / Uncredible (7 pt)
Easy / Difficult (7 pt)
Effective / Ineffective (7 pt)
Excellent / Poor (7 pt)
Fast / Slow (7 pt)
High / Low (7 pt)
Important / Unimportant (7 pt)
Likely / Unlikely (7 pt)
Relevant / Irrelevent (7 pt)
Safe / Risky (7 pt)
Satisfied /Dissatisfied (7 pt)
Significant / Insignificant (7 pt
Superior / Inferior (7 pt)
Trust / Distrust (7 pt)
Done
Local intranet

Figure D12 **Question Editor**

This is the screen where you can add or edit questions to your survey form. Please follow the following steps when you add or edit a question to the form.

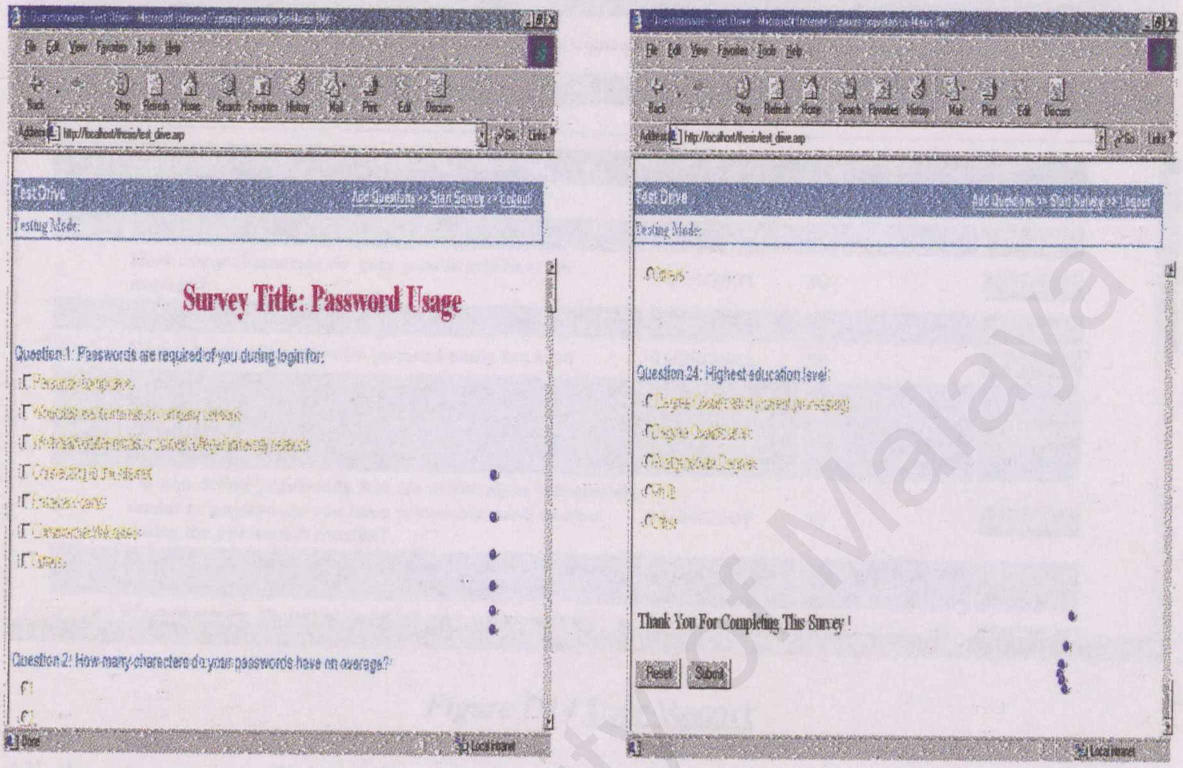
1. Enter your survey question into the text area which shown in the Figure D12.
2. Select the Type of Question for your question. E-Questionnaire support all standard HTML options such as radio button, check boxes, single selection, multiple selection, text boxes and text area.
3. Enter your question options. You have a choice of pre-built options on the right side of he screen. If you are using IE 4.0, you can simply click on any option and Java Script will fill the question options with your choice. You can always type in your own choices or edit existing ones.
4. Click the "Save Your Question" button at the bottom of the screen to save your question. You always have to click this button when you are done editing your questions. You must save the question in the database in order for it to be displayed on your form.

After saving your question you will be directed to the "Edit survey Question" (Figure D11) screen with your question added to the end of the list. Repeat the process until you are done entering your question to the survey form.

Please note that you can enter unlimited number of questions per form. But it is recommended not to add more than 50 questions per form. The reason is to avoid database performance problems at the time when your visitors (clients) answering your survey form.

Test Drive

After you are done with the questions, you can now test your newly created form by clicking the "Test Drive" option on the top navigation bar at Edit Survey Questions (Figure D11). After you have clicked the "Test Drive" option, the following screen will be displayed.



http://localhost/thesis/test_drive.asp

Test Drive

Add Questions >> Start Survey >> Logout

Testing Mode:

Survey Title: Password Usage

Question 1: Passwords are required of you during login for:

☐ Personal computers

☐ Workstations/terminals in company network

☐ [illegible]

☐ Connecting to the Internet

☐ E-mail accounts

☐ Commercial Websites

☐ Others

Question 2: How many characters do your passwords have on average?

○ 1

○ 2

○ Others

Question 24: Highest education level:

○ Degree Qualification (current processing)

○ Degree Qualification

○ Postgraduate Degree

○ Ph.D

○ Other

Thank You For Completing This Survey !

Reset Submit

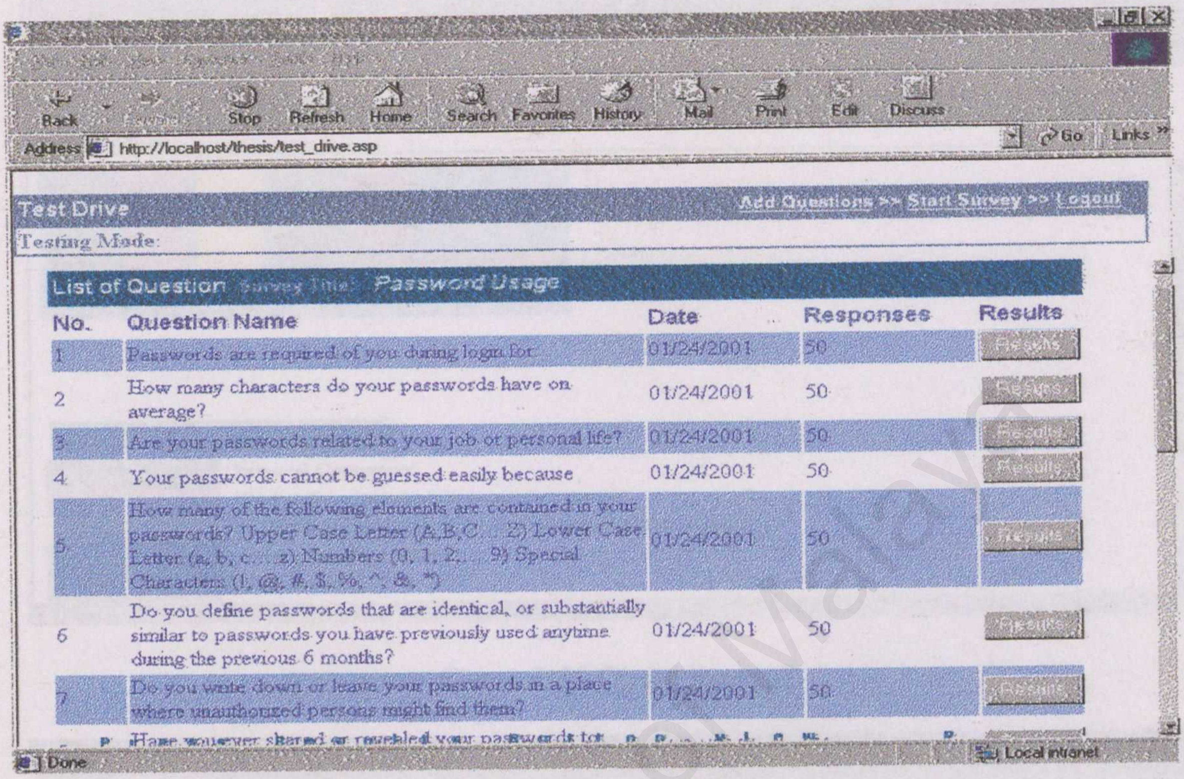
Figure D13 **Test Drive**

You are now ready to test your survey form. E-Questionnaire will render all the questions of your current survey form and create a fully functional online form for you. Fill out the form and press the " Submit" button.

Please note that all your test responses will be removed at the time when you publish the form on a live server. E-Questionnaire allows you to create the form and test it until you are satisfied with it.

User Report

After submission of your form, the following screen will be displayed.



http://localhost/thesis/test_drive.asp

Test Drive

Add Questions >> Start Survey >> Logout

Testing Mode:

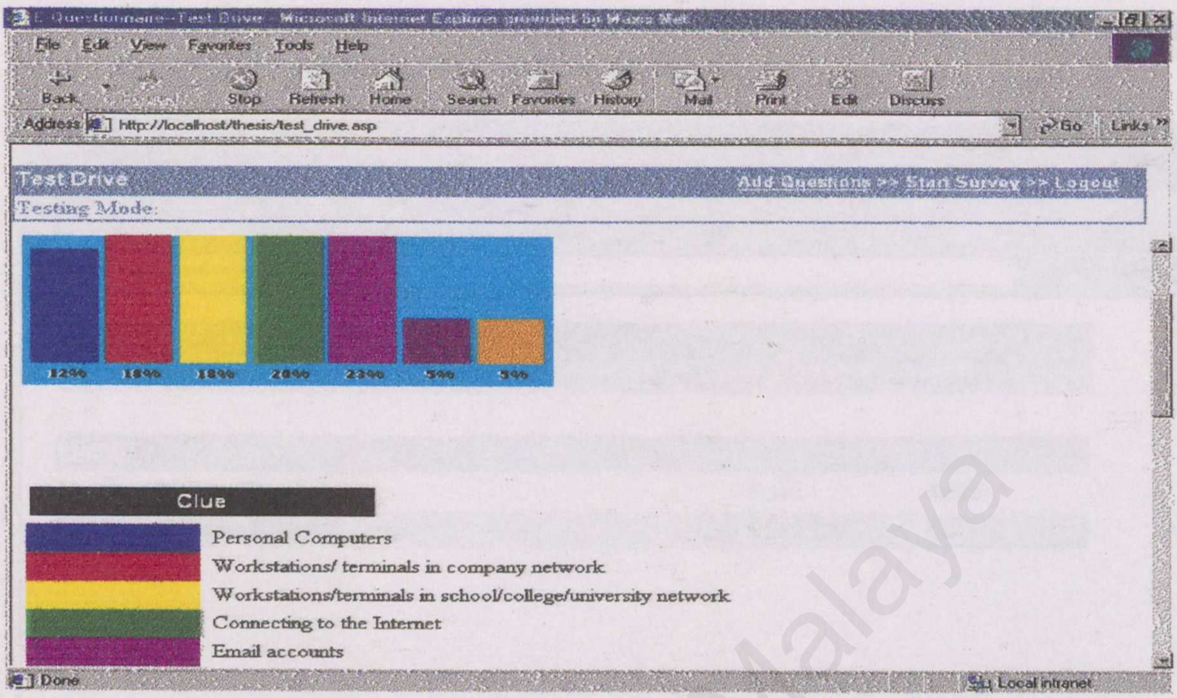
List of Question Survey Title: Password Usage

No.	Question Name	Date	Responses	Results
1	Passwords are required of you during login for	01/24/2001	50	Results
2	How many characters do your passwords have on average?	01/24/2001	50	Results
3	Are your passwords related to your job or personal life?	01/24/2001	50	Results
4	Your passwords cannot be guessed easily because	01/24/2001	50	Results
5	How many of the following elements are contained in your passwords? Upper Case Letter (A,B,C, ... Z) Lower Case Letter (a, b, c ... z) Numbers (0, 1, 2, ... 9) Special Characters (!, @, #, $, %, ^, &, *)	01/24/2001	50	Results
6	Do you define passwords that are identical, or substantially similar to passwords you have previously used anytime during the previous 6 months?	01/24/2001	50	Results
7	Do you write down or leave your passwords in a place where unauthorized persons might find them?	01/24/2001	50	Results
	Have you ever shared or revealed your passwords to			

Figure D14 **User Report**

All the responses will be collected into the database. Figure 14 shows you information about incoming responses from your participants. This report has five columns. "No" is the number of the questions. "Question Name" is the name of the survey questions. "Date" is the current date that the last respondent who answered the survey question. "Responses" is the number of respondents who answered the survey question. "Results" is the special area that you can view and analyze you results.

Chart Result


E Questionnaire - Test Drive - Microsoft Internet Explorer provided by Maxis Net
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://localhost/thesis/test_drive.asp
Go Links
Test Drive
Add Questions >> Start Survey >> Logout
Testing Mode:
12%
18%
18%
20%
23%
5%
5%
Clue
Done
Local intranet

🟦 Personal Computers

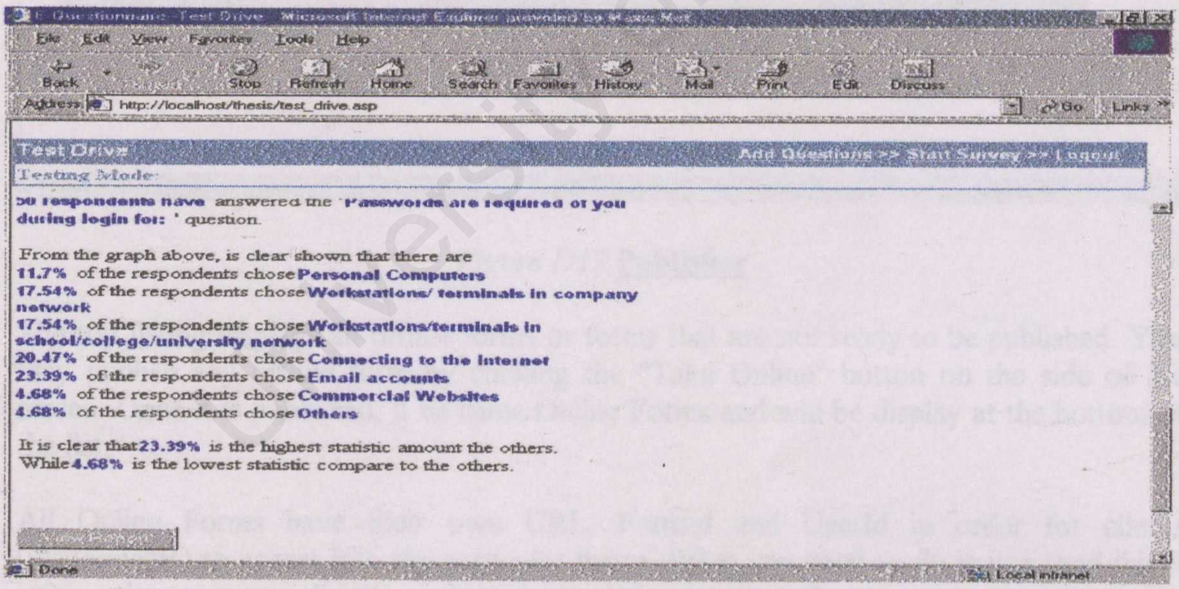
🟥 Workstations/ terminals in company network

🟨 Workstations/terminals in school/college/university network

🟩 Connecting to the Internet

🟪 Email accounts

Figure D15 **Chart Result I**


E Questionnaire - Test Drive - Microsoft Internet Explorer provided by Maxis Net
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://localhost/thesis/test_drive.asp
Go Links
Test Drive
Add Questions >> Start Survey >> Logout
Testing Mode:
View Report
Done
Local intranet

50 respondents have answered the 'Passwords are required of you during login for: ' question.

From the graph above, is clear shown that there are
11.7% of the respondents chose Personal Computers
17.54% of the respondents chose Workstations/ terminals in company network
17.54% of the respondents chose Workstations/terminals in school/college/university network
20.47% of the respondents chose Connecting to the Internet
23.39% of the respondents chose Email accounts
4.68% of the respondents chose Commercial Websites
4.68% of the respondents chose Others

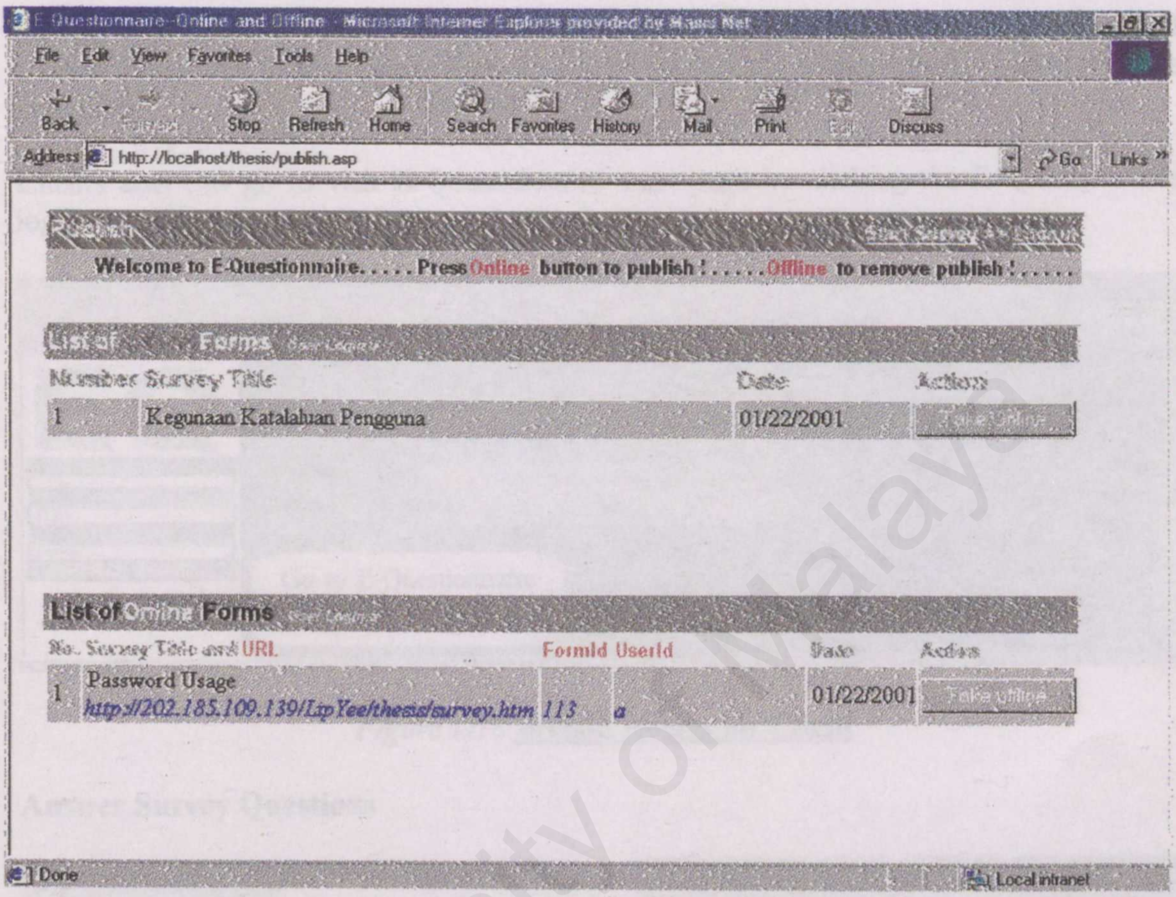
It is clear that23.39% is the highest statistic amount the others.
While4.68% is the lowest statistic compare to the others.

Figure D16 **Chart Result II**

Figure D15 and Figure D16 will be shown when the "Results" button has clicked. There are two types of format that analyzed the survey questions, graph and texts. Figure D15 displays the graph format and Figure D16 displays the texts format.

Publisher

This is the screen that you would need to use when you are done after creating of your survey and ready for publishing your form on the server.



http://localhost/thesis/publish.asp

Welcome to E-Questionnaire. . . . . Press Online button to publish ! . . . . . Offline to remove publish ! . . . . .

List of Forms

Number	Survey Title	Date	Action
1	Kegunaan Katalaluan Pengguna	01/22/2001	Take Online

List of Online Forms

No.	Survey Title and URL	FormId	UserId	Date	Action
1	Password Usage *http://202.185.109.139/LipYee/thesis/survey.htm*	*113*	*a*	01/22/2001	Take offline

Figure D17 **Publisher**

The top listing displays all offline forms or forms that are not ready to be published. You may publish any offline form by clicking the "Take Online" button on the side of the screen. Once it is published, it be came Online Forms and will be display at the bottom of the list.

All Online Forms have their own URL, FormId and UserId in order for clients (respondents) to access into the particular forms. What you need to do is just send this 3 information to your clients or the person that you want them to answer your survey forms. You can also take your survey forms offline by just clicking the "Take Offline" button on the bottom side of the screen.

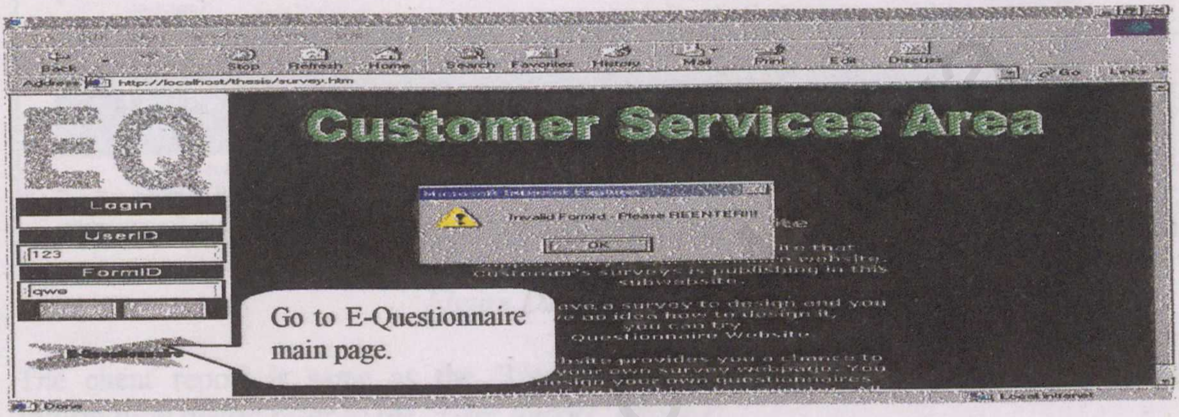
Please take note that after you have published your survey forms, all your test results will be removed.

Clients Section

The first thing clients have to do is to access into the E-Questionnaire System with the following URL *http://202.185.109.139/LipYee/thesis/survey.htm*

Clients need to have correct UserId and FormId in order to access into the system and answer the survey forms. Figure D18 shows the invalid client who tries to access into the system.

Clients also can go to visit E-Questionnaire main page by clicking the E-Questionnaire logo.



Address http://localhost/thesis/survey.htm

Customer Services Area

UserID: 123

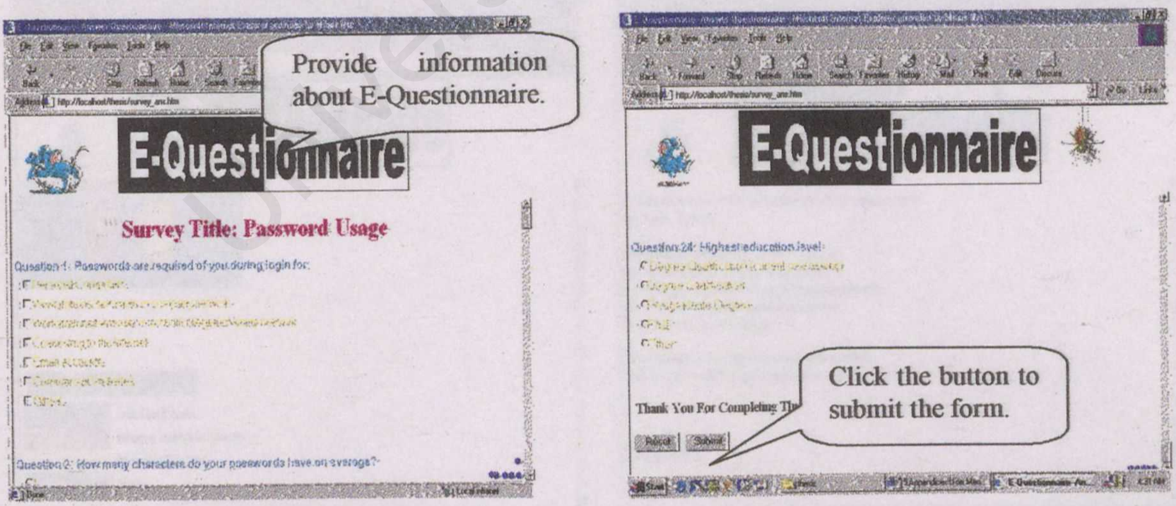
FormID: qwe

Invalid FormId - Please REENTER!!!

Go to E-Questionnaire main page.

Figure D18 **Invalid Access for Client**

Answer Survey Questions



Address http://localhost/thesis/survey_anc.htm

Survey Title: Password Usage

Question 1: Passwords are required of you during login for:

Question 2: How many characters do your passwords have on average?

Question 24: Highest education level:

Thank You For Completing Th

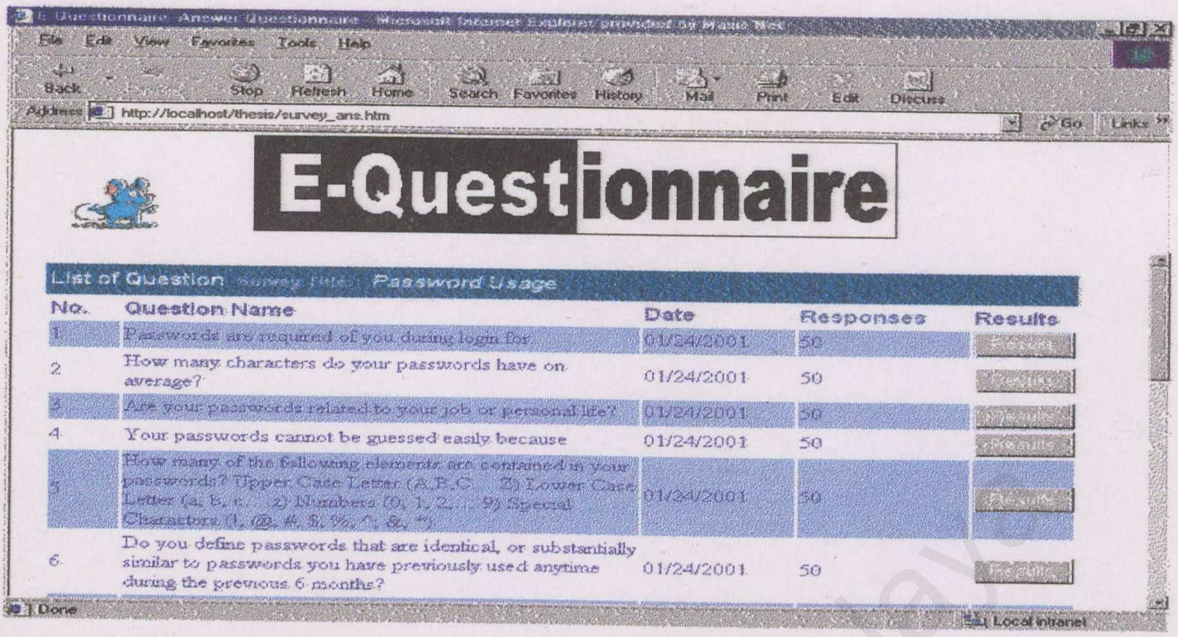
Provide information about E-Questionnaire.

Click the button to submit the form.

Figure D19 **Answer Survey Questions**

Figure D19 shows the successful login for a client. After filling the survey form, client has to click the "Submit" button to submit the form. After submitting the form, the following screen will be displayed.

Client Report



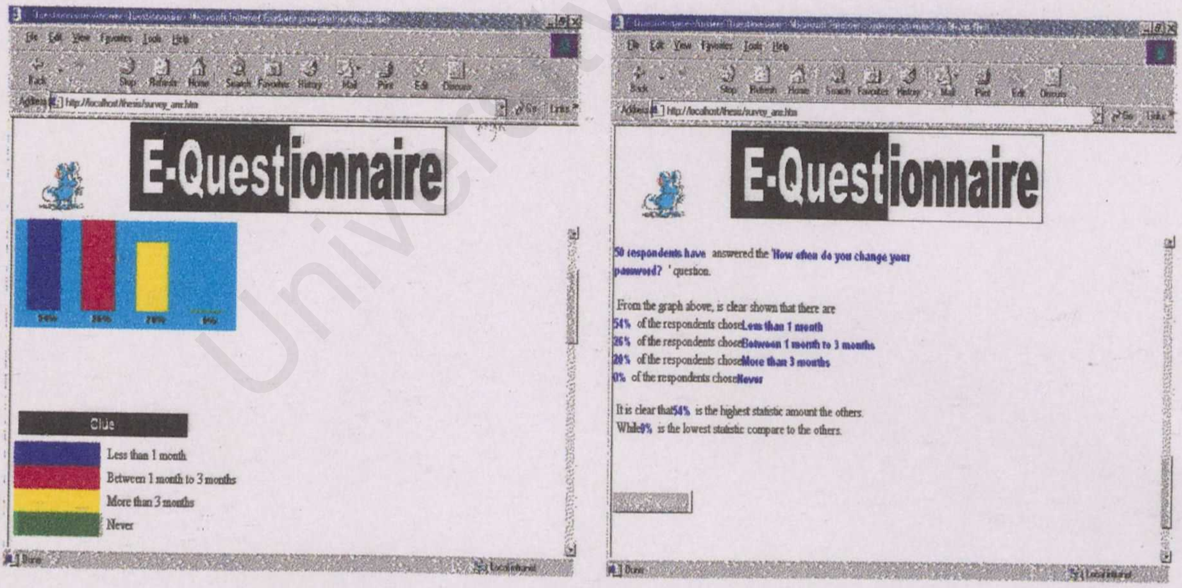
List of Question Survey Title: Password Usage

No.	Question Name	Date	Responses	Results
1	Passwords are required of you during login for	01/24/2001	50	Results
2	How many characters do your passwords have on average?	01/24/2001	50	Results
3	Are your passwords related to your job or personal life?	01/24/2001	50	Results
4	Your passwords cannot be guessed easily because	01/24/2001	50	Results
5	How many of the following elements are contained in your passwords? Upper Case Letter (A,B,C, ... Z) Lower Case Letter (a, b, c, ... z) Numbers (0, 1, 2, ... 9) Special Characters (!, @, #, $, %, ^, &, *)	01/24/2001	50	Results
6	Do you define passwords that are identical, or substantially similar to passwords you have previously used anytime during the previous 6 months?	01/24/2001	50	Results

Figure D20 **Client Report**

The client report is same as the "User Report" in the above section. *(For further information please refer to the "User Report" above.)*

Client Chart Result



50 respondents have answered the 'How often do you change your password? ' question.

From the graph above, is clear shown that there are
54% of the respondents choseLess than 1 month
26% of the respondents choseBetween 1 month to 3 months
20% of the respondents choseMore than 3 months
0% of the respondents choseNever

It is clear that54% is the highest statistic amount the others.
While0% is the lowest statistic compare to the others.

Figure D21 **Client Chart Result**

The client chart result is also same as the "Chart Result" in the above section. *(For further information please refer to the "Chart Result" above.)*