ANALYZING FUNCTIONALITIES FOR ONLINE QUESTIONNAIRE SYSTEM (OQS)

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ANALYZING FUNCTIONALITIES FOR ONLINE QUESTIONNAIRE SYSTEM (OQS)

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ABSTRACT

In these days, and after the rapid development of information systems make the researchers are looking an easy and automate way to analysis a data collection in a questionnaire that enables researchers to obtain the results quickly instead of using manual way. Questionnaires are used in a wide range of settings to gather information about the views and behavior of individuals to inform people about the specific issues. Feedbacks of the questionnaires are used by the researcher to find an accurate result with supporting of statistical analysis functionalities. In addition, there is a strong relationship between questionnaire and research, which is questionnaire the most important phase in research activities. Consequently, this project focuses on the development of the questionnaire system by focusing on the 'built-in' statistical analysis functionalities to facilitate and support the researcher's tasks. The Online Questionnaire System is developed in order to reduce loss of papers, time and effort. The general design methodology is represented by using Unify model language (UML). Moreover, the system has been tested based on usability and flexibility and evaluated by using questionnaires that answered by the students. A percentage of 55.2% percent and 44.8% percent answered useful and very useful respectively of the proposed model. As a conclusion it is found the respondents agree with use statistical analysis functions in Online Questionnaire website.

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وقل اعملوا فسيرى الله عملكم ورسوله والمؤمنون وستردون الى عالم الغيب والشهادة فينبئكم بما كنتم تعملون

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LIST OF ABBEREVIATIONS

Online Questionnaire System (OQS)

Statistical Package for Social Sciences (SPSS)

World Wide Web (WWW)

Java Server Pages (JSP)

Graphical User Interface (GUI)

computer-assisted data collection (CADAC)

Online Survey System (OSS)

Charge Coupled Device (CCD)

Survey Analysis System (SAS)

SQS (Shared Questionnaire System)

Online Survey Expert (OSE)

Extreme Programming (XP)

CHAPTER ONE
INTRODUCTION

1.1 Introduction

A questionnaire is a research instrument consisting of a series of questions and other prompts for the purpose of gathering information and opinions of the respondents (Chaudhuri, Ghosh, & Mukhopadhyay, 2009). Although they are often used for statistical analysis of the responses, the questionnaire system can be tool for research that contain many questions and functions in order to obtain statistical information from the respondents. Sir Francis Galton was recently invented the questionnaire in the first decade of the 20th century (Ito, Redda, Albuquerque, & Arruda de Campos, 2008). Questionnaire could also mean the method of collecting data for descriptive research by using a list of questions.

Questionnaire is one of the ways that are often used by the researcher to finish their research or to conduct a survey of expectations for future to assess the quality of many institutions such educational institutions (Kitagaki, Tomita, & Hikita, 2004). The researchers used questionnaire in many types of surveys because of cost-effective, easy to analyze, often have standardized answers that make it simple to compile data, this not require as much effort from the questioner, and most people aware of using the questionnaire. However, some standardized answers may frustrate the researcher. Therefore, questionnaires are severely limited by the fact that respondents must be able to read and understand the questions well and respond to them. Consequently, a survey by questionnaire for some demographic groups may not be practical (Mondal, 2010).

The questionnaire procedure is probably the best option for primary data collection. Especially in a situation where the population is too large to observe directly. This uses a set of questions. This method is suitable to obtain information which enables the analysis of a more easy. The online questionnaire is one of the most widely research tools used and widespread. It is intended to collect information from respondents (Sudman, Bradburn, & Schwarz, 1996). The use of online questionnaires increases rapidly. Since 1995, the online questionnaire is increased in the field of social and behavioral sciences (Birnbaum & Reips, 2005). Online questionnaires have many advantages like flexibility, locality, synchronism, representativeness, self-selection, and uncontrolled circulation (Batinic, 2001).

Collection of data through web pages, it is the best and most effective way to collect responses from the participants. By using Graphical User Interface (GUI) the data is transmitted from the participant to the questionnaire system. The participants will be notified by sending the questionnaire via e-mail. Therefore, this project contributes to the design and develop processes the online questionnaire system. This system enables the users (the researchers) to create an online questionnaire, and analyze the questionnaire easily. In addition, they can manage the questionnaire, respondent to the questionnaire, and present the result of the questionnaire.

1.2 Problem Statement

Current the online survey system establishes the questionnaire and distributes it to the largest number of participants. However, the resulting from the questionnaire is lack supported by the analyzing functionality. Analyzing functionality is refers to the statistics analysis tools, which can't of collection of methods that used to process large amounts of data and report. Additionally, the overall trends and the performance of each question are analyzed by using the equations of the statistics analysis. By using the statistics analysis tools, the researcher will be able to get the results of the research. Normally, the analyzing functionality is done manually or separate software applications such as the Statistical Package for Social Sciences (SPSS) software and Microsoft Excel, which is difficult to achieve the desired results. Therefore, online survey system that possible to provide analysis functionality is really useful and improves the implementation of the survey system. This project contributes to the development of the traditional questionnaire, and the processes that are applied are to analyze the questionnaire to be the online questionnaire system.

1.3 Research Questions

The main questions for this research are:

1. What are the components of Online Questionnaire System (OQS)?
2. What are the analysis functionalities required by the researcher?
3. How to design and develop the OQS?
4. How to evaluate the usefulness of the OQS?

1.4 Research Objective

The main objective of this research is to design and develop the Online Questionnaire System (OQS). In order to achieve is the followings objectives are required:

1. To identify the components of OQS.
2. To define the analysis functionalities required by the researcher.
3. To design and develop the prototype of the OQS.
4. To evaluate the usefulness of the OQS.

1.5 Research Scope

This research focuses on the designing and development of the OQS to facilitate and support the researcher's tasks. The system is used to reduce loss of papers, time and effort. The user of this system refers to any person who wants to establish a questionnaire and distributed to a group of participants, that mean the user and participant may refer to student or staff or researcher or others. The system is proposed, we used to collect and analyze data online. This system well invites the researchers who wish to conduct a questionnaire, and data collection and analysis. The results of the analysis will be presented in the system via the Internet. The system will analyze the questionnaire for descriptive research, therefore does not supported all researchers. This system depends on a Likert scale, which contains a range of answers where the participant has chosen the correct answer for them. This system covers some analysis functionalities, such as

frequencies, mean, median, mode, standard deviation, T-Test, statistics, reliability test and correlation.

1.6 Significance of the Research

The significance of this research is to support the researchers in easier way to develop the questionnaire and published in large numbers of respondents, as well as enables the researcher to collect these responses, and the possibility of data analysis without the needed the application software to perform the statistical analysis.

1.7 Summary

In this chapter, we described the background of the research, such as the survey system problem that need to be solved and was stated with the questions of research that was answered by the objectives of the research. The research scope and significance were also pointed and highlighted.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

A questionnaire is a list of questions designed to collect specific information. or can be defines it is a group of printed questions used to collect information from the people who answer them usually called respondents (Newsted, 1988). In the end, everyone agreed that the questionnaires are an inexpensive way to gather data from a potentially large number of respondents (Garelli, Bisconcin, Maso, Pucci, & Filocamo, 2000).

Questionnaire is used for research work by scientists and businesses among others. This is the only way to reach large number of reviewers to allow statistically analysis of the results (Dörnyei & Taguchi, 2010). It is important to remember that a questionnaire should be viewed as a multi-stage process beginning with definition of the aspects that should be studied and ending with interpretation of the results. Each step must be carefully designed, because the final results are only as good as the weakest link in the process of the questionnaire. Although the questionnaires may be cheap to manage compared with other methods of data collection, they are every bit as costly in terms of design time and interpretation (Williams, 2003).

The web is defined a highly programmable environment that allows mass customization throws the immediate deployment of a large and diverse of application to millions of global user (Conallen, 1999). The World Wide Web (WWW) has become a common communication for several different types of information. It's important for most people around world because they rely on this method to retrieve information which they need at times, as is the case using online survey to collect information about specific

topics. The web is growing quickly but actually it is chaos to large extent. This means that while the internet contains great define certainly be seen continuing value, for examples the scientific research output and web sites of supporting parties.

New surveys technologies are trying to test the feasibility and usability of using computer networks, particularly in the WWW. Also covered the review of computer-assisted survey techniques, and the comparisons among different survey methods (Chou, Chang, & Jiang, 2000). The advent of handy Internet building tools, online questionnaire are becoming a promising alternative to mail-based surveys and traditional paper to collect data and analysis for questionnaire (Singh, Taneja, & Mangalaraj, 2009).

2.2 WEB Application and JSP

A web application is a set of applications that can be accessed over the network, whether from the Internet or Intranet. This term may also mean the application of computer software that is hosted in an environment dominated by browser such as Java applet or controlled by using markup language browser (such as HTML or JavaScript), which rely on a web browser to execute this application. WEB application is created by Donald Knuth as the first implementation of what he called (literate programming), the idea that one could create software as works of literature, by embedding source code inside descriptive text, rather than the reverse (Ramsey & Marceau, 1991).

In recent years, web applications have become scattered around the world (Yang, Huang, Wang, & Chu, 1999), because the web applications are very popular, due to the spread of web browsers, and ease of use, speed of implementation and interaction with

the client. Web applications have the ability to update and maintenance without installed software and distributing on thousands of computer equipment. Web applications have large applications in our daily lives tend from the buying and selling operations to browsing and have many other functions. The qualities of web applications play a major role in its success. Use of the web application architecture with the development of a powerful platform not only make the network robust applications and high quality but also give the web application the ability to meet the changing needs and requirements of the customers (Prajapati & Dabhi, 2009). Communication provides a platform to facilitate services for a variety of clients regardless of their sites or software or hardware. This in turn can merge several systems and also joint work among heterogeneous applications.

The development of WWW at the moment. Established the WWW infrastructure for unified communications which enabled a wide range of applications, especially for customer support. As a result for a large increased in the development of web sites led to the need for standards Web-based specific measurements (Dhawan & Kumar, 2008). Since the static web application that represented by HTML was not sufficient to catch the speed of update data, led to the provision a dynamic web application. VBScript and JavaScript are used to provision a dynamic web application on the client side. CGI/Perl, PHP, ASP, JSP, multimedia and others are used to provide a dynamic web application on the server side (Jablonski, Petrov, Meiler, & Mayer, 2004).

Java environment provides a good infrastructure for the development of web services. In this project we need to design and develop OQS where implementation by using Java programming language. Java has a powerful feature of being platform independent programming language. Hence has the potential to provide a number of XML APIs, which can be used in the development of web applications (Dezhgosha & Angara, 2005). Java makes an ideal choice for programming web services applications. Because Java provides robust security features like symmetric and asymmetric for the key encryption techniques. Some tools such as GUI and to test data been merged with Web browsers to allow for testing data (Liu, Kung, Hsia, & Hsu, 2000). Java Server Pages (JSP) is one of the languages code that proved its existence and which occupies a great deal in the global WEB development domain, which are based on the principle of splitting JSP pages into parts for ease of control and to maintain data (Nakaike, Kondoh, Nakamura, Kitayama, & Hirose, 2004) , as shown in Figure 2.1.

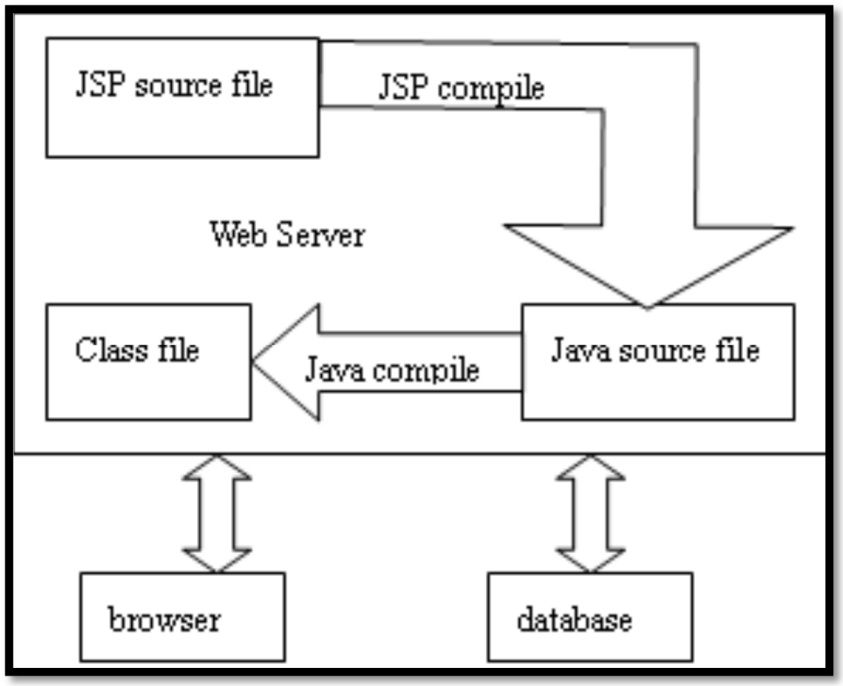

Figure 2. 1: Web server JSP (Nakaike, Kondoh, Nakamura, Kitayama, & Hirose, 2004).

2.3 Statistical Analysis

Statistical analysis refers to a collection of methods used to process large amounts of data and report (Cowan, 1998). It is particularly useful when deal with huge data and to provide appropriate reports to the conclusion of the information and data collected. Moreover, it is deals with the aspects of study, collect, analyze, interpret and organize data, including planning for data collection in the design of surveys and experiments (Dodge, Cox, & Commenges, 2006). Usually, the used of statistical analysis is to examine the huge amounts of data that are readily available in our daily lives (Mandel, 1984). This due to the need of statistical analysis, especially in the field of research that required providing reports on the results and testing results. Because of their impact in the future, some cases may require statistical analysis to evaluate the work or project.

Given the huge development in information technology, the statistical analysis needs to a huge data, and often require sometimes graphs, which need to time and considerable effort, especially that of people working them manually. It necessary to resort to the use the computer software that led to reduce the time and effort if compared with the use of manual (Afifi & Azen, 1979). At the present time, there is a wide range of software applications and services for statistical analysis. One of the software is SPSS that known as one of the best software that heavily used in the present day especially by the researchers. SPSS is a useful software package for questionnaire surveys because it is flexible and easy to use (Leech, Barrett, & Morgan, 2005). The SPSS software has proven its efficiency and accuracy of the findings, especially when used in the analysis of the results of the questionnaire on the topics and specific issues (Jinshan, Licheng, Zhongming, Chunyang, & Yin, 2010).

2.4 Questionnaires

In research field, the researcher collects information directly from participants. However, this tack is difficult to implement because of the number of participants is too large. Set of studies have proven that the best method to primary data collection is to use the online questionnaire system (Birnbaum & Reips, 2005). Questionnaires are frequently used in social research and quantitative marketing research. They are a valuable method for collecting a wide range of information from a large number of individuals that often referred to as respondents. For example, in some cases, the questionnaire is designed to assess the level of students' knowledge and expertise in a specific topic using a mobile phone application (de-Marcos et al, 2010). Then, the results is use to design the system which can offer a consultation environment that previously not available. Moreover, staff members can build questionnaires and allow pupils to complete the form anonymously and analyses the results in a collated form (Milne, Gibson, Gregor, & Keighren, 2003).

2.4.1 Types Questions in Questionnaire

Most of the participants want to know the purpose of the questionnaire, which will have a significant impact to the participants. The questionnaire would be more enthusiastic to provide adequate and clear responses if the results of the study are useful to them, and must a certain formula of questions those participants can be interpreted. This should be very clear and comprehensible wording and easily understandable for all educational levels (Kitchenham & Pfieeger, 2002). The questions in the questionnaire can be divided into open-ended questions and closed questions as follow:-

a. Open-ended questions are a set of questions that can be answer by participants, which are not subject to specific answers, but it is free to give their own response. It allows participants to give their own opinions, without compliance to the rules specified. Open-ended questions are useful for identifying a range of possible responses where no previous data exist. The main disadvantage of open-ended questions is that they take longer to complete, particularly for less articulate subjects, and may be they are left unanswered. It is also more difficult to code the responses for your analysis than closed questions (Williams, 2003).

b. Closed questions are quicker to complete and easier to analysis. Answers are predetermined and the participants have chosen the correct answer for them. Questions may contain a mixture of questions or statements that we can answer them (Yes - No) or depend on a Likert scale. In a Likert scale, contains a range of answers to measure agree or disagree about an issue. The responses may be given in the form of a (usually 5-point) scale, such as (Strongly Disagree, Disagree, Neutral, Agree, Strongly agree).

2.4.2 Survey Types

There are many of the types to the survey, the types most frequently used include interviews, telephone interviews, email surveys and internet surveys.

a. Interviewers: - Questionnaire administered by the researcher, which has a feature where you can clarify the issues are not clear from the questions of the

participants. There are some disadvantages such as some people may be unwilling to give up their time for interviews therefore reduce response rates (Bogen, 1996).

b. Telephone Interviews: - Usually conducted by telephone, response rates are very low because the participants tend to assume that the voice of the researcher is unfamiliar, therefore the call is disconnected before you even explain the purpose of your call (Chaudhuri, Ghosh, & Mukhopadhyay, 2009).

c. Email surveys: - email survey is a written questionnaire and sent through the mail to selected members of the participants to be surveyed. Earlier, email survey was a novel method and generated high response rates (Parker, 1992). In many comparative of studies email response rates, as shown in Table 2.1, the response rates of email surveys were lower than those of mail surveys and telephone surveys (Cho & Larose, 1999). Email surveys that garner high response rates tend to be done in organizational settings.

Table 2. 1: Response Rates of E-Mail and Mail Surveys (Cho & Larose, 1999).

Author(s) and Year	*E-Mail*	*Mail*
Bachman et al. (1996)	52.5	65.6
Hertz et al. (1996)	68.5	96.2[a]
Mehta and Sivadas (1995)	40.0 (without prenotice), 63.0 (with prenotice), 64.0 (with prenotice, an international survey)	64.0 (with prenotice, 45.0 (without prenotice), 83.0 (with prenotice)
Noh (1998)	31.4	
Opperman (1995)	48.8	
Parker (1992)	68.0	38.0
Parks and Floyd (1996)	33.3	
Tse (1998)	7.0	52.0
Tse et al. (1995)	6.0	27.0
Schaefer and Dillman (1998)	58.0	57.5
Schuldt and Totten (1994)	19.3	56.5
C. Smith (1997)	8.0 (without prenotice), 13.3 (with prenotice)	
Sproull (1986)	73.0	87.0[a]
Walsh et al. (1992)	76.0	
Zelwietro (1998)	38.0	36.0

d. Internet surveys: - An internet survey is a form of a written survey. Respondents may be invited to participate in the survey through a particular web pages or email.

Internet surveys is the best approach because it is easy administer, which the sample data can be a large number of participants and relatively low cost compared with the geographical area, whatever their defects, and the response rates are good (Williams, 2003). Emails can also be personalized for the respondents to achieve a relatively better response rate (Heerwegh, 2005).

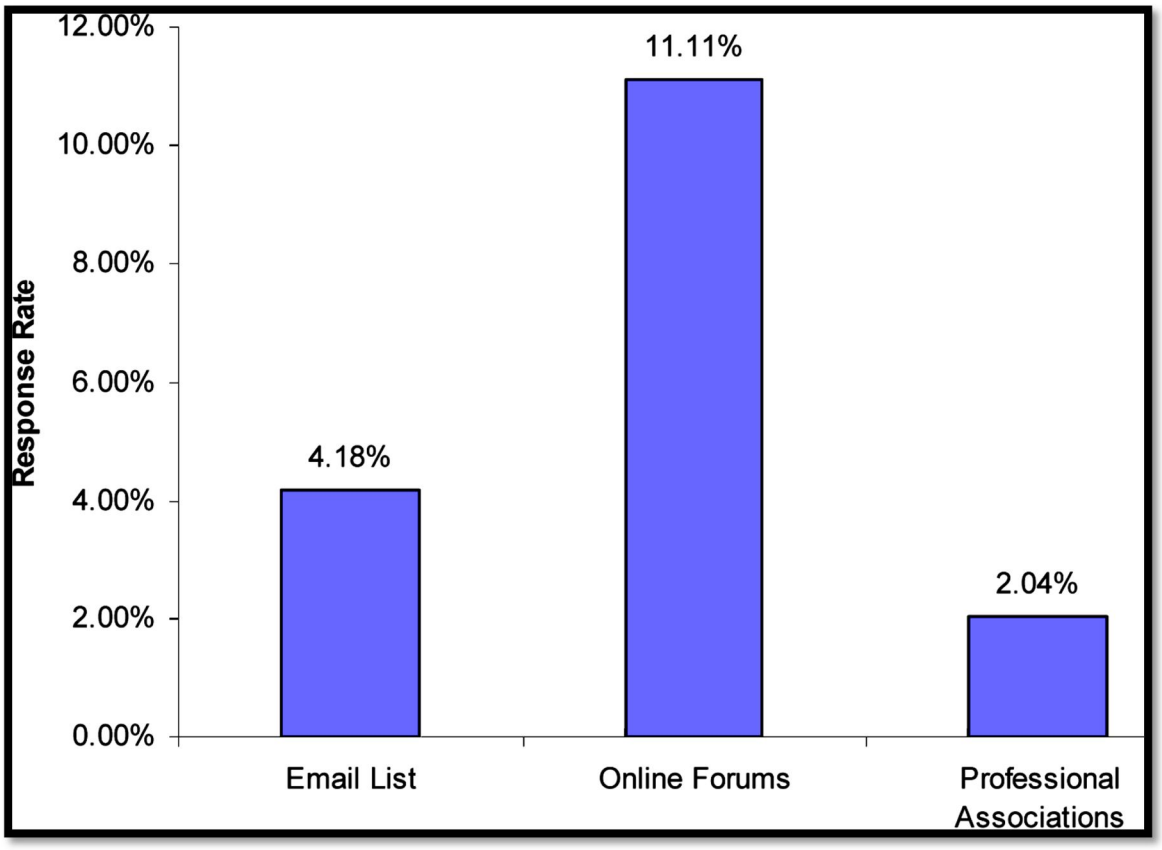

Figure 2. 2: Comparison of responses rate (Singh, Taneja, & Mangalaraj, 2009).

2.4.3 Advantages and Limitations Using the Online Surveys

Adequate questionnaire construction is critical to the success of a survey. Inappropriate questions, incorrect ordering of questions, incorrect scaling, or bad questionnaire format can make the survey valueless, as it may not accurately reflect the views and opinions of the participants (Singh, Taneja, & Mangalaraj, 2009). A useful method for checking a questionnaire and a sure it is accurately capturing the intended information is to pretest among a smaller subset of target respondents (Stieger & Reips, 2010). The advantages of computer-network surveys are:-

- **a.** The delivery of network surveys is usually faster than that of mail surveys (Oppermann, 1995).
- **b.** The cost of delivery is less than using regular mail and as especially if the presence system on the Internet (Anderson & Gansneder, 1995).
- **c.** Network surveys allow more flexibility for the respond of the user (Chou, 1997).
- **d.** Web surveys provide time if compared with the other surveys (Parker, 1992).
- **e.** It's the best surveys environmentally because the network does not use the paper or at least they use less paper (Saltzman, 1993).
- **f.** Web surveys provide a convenient way of communication between participants and researchers (Fisher, Margolis, & Resnick, 1996).

However, there are many limitations of online surveys, such as the researcher must know who wants to passes the questionnaire must be able to access the internet. Furthermore, the computer browser may load the information study and crash the system. The respondents to the questionnaire may lack the internet experience that can affect

negatively and threats of all responses (Evans & Mathur, 2005). In addition, Respondents may have difficulty in reading or writing of the questionnaire that are poorly designed, this leads to incomplete analysis in the perfect way (Granello & Wheaton, 2004). In addition, there is cost of time to download and open e-mail and effort to establish and maintain an Internet connection (Cho & Larose, 1999).

2.4.4 Effects on the construction of the questionnaire

To build a suitable online questionnaire must identify the means desired by the researcher and the respondent. The questionnaire is divided into different sections and assembles them into an attractive, easy-to-use interface that encourages response and continuity of contact the respondents (Bhaskaran & LeClaire, 2010). Irritated in of participants may be raised if exist grammatical mistakes, options is inaccurate, choice of colors is inappropriate and the questions are not clear (Fey, 1992). The online questionnaires could be the poorest response rates if the use of questionnaires mode instead of questionnaires colors and simple designs (Dillman, Tortora, Conradt, & Bowker, 1998). Several online surveys are unattractive, that prevent the participants to answer properly (Singh, Taneja, & Mangalaraj, 2009), and some studies have shown that the selection of the appropriate color of the questionnaire can increase response rates to the questionnaire (Etter, Cucherat, & Perneger, 2002).

It is not easy to design a suitable questionnaire, especially with the rapid development of systems and applications. A questionnaire design greatly depends on the knowledge and previous experience of the design (Dong-Xiao, Changyong, Wen-En, Ya-Di, Xin, & Wei, 2008). The researcher must focus specifically on the length of answers to

open-ended questions included in the questionnaire. Therefore, to determine the importance of the answers, will be have much more influence on the length of answers to open-ended questions (Denscombe, 2008). The questions may be either open-ended, respondents are required to answer in their own words, or closed questions (multiple-choices), respondents are required to select one or more answers provided. The respondents may provide with checklists or rating scales (Kimura, Akiyoshi, Komoda, & Oiso, 2006). The questions is concerned with the respondents' personal background, factual knowledge, attitudes or opinions, therefore the method of closed questions the best methods used in the online questionnaire (Morton & Carey-Smith, 1995).

2.5 Online Questionnaire

The online questionnaire is one of the most used widely research tools for collect information from respondents (Sudman, Bradburn, & Schwarz, 1996). Since 1995, the use of online questionnaires is increased rapidly, expertly in the field of social and behavioral sciences (Birnbaum & Reips, 2005). Online questionnaires have many advantages such as flexibility, locality, synchronism, representativeness, self-selection, and uncontrolled circulation (Batinic, 2001). Furthermore, using script languages to gather data that are already built in web browsers is inconspicuous. Most users do not realize that data are being collected only. Thus, there are not motivations to monitor the behavior of participants (Stieger & Reips, 2010). Collection of data through web pages, it is the best and most effective way to collect responses from the participants. By using GUI the data transmitted from the participant to database of the questionnaire system, the participants will be notified by sending the website of a questionnaire to e-mail.

2.5.1 Related Work

The advancement of tools for building the Internet, online surveys have become a promising alternative to traditional paper-and mail-based surveys to collect data for the survey research (Buchanan & Smith, 1999). Many studies have focused on comparing online surveys from the shape, color, and design and neglected the methods of collection and analysis data. A surveys process is usually complex, expensive and time consuming to complete. One problem is that the data collected through paper forms usually contain many errors. The rapid developments in information technology in recent decades have enabled users to make computer-assisted questionnaire (Bethlehem & Hundepool, 2002). A computer program has a set of questions that enable the computer to take control the process of conducting the survey.

The computers are used to conduct a survey research of social science in many ways. The construction of questionnaire questions, will researchers to collect data and perform analysis. According to Saris (1991), the use of computers in survey known as distribution computer-assisted data collection (CADAC), was helped researchers skip the coding, printing, data entry and mailing. CADAC has allowed the technology of computer networks equipped itself with powerful communication capabilities that provide additional channels for the distribution of the survey. Network-Computer surveys can be used in two ways. First is to supplement other methods such as phone surveys, mail surveys, and fax surveys. The same questionnaires are distributed by networks, regular mail or phone. Regardless of the method used, target respondents are free to choose their own reply methods (Schuldt & Totten, 1994). Second is to use the network as a means for the distribution of questionnaires, which is no need for researchers to make phone calls or

provide paper questionnaires to the participants. The goal is to ensure the arrival of the questionnaire to all participants through the use of computer networks (Anderson & Gansneder, 1995). The main reason for the increase in online surveys largely to reduce cost if compared with the other surveys (Dillman, Bowker, Tortora, & Conradt, 1998).

Applications of the survey on the Internet help researchers to create online questionnaires, data collection, and analysis of the results easily. Questionnaire is the best method and a very common method for the survey. Online questionnaire is more popular because of the fast and efficiency in data collection. However, to create online questionnaire requires lot of knowledge about programming and database. Although web-based have many online survey systems such as Question Pro (QuestionPro, 2010), Survey Galaxy (SurveyGalaxy, 2002), and Survey Shack (SurveyShark, 1998), their operations are not valid for using in terms of flexibility and functionality. Survey software such as Survey Select Expert (SurveySelectExpert, 1996) and Snap Professional (SnapProfessional, 1981) is an alternative, but their prices are extremely high. Therefore, the process of development online questionnaire survey is desirable, easily use and cost effective (Zhao & Luo, 2005). According to website Online Survey System (OnlineSurvey, 2007), the OSS has been developed to support RTOs to collect survey responses online, and export the data for analysis and reporting.

Online questionnaire seemed to emerge in mobile phones, which aimed to improve the content service, and the questionnaire consists of open-ended and closed questions (multiple-choices) that appear on the screen of their mobile phones. Multiple-choices questions not face any difficulty with using statistical analysis, where the questionnaire

asks participants to choose the correct answer from a limited set of answers. In open-ended questions, there was a problem in dealing with open opinions which subsequently classified to the typical opinions (Yamanishi & Li, 2002). According to Väätäjä and Roto (2010), which assumes that the questionnaires by the mobile phone provides an alternative to the sampling and the answers to the participants, where it is easy to use and available in the hands of everyone at all times and therefore will achieve quality, accuracy, speed in implementation and collection data. But they neglected the data analysis, and assumed the transfer of the collected data to one applications of the computer for analysis.

Figure 2. 3: Use Questionnaire in mobile phone (Väätäjä & Roto, 2010).

In some studies focused on the dissemination of the questionnaire by using the cellular phone via mobile network. According to Domoto et al (2010). It possible to establish communication between the students by using a questionnaire. This leads to promotion of the educational activity by comparing the result with the result of the

analysis. According to Kimura et al (2006) called the reason is the fact that not all the opinions of the participants are clear or useful and usually to interpret and analyze the personal opinions is difficult as shown in the Figure 2.4.

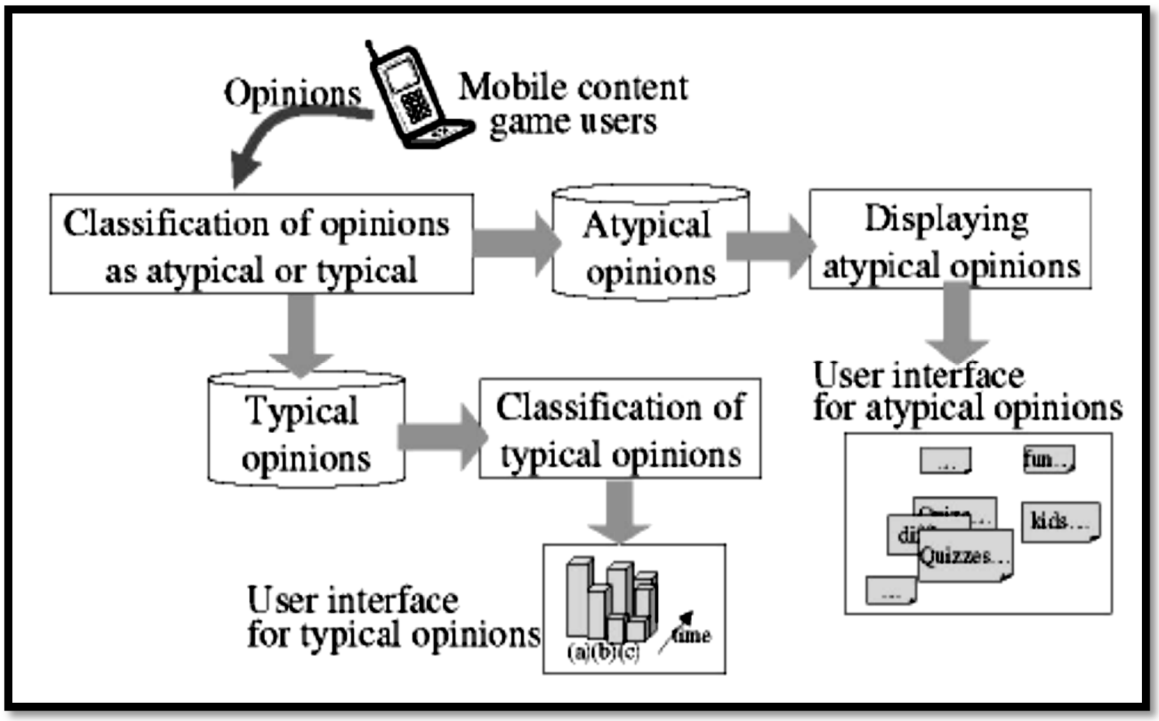

Figure 2. 4: Questionnaire analysis support (Kimura, Akiyoshi, & Komoda, 2006).

Along with the tremendous progress in the capabilities of the computer and because the number of questionnaires is usually very large, therefore data collection process is difficult and takes considerable time. Some of studies have developed a range of service applications that help in data collection and analysis shortly (Pu, Chang, & Lee, 2009). One of these applications is Charge Coupled Device (CCD), CCD is scan of the questionnaire and the introduction of the answers as information to the computer, and then a proper analysis, but lacked the common mistakes of the scan in process.

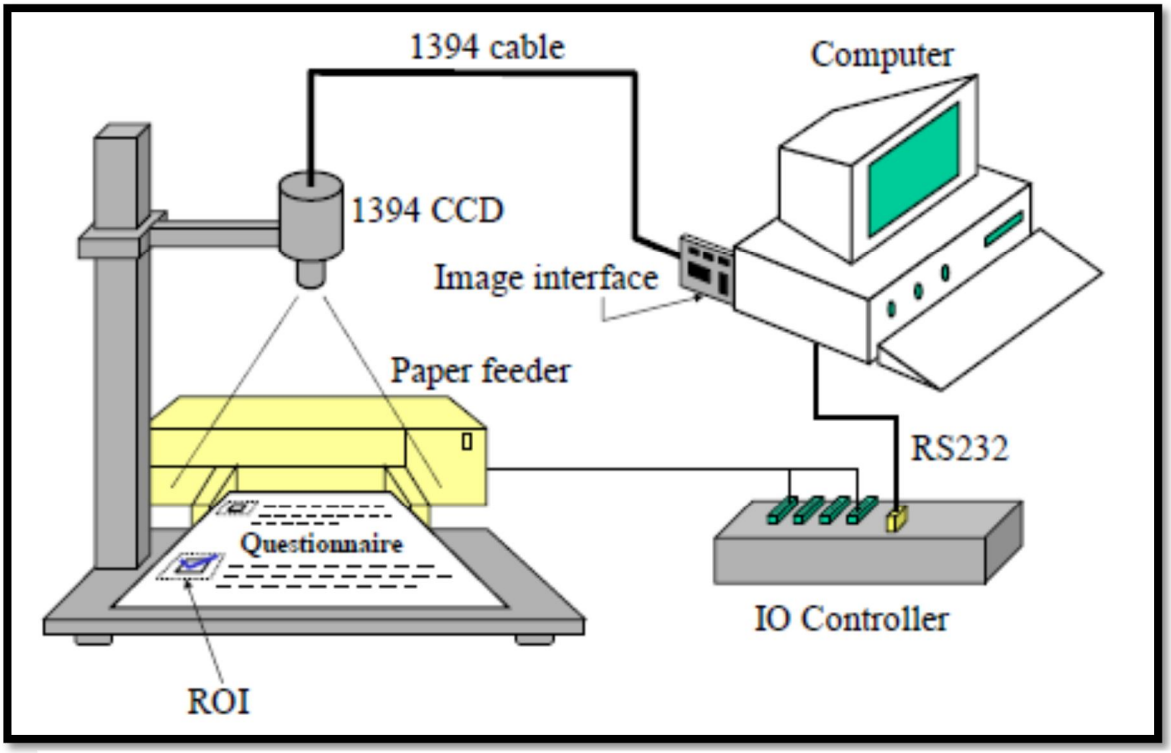

Figure 2. 5: The schematic diagram of the developing automatic questionnaire input system (Pu, Chang, & Lee, 2009).

According to Wang et al (2001), the data analysis by using SAS/WEBEIS application. SAS/WEBEIS is dealing with point-and-click GUI environment that allows for the user to perform descriptive data analysis. This application allows the user to dealing with computational analysis tools such as mean, frequency, and median, and shown as a graphical presentation such as line graphs, organization charts, bar, pie, and data plots. Therefor the results of the analysis appear as the form of graphs.

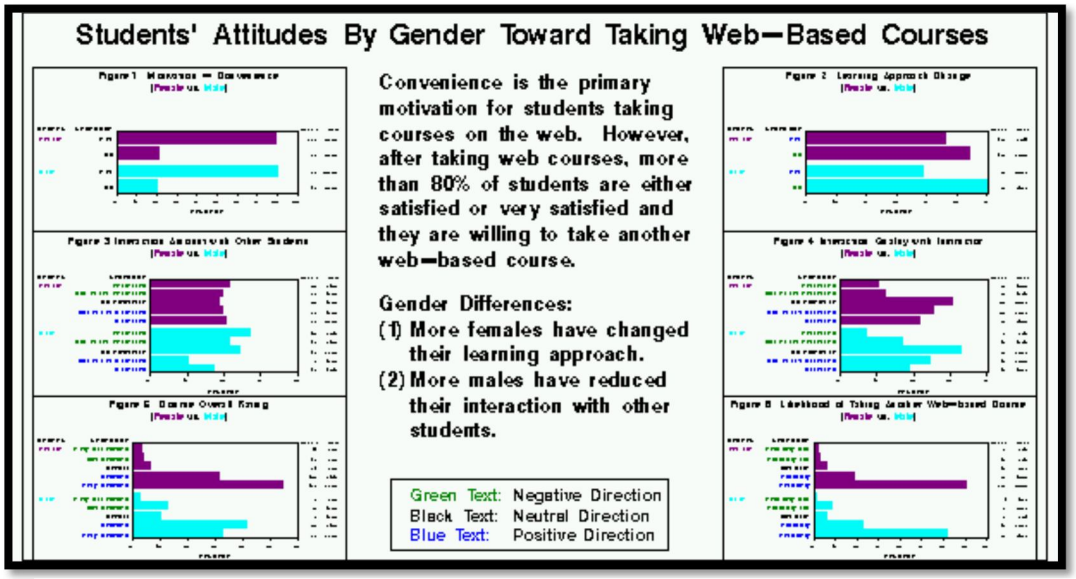

Figure 2. 6: The Data Analysis by graphical presentations (Wang, Dziuban, & Hartman, 2001).

According to Kubo et al (2004), where developed a set of web applications called SQS (Shared Questionnaire System) based on XML technologies. This application focused on analysis and generates visual report with graphs, charts and tables via web interface.

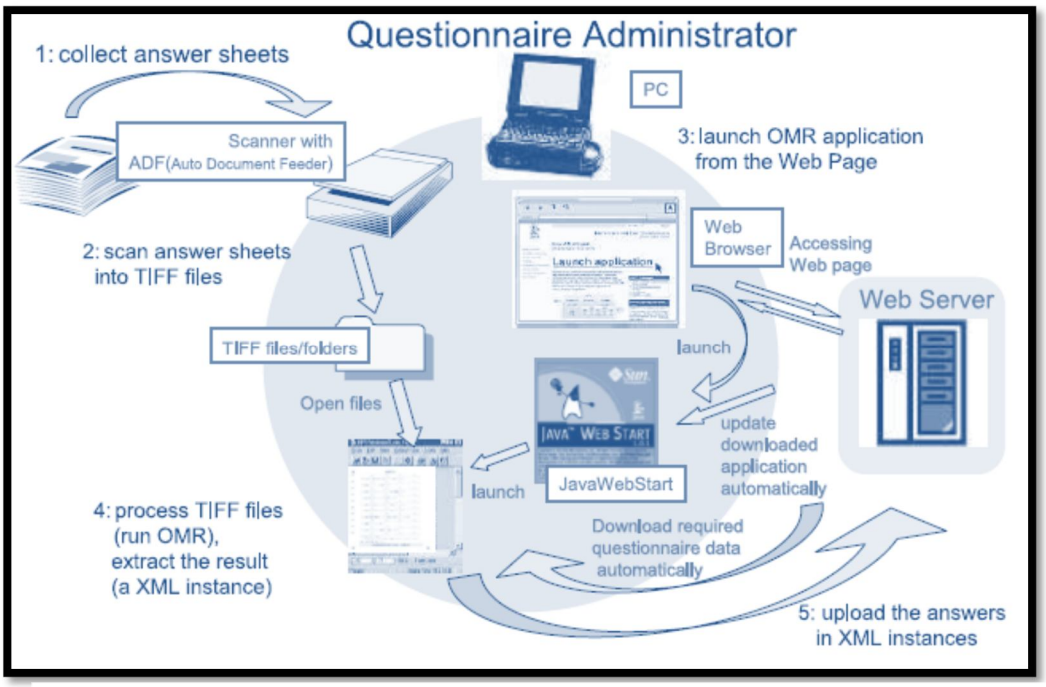

Figure 2. 7: SQS Processor (Kubo, Ohashi, Tamamura, Kowata, & Kaneko, 2004).

Early 1996, started to take advantage of database-backed Web technology, which led to the interaction between the user and website, especially on the Internet (Dennis & Gambhir, 2000). Some examples of Web-based surveys include: student applications, personnel performance reviews, employee/employer satisfaction questionnaires, patient information forms, product order forms, product registrations, etc. The capability to interactive through a set of questions contingent upon each respondent's replies.

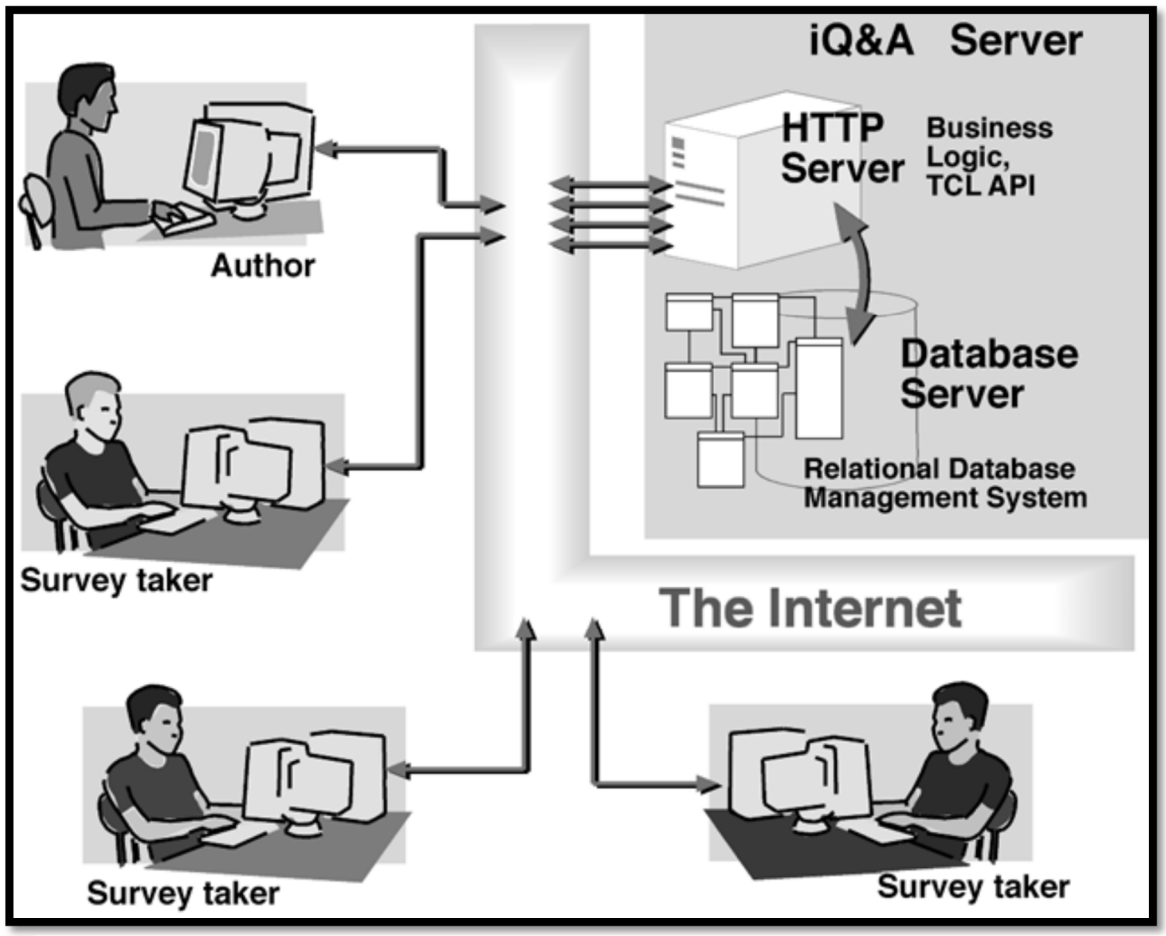

Figure 2. 8: The relationship between researchers and participants by http server and database server in online questionnaire (Dennis & Gambhir, 2000).

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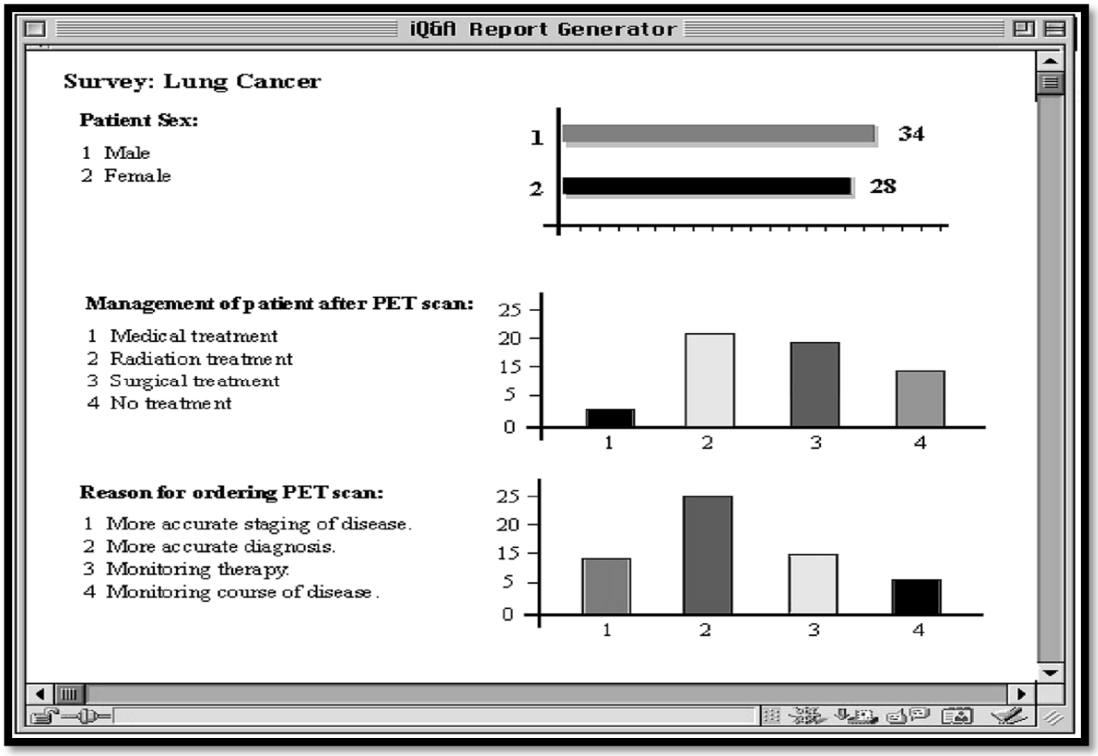

Figure 2. 9: Using representation (bar chart, line graphs, etc.) to analysis in online questionnaire (Dennis & Gambhir, 2000).

Some of the systems, may not perform editing operations questionnaire, and dissemination of the questionnaire, data collection and analysis in the local machine, therefore it will need to link with the Web server and database server to enable dissemination and collection of data (Zhao & Luo, 2005), such as that have been implemented in the Online Survey Expert (OSE) system.

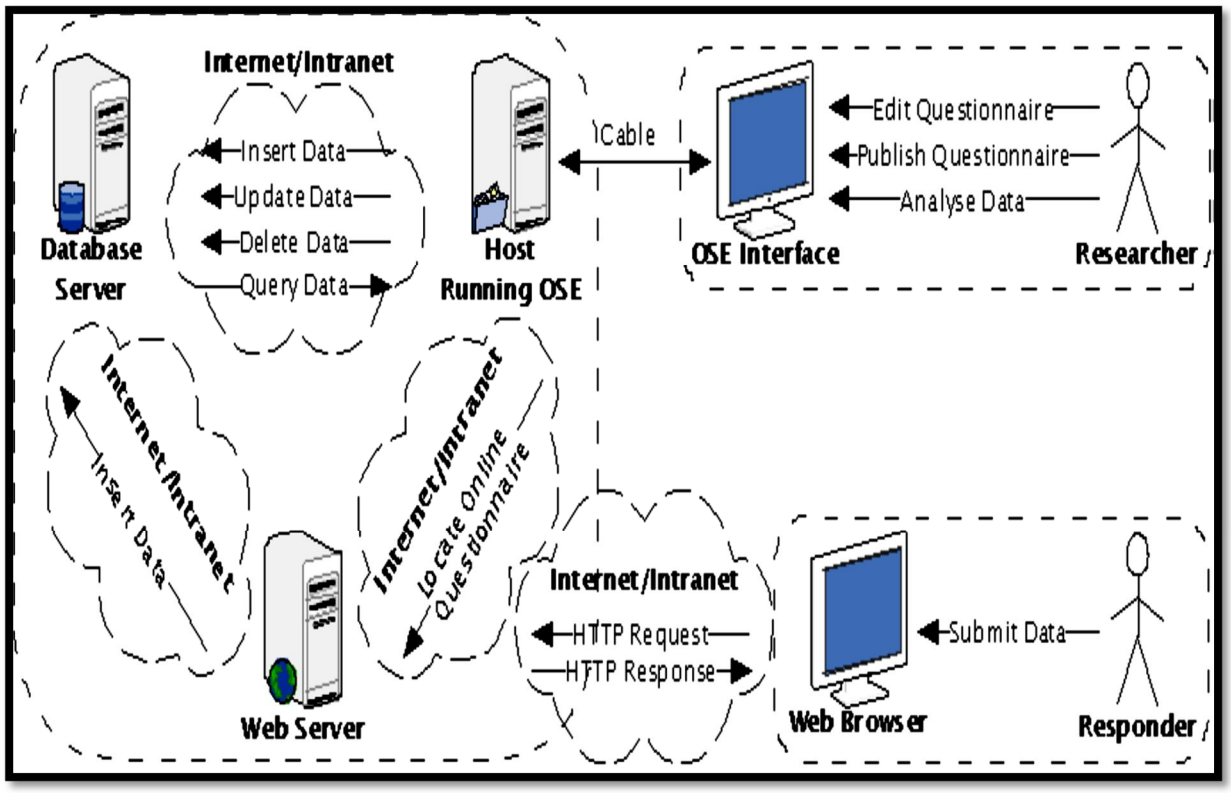

Figure 2. 10: OSE Operational Model (Zhao & Luo, 2005).

2.6 Summary

In this chapter, we dealt in particular about literature review that having to do with online surveys. Also explain the type's survey and type questions that used in the survey. Further, this chapter reviewed some methods and web sites that use analysis with the questionnaire.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

Research methods reflect the methods and techniques used by a researcher at the various stages of research. The research methodology suggested in this study is the general Research Design Methodology (Vaishnavi & Kuechler, 2008). The design project methodology or sometimes called "Improvement Research" contained the major phases as shown in Figure 3.1 that consists of five phases namely: Awareness of a problem, Suggestion, Development, Evaluation and Conclusion. Therefore, an appropriate questionnaire system needs is developed to facilitate the analysis functionalities of the questionnaires.

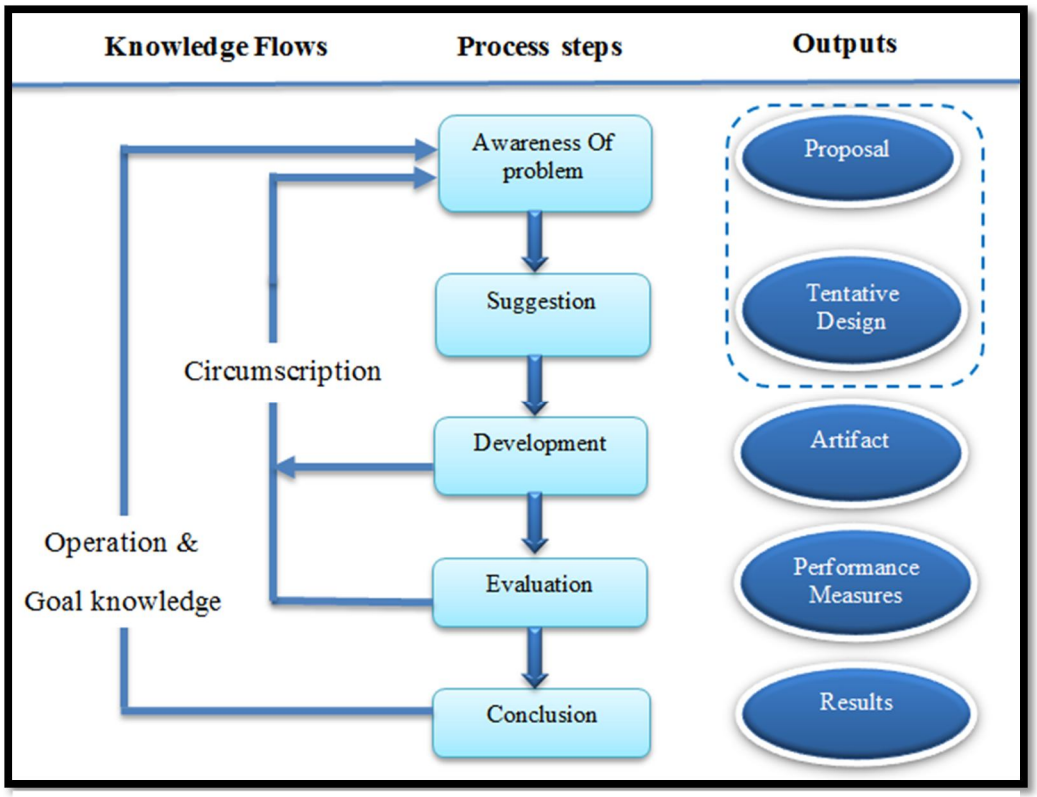

Figure 3. 1: General Methodology for Design Research (GMDR) (Vaishnavi & Kuechler, 2008).

3.2 Awareness of problem

The first stage of this methodology is to recognize the requirements of the prototype. This stage is concerned with the understanding of the objectives and the scope of the problem which arises when the researcher needs to use the best way possible to create the questionnaire and collection and analysis of information which do not require the effort and cost and time compared with other means. Could be done literature survey from the available sources such as books, journals and reports in order to collect the relevant information.

3.3 Suggestion

The project suggests improve method for online questionnaire system by suggestion the analysis functionality. This method is used to collect a response for a questionnaire, through the use of web site and conduct a proper analysis of the information. The design of the questionnaire is through a program written by JSP programming language. This suggestion proposed based on literature review that have been done in the previous phase. The analysis and design of the system is use object-oriented approach and supported by the UML diagrams. The UML diagrams used in design the OQS such as use case diagrams, detailed sequence diagrams for each use case, and class diagrams, as shown in Figure 3.2.

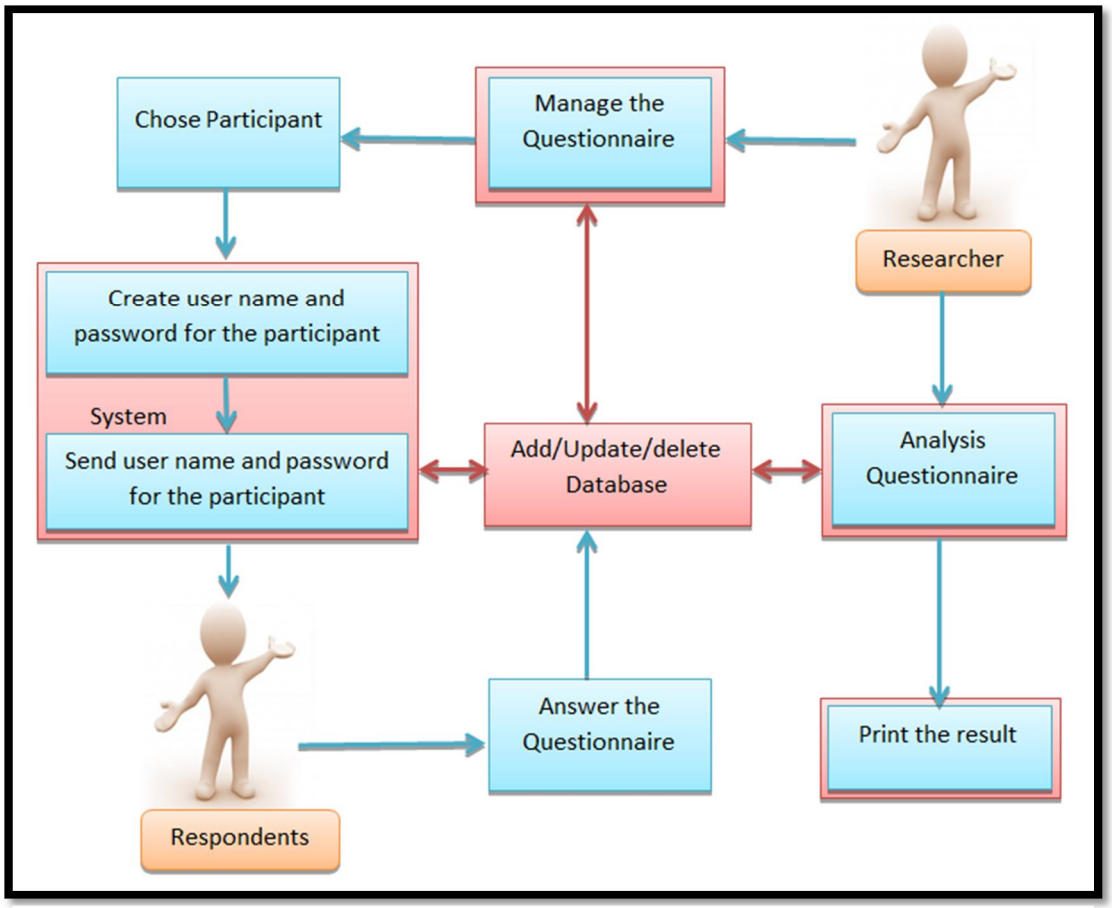

Figure 3. 2: Tentative design processes for the OQS.

3.4 Development

The prototype of the OQS will be developed. Prototyping is a technique that involves developing a small-scaling working model of a system or sub-system (Whitten, Bentley, & Dittman, 1998). It uses prototyping approach as its method. The OQS system will be developed by using a Java application programs (JCreator) and MySQL Community Server. The work of JCreator with MySQL has provided two new techniques, and using both techniques will be important for programmers. Those techniques use (language integrated query) with JSP (Java Server Pages). The first technique provides the ability to write queries directly within the code JSP which can be write inside JCreator program.

The second technique provides model objects which are powerful, has new features and tools to make the databases freer. Table 3.1, illustrates requirements necessary software and server used in OQS. By interacting with the prototype, users can get a better idea of their information requirements. The application approved by the users can be used as a template to create the final system.

Table 3. 1: Tools used in developing the OQS system.

Prototype Development Environment	
Program language	**JSP**
Server	**Pentium IV**
Database	**MySQL v. 6.0.11**
Operating System	**Windows 7 Home Premium**
Service programs	**Navicat Premium for MySQL**
Service programs	**Apache HTTP Server 6.0.26**
Service programs	**Macromedia Dreamweaver v.8**

The development phase contains five main steps which were adopted from Beck and Andres (2004): Planning Phase, Analysis Phase, Design Phase, Develop prototype Phase and Usability Testing. Where we will adopt in the development methodology on the method used in research Extreme Programming (XP). XP focused and disciplined approach to application development. It is designed to deliver our application for customers when needed and brings customer satisfaction. XP improves our development

projects in four main ways that contains in its content simplicity, communication, feedback, and courage. Thus we can say that XP includes welcomes changes, at any stage of the development life cycle (Martin, 2003).

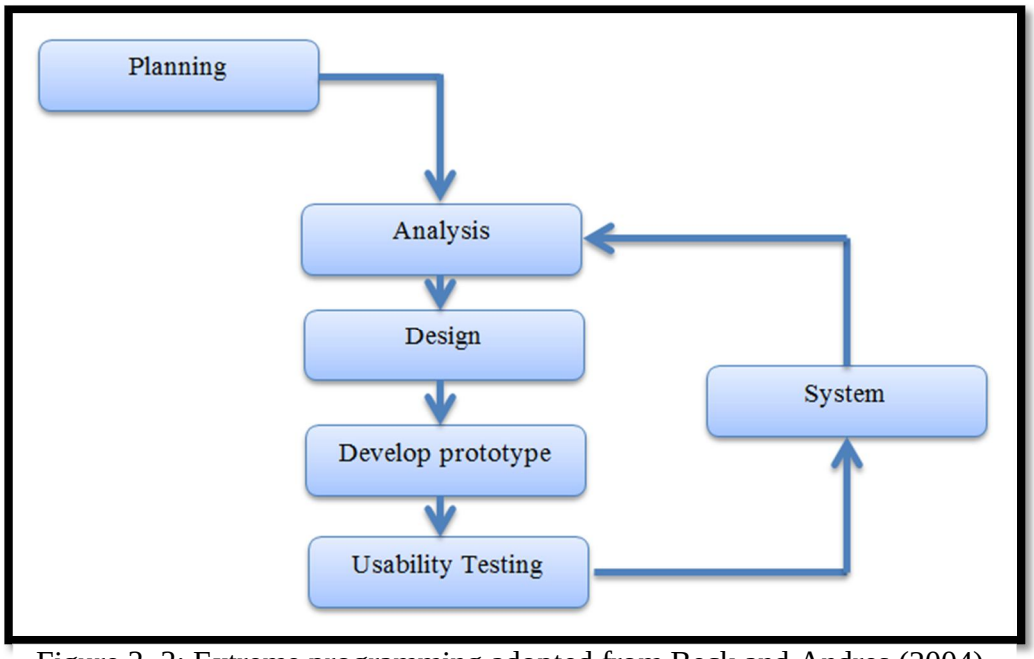

Figure 3. 3: Extreme programming adopted from Beck and Andres (2004).

3.4.1 Planning

According to Rubin and Chisnell (2011), this step depends on the collection of information about the current system. The purpose is to understand the system and measure its impact in the future. This understanding must include all the technical details and users' feedback to produce system in easy way and meet the needs of the community.

3.4.2 Analysis

At this phase, will be answer the following questions.

- Who will use the system?
- Where will be used?

- What are the steps that must followed in the implementation of this system?

Thus, after answering these questions, you will be checked of the current system and give an opportunity to improve in the future with the development of information technology. Details the analysis phase is presented in chapter four.

3.4.3 Design

At this phase, will be decide how the system will be implemented, and to identify the necessary tools that will be used in the implementation of the system, such as software, hardware, network infrastructure, the user interface, forms and reports. In addition to databases and all files that will be needed in implementation this system. Details the design phase is presented in chapter four.

3.4.4 Develop Prototype

The final phase in the XP life cycle is develop prototype, this phase usually gets the most attention, because during this phase will be building the actual system. Details the develop prototype phase is presented in chapter four. The step on this phase as follows:-

1. Designing

- Simplicity.
- Clear.
- Design attractive interface for the system.

2. Coding

- Expect all exceptions that facing the system.
- The ability to update.
- Writing code in a simple and easy to enable the other programmers to understand.

3. Testing

- All code must be tests.
- Make the necessary adjustments after the testing process.

3.4.5 Usability testing

Usability testing is a method that used to evaluate the system by testing it on users. It phase must be conducted peacefully, because it gives indication about how the user can use the system (Nielsen, 1993), and some methods to evaluate their ability to interact with users.

In order to meet the objective, examination is conducted on the prototype. From there, we choose some of the users at random to measure the interactive system with the user, where we will use a simple scenario, from the interaction of users with system, we can measure the effectiveness, efficiency and user satisfaction.

3.5 Evaluation

Evaluation is performed to ensure the OQS system is working correctly and efficiently. The OQS prototype will be evaluated for its usability aspects. The method to measure users' satisfaction will be applied. The system will be evaluated by using questionnaires answered by researchers who decide to use this system in future. The

results checked by collecting the questionnaires and analyze them using the SPSS software. To get clear performance, measurement of usability will be tested as long as the usability can serve as a link between the users' capabilities and requirements and the application. Details the evaluation phase is presented in chapter six.

3.6 Conclusion

This phase is the final pace in the research effort. The results will be consolidated and led to the future works that may unify with this application to implement the overall in prototype. The goal of this research is to design and develop the Online Questionnaire System (OQS).

3.7 Summary

This chapter shows the five phases in research design methodology suggested in this study. The researcher used this methodology to improve and test the prototype.

CHAPTER FOUR
ANALYSIS AND DESIGN

4.1 Introduction

The objective of this chapter is to highlight the system functionality, which identifies and gives a brief description for the functional requirements and the non-functional requirements for OQS, after that we clarify the UML diagrams that will present use case diagram, class diagram and sequence diagram.

The next section of this chapter will focus on the implementation and testing of the system by defining the use case and the quality and interactive system with the user (researcher and respondent). The end of this chapter will provide the conclusion in order to determine the purpose of this system.

4.2 System Requirements

A requirement is a statement of what the system must do or what characteristic it must have. Requirements in analysis part are written from the user and focus on what of the system. Requirement has two types: the functional requirement and the nonfunctional requirement.

4.2.1 Functional Requirements

There are several functional requirements to the proposed system. The aim of the functional requirements to capture the expected behavior of the system. The system will deal with many researchers, who wish to create a questionnaire. Each one (researcher) will interact with the system through the website interfaces as well as the requirements appear when it is based on the users interface (Kaindl, Kramer, & Kacsich, 1998).

Table 4.1 shows the functional requirements of the OQS and gives a brief description for each requirement.

- M – mandatory requirements (something the system must do)
- D – desirable requirements (something the system preferably should do)
- O – optional requirements (something the system may do)

Table 4. 1: List of Functional Requirement.

NO	Requirement ID	Requirement description	Priority
	OQS_ 01	**Register**	
1	**OQS_ 01_1**	**Researcher must register before Log in the system.**	**M**
2	**OQS_ 01_2**	**Researcher must fill all fields in the registration form, otherwise the system will show an error message.**	**D**
	OQS_02	**Login**	
3	**OQS_02_01**	**Researcher can login to the system.**	**M**
4	**OQS_02_02**	**Participant can login to the system to answer questions of questionnaire.**	**M**
5	**OQS_02_03**	**To authenticate user (the user must enter the valid user name and password, otherwise the system will show an error message).**	**D**
	OQS_03	**Manage Questionnaire**	
6	**OQS_03_01**	**Researcher gives name for the questionnaire, a brief description for the questionnaire and determine number of sections in questionnaire.**	**D**

7	**OQS_03_02**	**The researcher must determine the number of questions for each section, and write the questions for each section.**	**D**
	OQS_04	**Edit Questionnaire**	
8	**OQS_04_01**	**Researcher can edit questionnaire and update the question.**	**O**
	OQS_05	**Manage Respondent**	
9	**OQS_05_01**	**Researcher identifies the participants to answer in this questionnaire, either by write the name of the participant and selected Email him or choose Email from a list of former participants (the system automatically sends an email containing the participant's name and password).**	**D**
	OQS_06	**Respondent answer**	
10	**OQS_06_01**	**After the participant login to the system by the name and password, will show him the interface contains questions a questionnaire that must be answered it.**	**D**
	OQS_07	**Analysis**	
11	**OQS_07_01**	**The researcher can see the analysis results of the questionnaire.**	**D**
	OQS_08	**Print Results**	
12	**OQS_08_01**	**The researcher can print results of analysis of the questionnaire.**	**O**
	OQS_09	**Log out**	
13	**OQS_09_01**	**The researcher can log out of the system.**	**O**

4.2.2 Non-Functional Requirements

A non-functional requirement is a requirement that determines the criteria that can be used to judge the system, rather than the behavior of the system, and often called qualities of a system. Usually refers to properties of the system that has to do with quality, performance or features that are not fundamental for the system to work. They are however very important because they are often properties that highly desired by the user and can help the system gain competitive advantage over other systems (Ghezzi & Tamburrelli, 2009). Table 4.2 shows the non-functional requirements for the OQS and gives a brief description for each requirement.

Table 4. 2: List of Non-Functional Requirement.

NO	Requirement ID	Requirement description	Priority
	OQS_ 10	**Usability issues**	
14	**OQS_ 10_01**	**That means we should make sure that the system stay working smoothly without any interruption.**	**M**
	OQS_ 11	**Understand ability**	
15	**OQS_ 11_01**	**The system should be easy to understand.**	**M**
	OQS_ 12	**Performance requirement**	
16	**OQS_ 12_01**	**The system database must be updated in real time and reply the request to the researcher.**	**M**
17	**OQS_ 12_02**	**The system should be available 24x7.**	**M**

	OQS_ 13	**Privacy**	
18	**OQS_ 13_01**	**Information in this system is confidential, only approved administrator can access this information, where it should not show the answers and information participants to preserve the privacy.**	**M**
	OQS_ 14	**Security requirement**	
19	**OQS_ 14_01**	**Unauthorized person should not use the system, just view the main page.**	**M**
20	**OQS_ 14_02**	**Only the person who has user name and password can access to the system.**	**M**
21	**OQS_ 14_03**	**No one (researcher) can change the password without login to the system.**	**M**
22	**OQS_ 14_04**	**Participant can login only once for the system to answer the questionnaire (to maintain the quality of the questionnaire).**	**M**

4.3 System Design

System design is the activity of proceeding from an identified set of requirements for a system to a design that meets those requirements (Daintith, 2004). The design of the system includes UML diagrams, and charts of the system's architecture design that have the use case diagram, sequence diagrams and class diagram (Dennis, Wixom, & Tegarden, 2009).

Gliffy is an online application that makes it easy for you to create, share, and collaborate with diagrams, where you can create an endless variety of professional-looking drawings, diagrams, process flows designs and interfaces. Gliffy support to deal with UML diagrams (Gliffy, 2011).

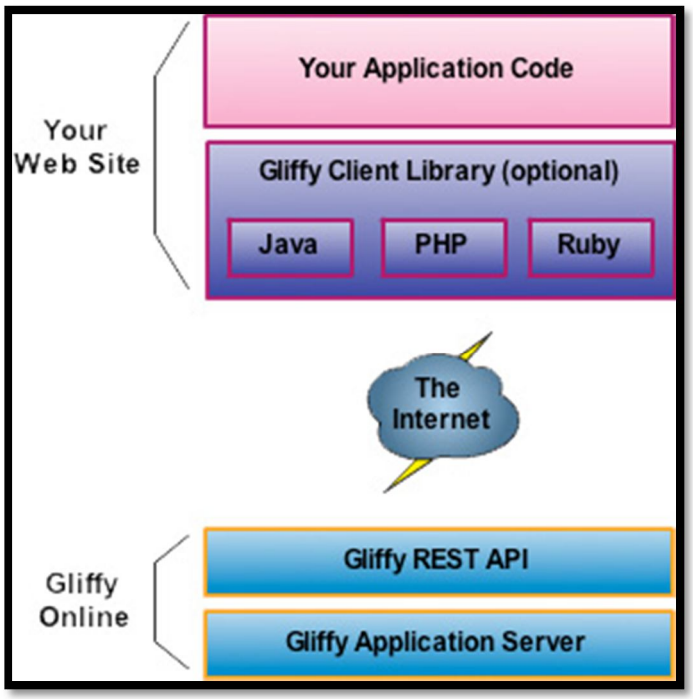

Figure 4. 1: Gliffy API Technical Overview (Gliffy, 2011).

The Unified Modeling Language (UML) is a graphical language for specifying building, display and documenting artifacts of software intensive systems. UML represents the unification of efforts to build a series of shortcuts for the expression. Currently, UML is considered standard for Object Oriented modeling (Fowler, 2003).

4.3.1 Use Case Diagram

The use case diagram is to illustrate a use-case analysis and describe the behavior of UML diagrams and shows the interaction between the system and the users. The purpose of use case diagram is to present a graphical overview of the functionality provided by a system in terms of actors, their goals represented as use cases, and any dependencies between those use cases.

According to the use case diagram, a system has two main components (actor/use case). In this study actor represents respondent (participant) and administrator (researcher). Use case it represented in the login, register, manage questionnaire, edit questionnaire, manage respondent, answer questionnaire, analysis questionnaire and logout. The system supports the administrator to analysis the questionnaire and sends user name and password to the respondents to answer the questionnaire. Figure 4.2 shows the use case diagram for OQS.

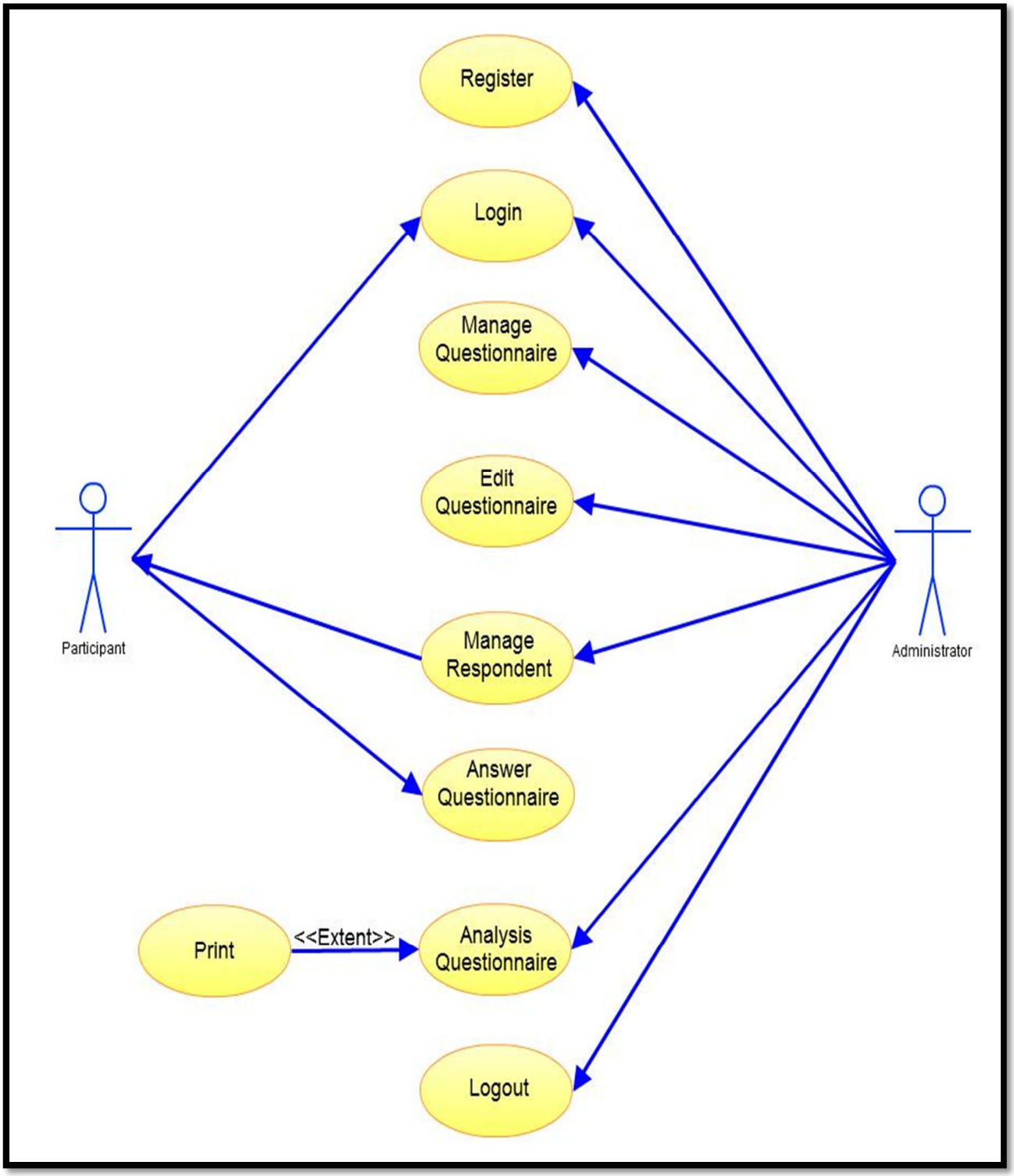

Figure 4. 2: The use case diagram for OQS.

4.3.2 Use Case specification for OQS

4.3.2.1 Use Case Specification for Register

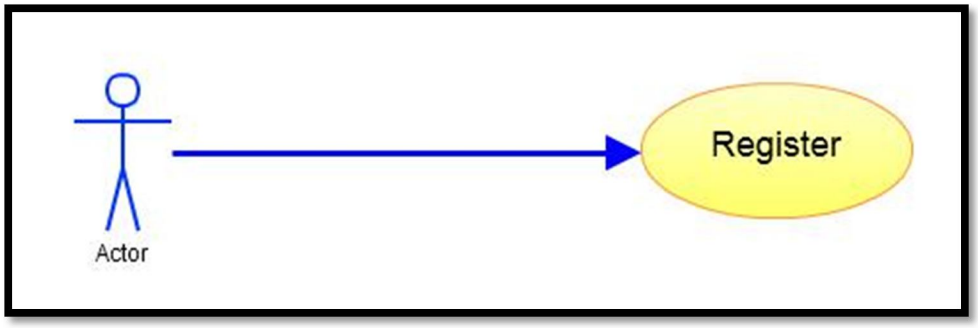

Figure 4. 3: Register use case for OQS.

Brief Description

This use case is initiated by the user and enables the administrator to register by filling the registration form.

Pre-Conditions

Not applicable.

Characteristic of Activation

This use case (Register) depends on administrator.

Flow of Events

I. Basic Flow

- The use case begins when the user enter main page and press "Register" button.
- The system will display Register page.
- The user will fill registration form with the correct details.
- User press "Register" button.

- The system will verify registration information with the database.
- The system will display successful message and after that display main page.

II. Alternative Flow

Not applicable.

III. Exceptional Flow

Incorrect Information

- The system will show error message when the customer didn't complete form.
- The system will show the following error message when the customer already register.

IV. Post-Conditions

Not applicable.

Rule(S)

Not applicable.

Constraint(S)

Not applicable.

4.3.2.2 Use Case Specification for Login

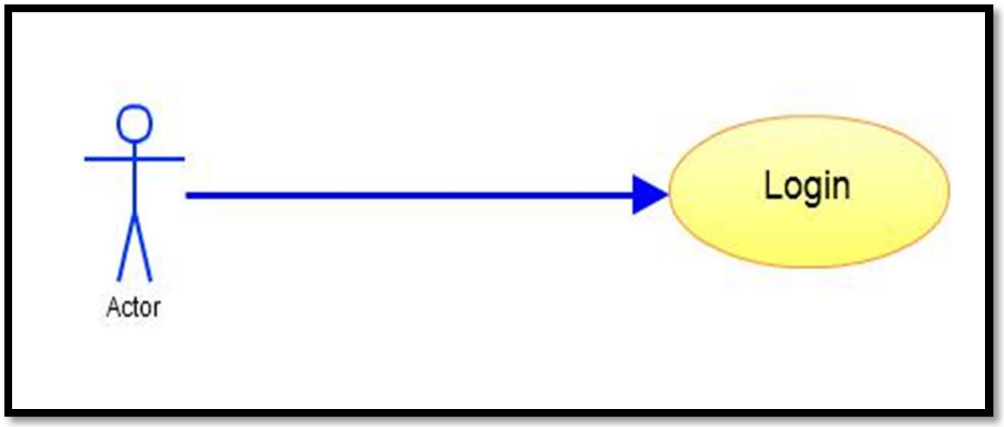

Figure 4. 4: Login use case for OQS.

Brief Description

This use case will be used to allow the actor (administrator/participant) to enable the user to access into the system through the use of username and password.

Pre-Conditions

The administrator must be registered before login to the OQS, the participant must have user name and password.

Characteristic of Activation

This use case (Login) depends on participant and administrator.

Flow of Events

I. Basic Flow

- This use case begins when the administrator/participant insert username and password.
- The administrator/participant needs to confirm the login process by press “Submit" button.
- The system will verify the username and password in database.
- The system will display the home page the OQS.

II. Alternative Flow

- The administrator/participant can exit from the login interface at any time.
- The administrator can press "Forgot password".

III. Exceptional Flow

- E1: Wrong Username or Password: The system will display the error message if the administrator/participant writes an invalid username/password.
- E2: A value is required: Refill the login fields.

IV. Post-Conditions

The administrator/participant login to the system.

Rule(S)

Not applicable.

Constraint(S)

The administrator/participant must enter the correct user name and password to access to the system.

4.3.2.3 Use Case Specification for Manage Questionnaire

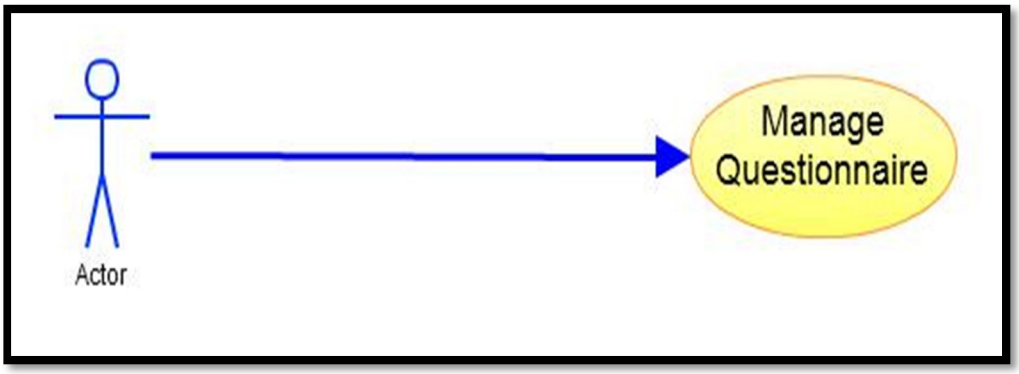

Figure 4. 5: Manage Questionnaire use case for OQS.

Brief Description

This use case will be used to allow the administrator to create questionnaire and insert questions to the questionnaire.

Pre-Conditions

The administrator must login to the system.

Characteristic of Activation

This use case (Manage Questionnaire) depends on administrator.

Flow of Events

I. Basic Flow

- This use case begins when the administrator press "Manage Questionnaire" button.
- The system will display "Manage Questionnaire" page.
- The administrator must fill the following fields such as questionnaire name, number of sections, range of answer and brief description for questionnaire.
- The administrator press "Next" button to show the next page.
- The administrator must fill the following fields such as section name, number of questions.
- The administrator press "Next" button to show the next page.
- The administrator writes questions for all sections.
- The administrator press "Submit" button to show the successfully process message, and the system will display the home page the OQS.

II. Alternative Flow

The administrators can logout from the system at any time.

III. Exceptional Flow

E1: A value is required: Refill all the fields in Manage Questionnaire.

IV. Post-Conditions

The administrator create questionnaire.

Rule(S)

Not applicable.

Constraint(S)

Not applicable.

4.3.2.4 Use Case Specification for Edit Questionnaire

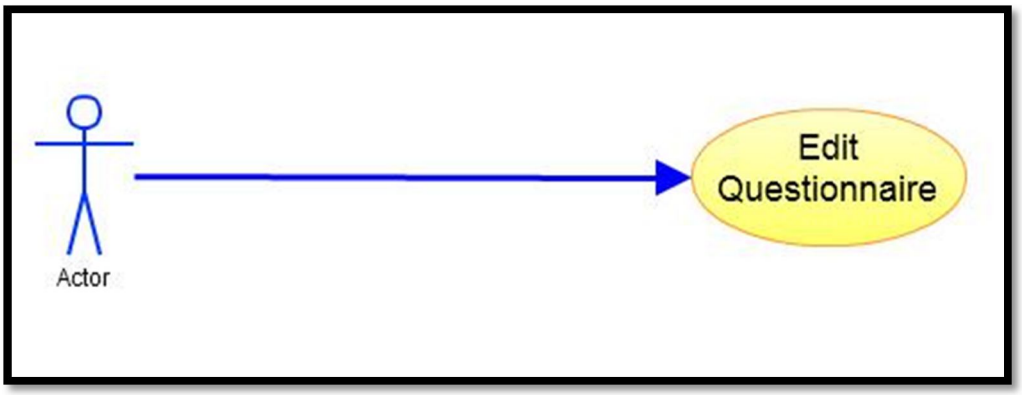

Figure 4. 6: Edit Questionnaire use case for OQS.

Brief Description

This use case will be used to allow the administrator to edit questionnaire and update the questions.

Pre-Conditions

The administrator must create questionnaire in Manage Questionnaire before coming to Edit Questionnaire page.

Characteristic of Activation

This use case (Edit Questionnaire) depends on administrator.

Flow of Events

I. Basic Flow

- This use case begins when the administrator press "Edit Questionnaire" button.
- The system will display “Edit Questionnaire“ page.
- The administrator must choose questionnaire that who wishes to update.
- The administrator press "Next" button to show the next page.
- The administrator can edit question and update questionnaire.
- The administrator has two choose, if press "Submit" button to save update questionnaire and the system will display the home page the OQS. Or press "Reset" button to re-edit the questionnaire.

II. Alternative Flow

The administrators can logout from the system at any time.

III. Exceptional Flow

Not applicable.

IV. Post-Conditions

The administrator update questionnaire.

Rule(S)

Not applicable.

Constraint(S)

Not applicable.

4.3.2.5 Use Case Specification for Manage Respondent

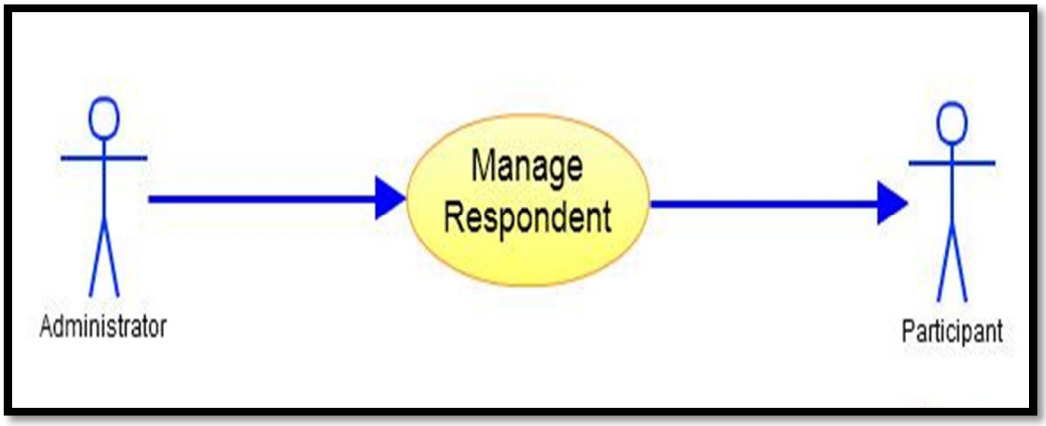

Figure 4. 7: Manage Respondent use case for OQS.

Brief Description

This use case is initiated by the administrator. This use case will enable the administrator to send an invitation by Email to participant to inform them of the possibility to answer the questionnaire through enter to OQS website by username and password.

Pre-Conditions

The administrator must create questionnaire in Manage Questionnaire before send questionnaire to the participants.

Characteristic of Activation

This use case (Manage Respondent) depends on administrator.

Flow of Events

I. Basic Flow

- This use case begins when the administrator press “Manage Respondent" button.
- The system will display “Manage Respondent" page.
- The administrator must select the participants by two ways, first insert name and Email the participants by press "Add Users" button, second to select participants from the list by press "Select Users" button and check the participants.
- The administrator must choose questionnaire that who wishes from the participants to answer them.
- The administrator press "Submit" button to send username and password to participants, and the system will display the home page the OQS.

II. Alternative Flow

The administrators can logout from the system at any time.

III. Exceptional Flow

Not applicable.

IV. Post-Conditions

The administrators send an invitation to participate to answer the questionnaire.

Rule(S)

Not applicable.

Constraint(S)

Not applicable.

4.3.2.6 Use Case Specification for Answer Questionnaire

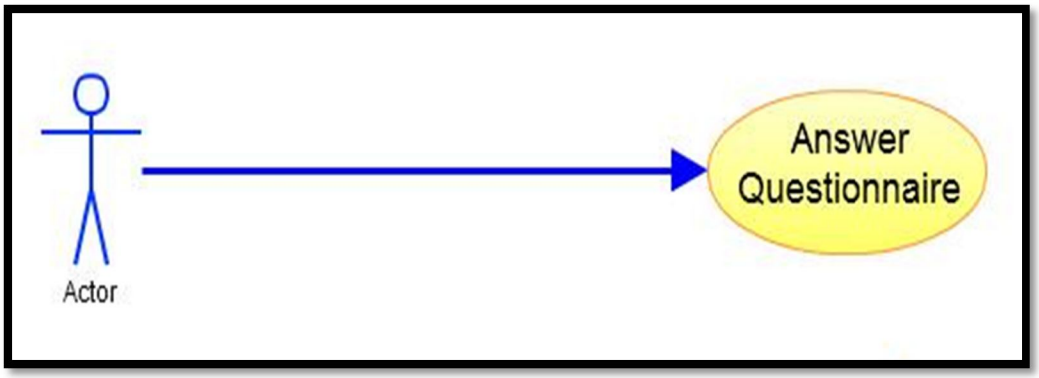

Figure 4. 8: Answer Questionnaire use case for OQS.

Brief Description

This use case is initiated by the participant. This use case will enable the participant to answer the questionnaire.

Pre-Conditions

The administrator must create questionnaire and sent this questionnaire to the participants.

Characteristic of Activation

This use case (Answer Questionnaire) depends on participants.

Flow of Events

I. Basic Flow

- This use case begins when the participant login to the OQS website.
- The system will display “Answer Questionnaire“ page.
- The participant must write the following fields (general information) such as name, select gender, select age, passport number and select race.
- The participant must answer the questions by select radio box from the range.
- The participant press "Submit" button to save answer in database and display thanks message page and shows the main page. Or press "Reset" button to return to answer.

II. Alternative Flow

The participant can exit from the system at any time.

III. Exceptional Flow

Not applicable.

IV. Post-Conditions

The participant answers the questionnaire.

Rule(S)

Not applicable.

Constraint(S)

The participant must enter the correct user name and password to access to the system.

4.3.2.7 Use Case Specification for Analysis Questionnaire

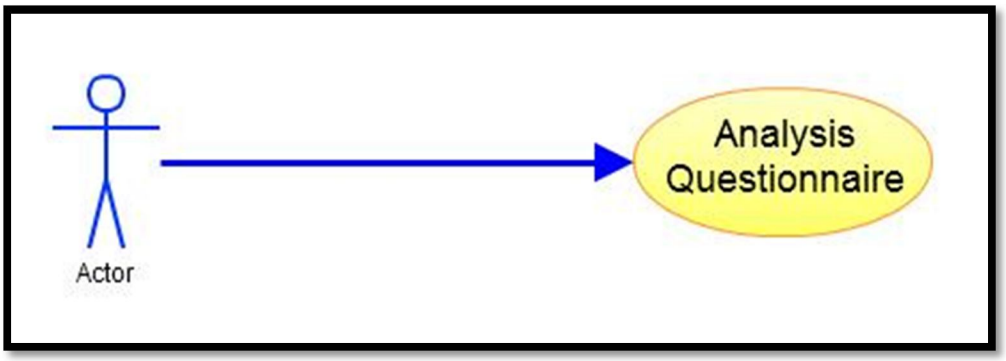

Figure 4. 9: Analysis Questionnaire use case for OQS.

Brief Description

This use case is initiated by the administrator. This use case will enable the administrator to display the analysis results of the questionnaire.

Pre-Conditions

The participants must answer the questionnaire.

Characteristic of Activation

This use case (Analysis Questionnaire) depends on administrator.

Flow of Events

I. Basic Flow

- This use case begins when the administrator press "Analysis" button.
- The system will display "Analysis Questionnaire" page.

- Show for the administrator many buttons, where the analysis can show for each one at a time when the button is pressed. This buttons is Reliability Test, Statistics, Frequency Table, Correlation, T-Test and View Report.
- All analysis appears when you click on the appropriate button.
- The administrator have choose to print the result if click on "Print" button.

II. Alternative Flow

The administrator can exit and logout from the system at any time.

III. Exceptional Flow

Not applicable.

IV. Post-Conditions

Not applicable.

Rule(S)

Not applicable.

Constraint(S)

The administrator must create questionnaire and send to participants. The participants must answer this questionnaire.

4.3.2.8 Use Case Specification for Print

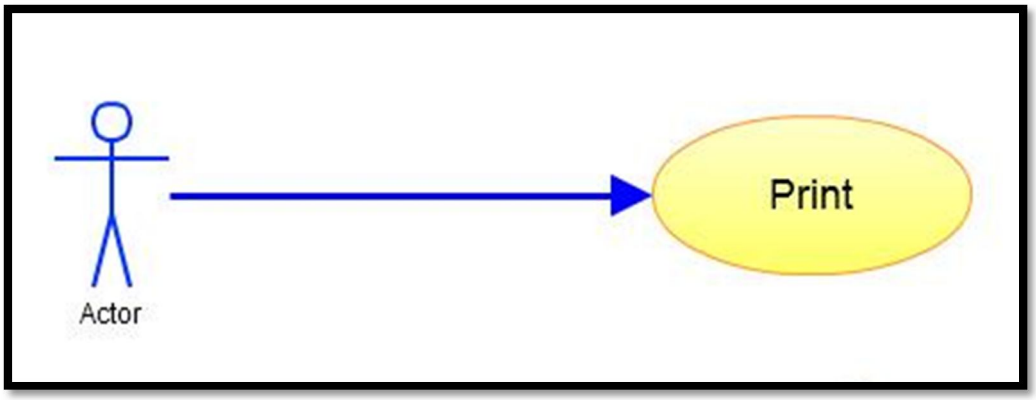

Figure 4. 10: Print use case for OQS.

Brief Description

This use case is initiated by OQS system. It will enable OQS system to print the result of analysis questionnaire, after administrator create questionnaire and send them to participants and wait to answer the participants. The system is working analysis questionnaire automatically, and the administrator can print the results.

Pre-Conditions

The participants must answer the questionnaire.

Characteristic of Activation

This use case (Print) depends on administrator and system's process.

Flow of Events

I. Basic Flow

- This use case begins when the administrator press "Print" button.
- The system will display print process (to choose printer and number of pages and print method).

- The system will print results.

II. Alternative Flow

The administrator can exit and logout from the system at any time.

III. Exceptional Flow

Not applicable.

IV. Post-Conditions

The administrator manages to print.

Rule(S)

Not applicable.

Constraint(S)

The administrator must have printer to print analysis results.

4.3.2.9 Use Case Specification for Logout

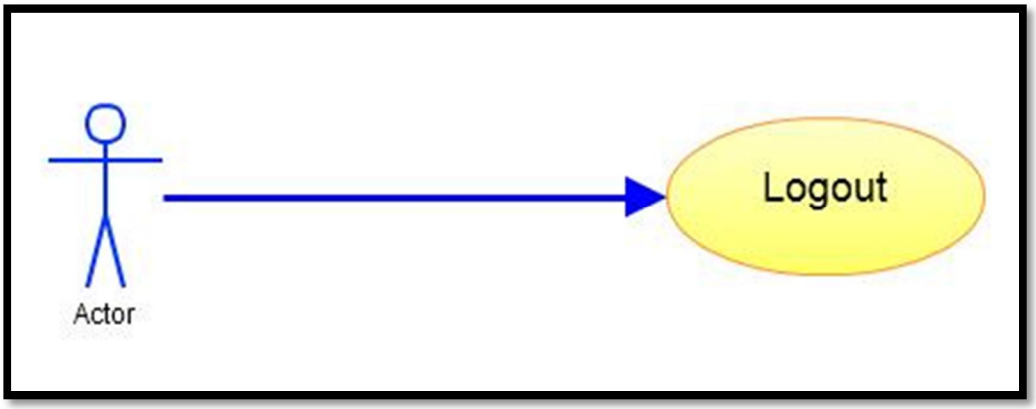

Figure 4. 11: Logout use case for OQS.

Brief Description

This use case starts when the administrator wants to exit or close by terminating the process or any operation of the system. When the administrator uses this use case, the system stops to provide the operations or functions to users.

Pre-Conditions

The administrator must login to the system.

Characteristic of Activation

This use case (Logout) depends on administrator.

Flow of Events

I. Basic Flow

- This use case begins when the administrator press "Logout" button.
- Then the system is disconnected from the database.
- After that, the user successfully terminates the process and the system will display main page.

II. Alternative Flow

Not applicable.

III. Exceptional Flow

Not applicable.

IV. Post-Conditions

Not applicable.

Rule(S)

The administrator must have an account.

Constraint(S)

Not applicable.

4.3.3 Sequence Diagram for OQS

A sequence diagram consists of objects and messages. Objects are represented exactly how they are represented in all UML diagrams as rectangles to emphasize the class name in the rectangle. This is the most popular UML diagram for modeling dynamic artifact and used for the purposes of analysis and design, which focuses on identifying the behavior within the system.

4.3.3.1 Sequence Diagram for Register

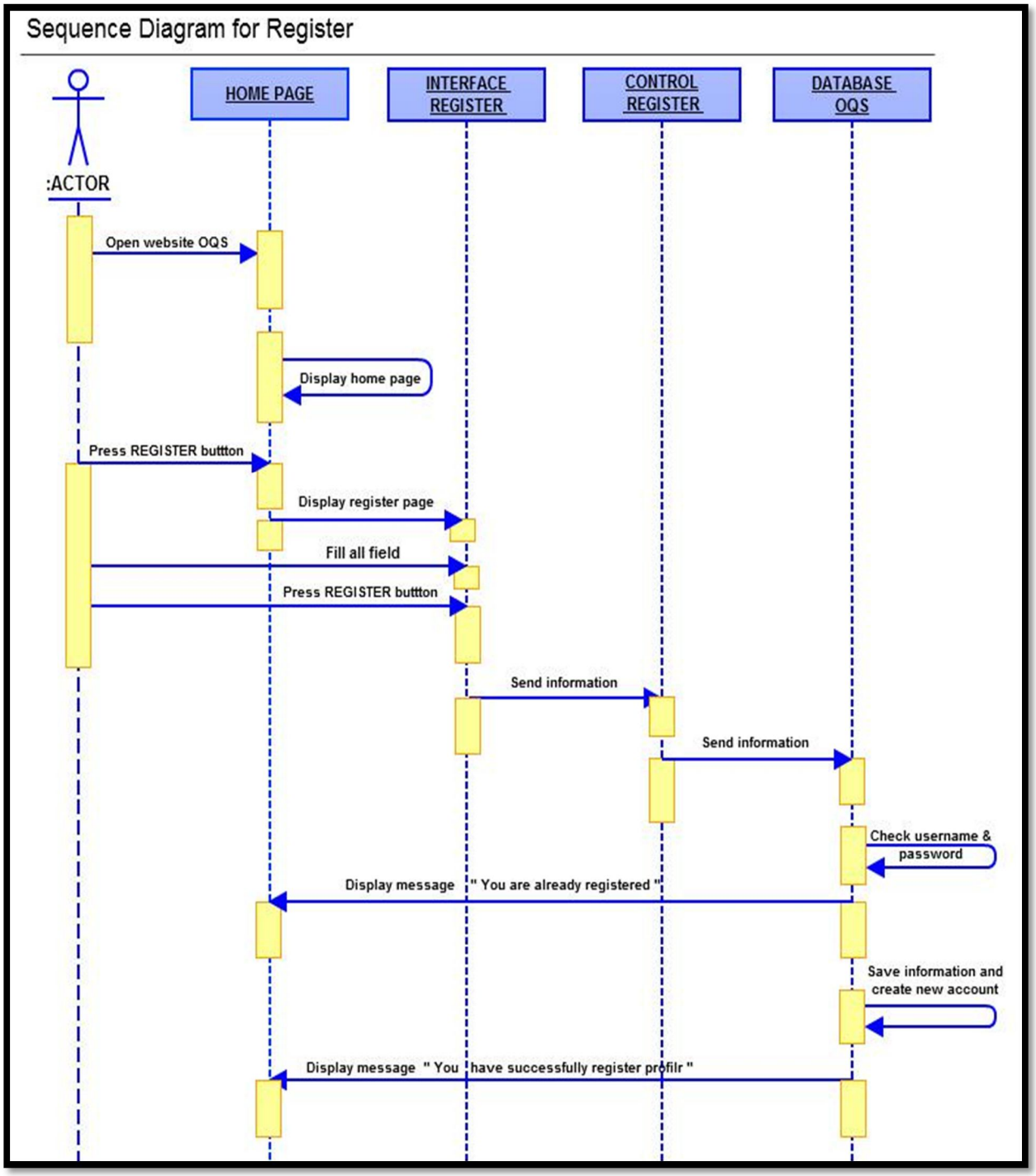

Figure 4. 12: Figure 4.12 Register Sequence Diagram.

The actor in this sequence diagram has the ability to register and become a member in the system.

4.3.3.2 Sequence Diagram for Login

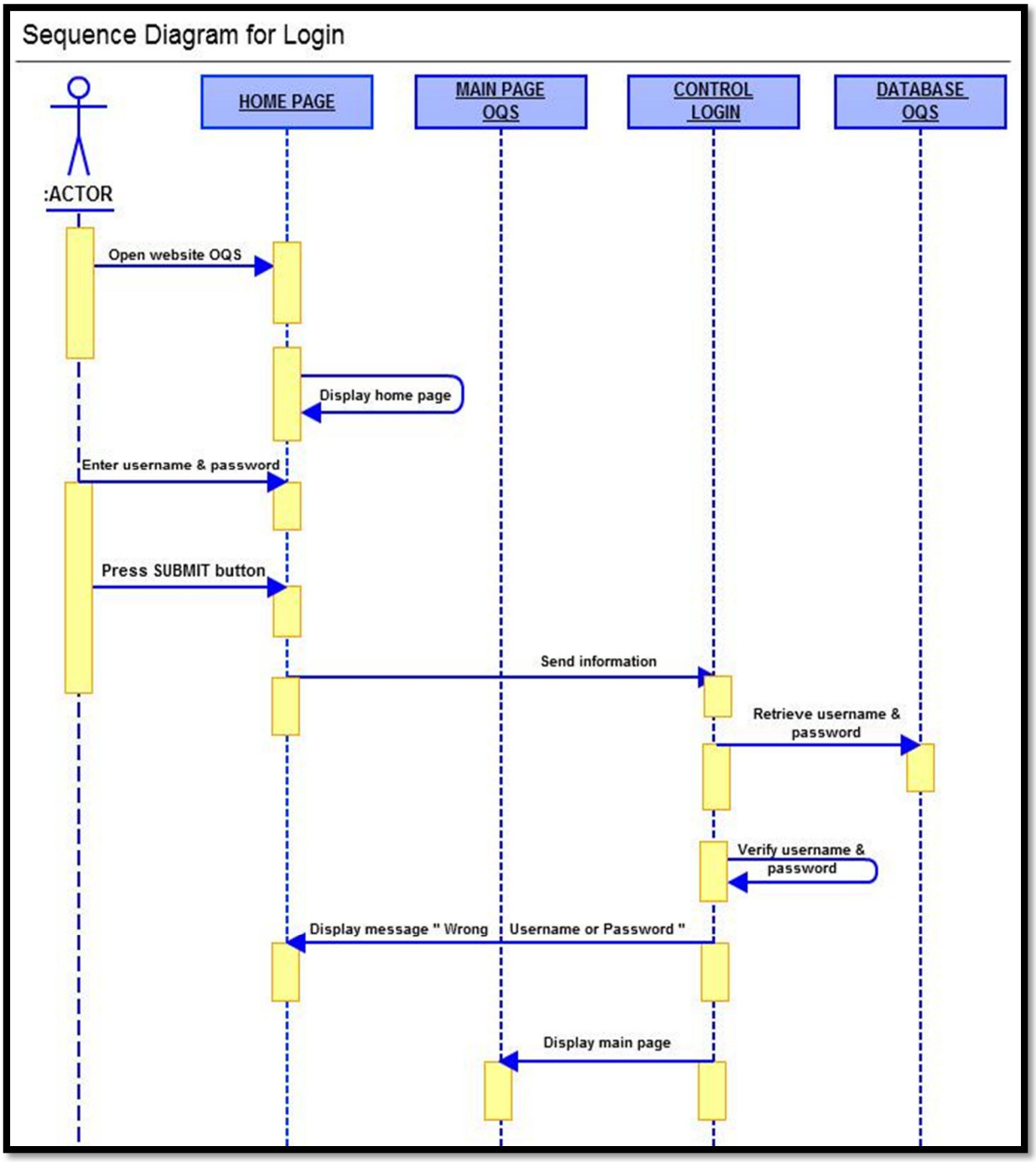

Figure 4. 13: Login Sequence Diagram.

This sequence diagram has shown how the actor (administrator/participant) can access to the system pages by login page through the username and the password.

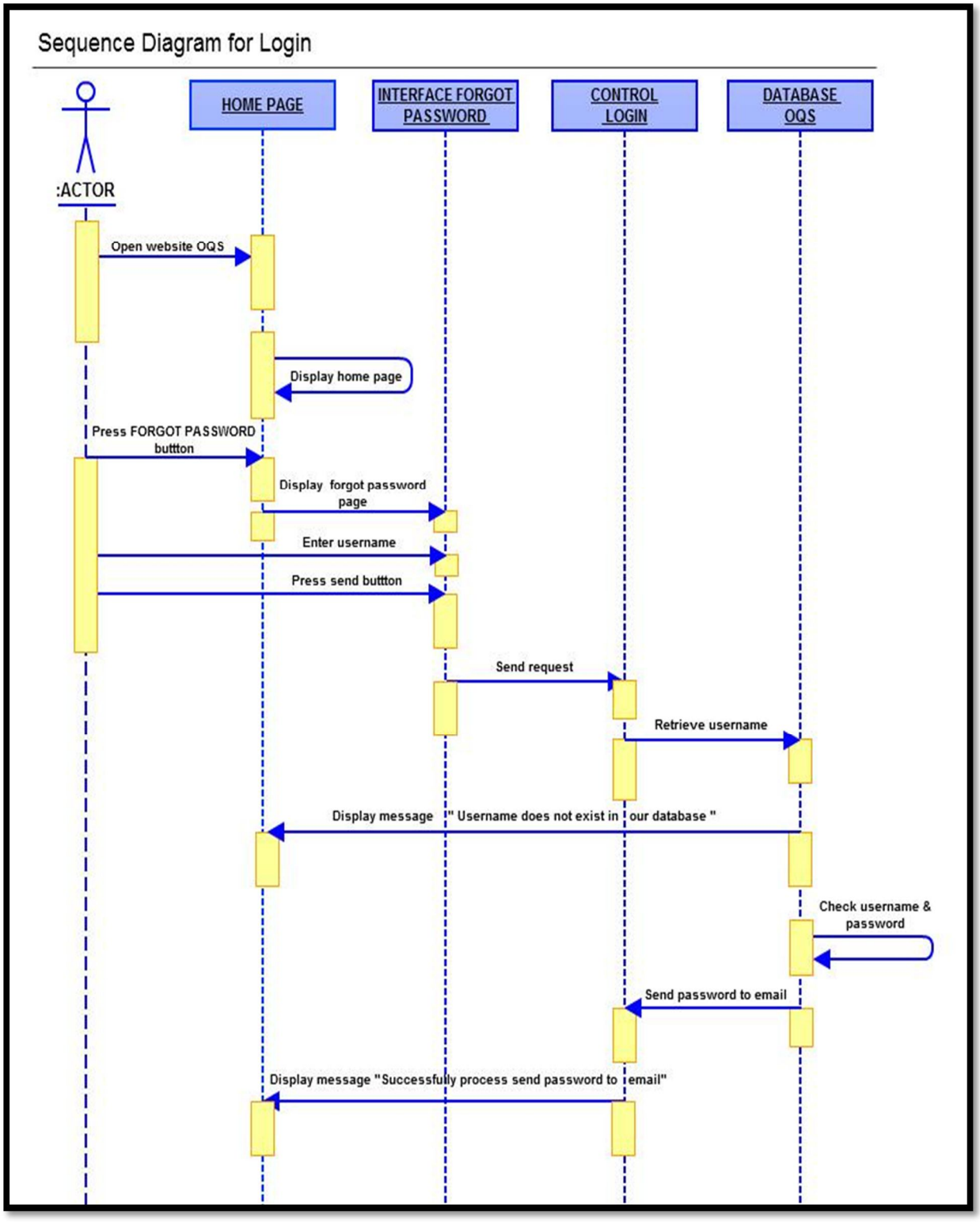

Figure 4. 14: Login Sequence Diagram in case forgot password.

The actor may forget password, in this case the actor can press "Forgot Password" and write email and after that the system send password to your email.

4.3.3.3 Sequence Diagram for Manage Questionnaire

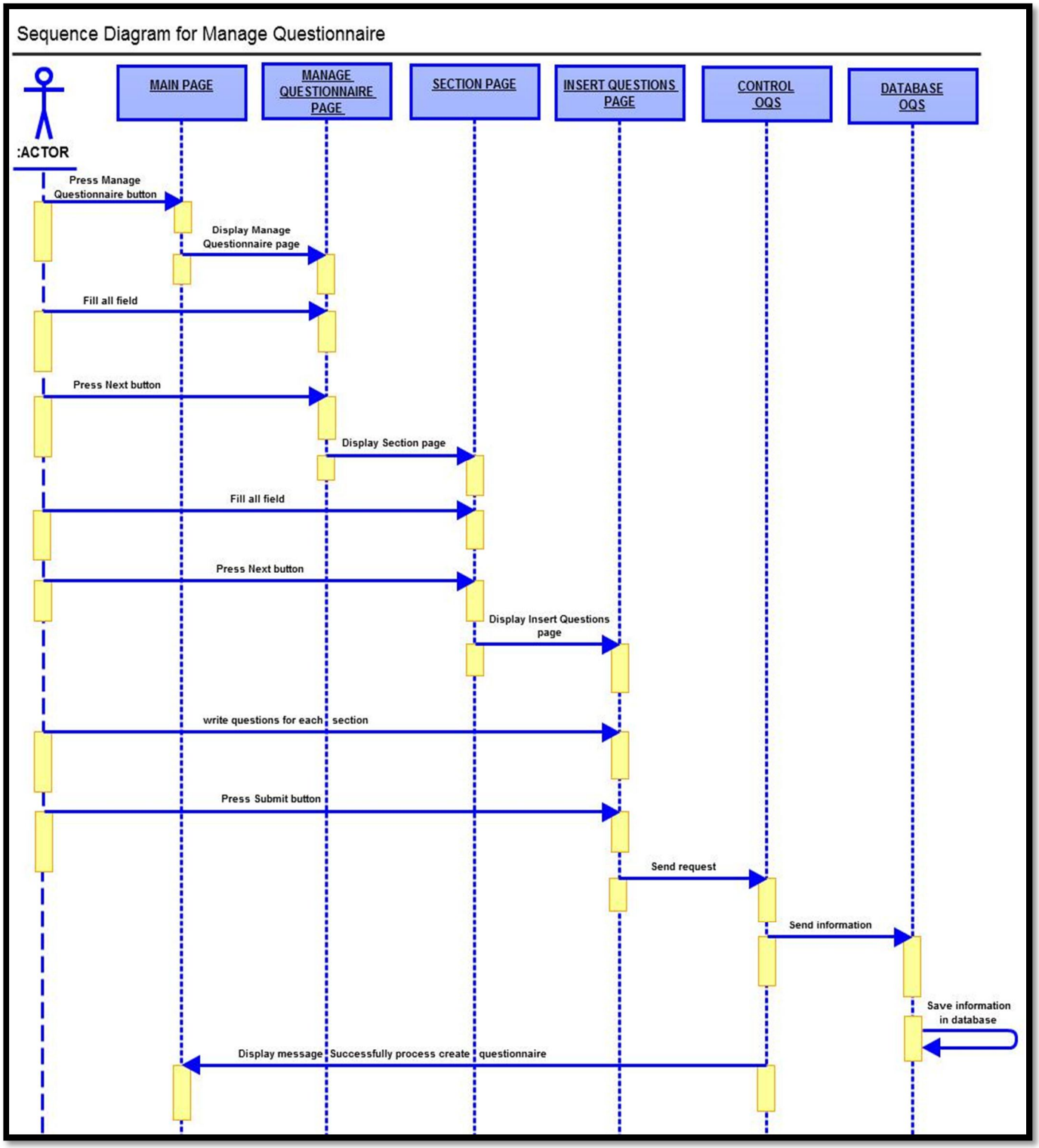

Figure 4. 15: Manage Questionnaire Sequence Diagram.

4.3.3.4 Sequence Diagram for Edit Questionnaire

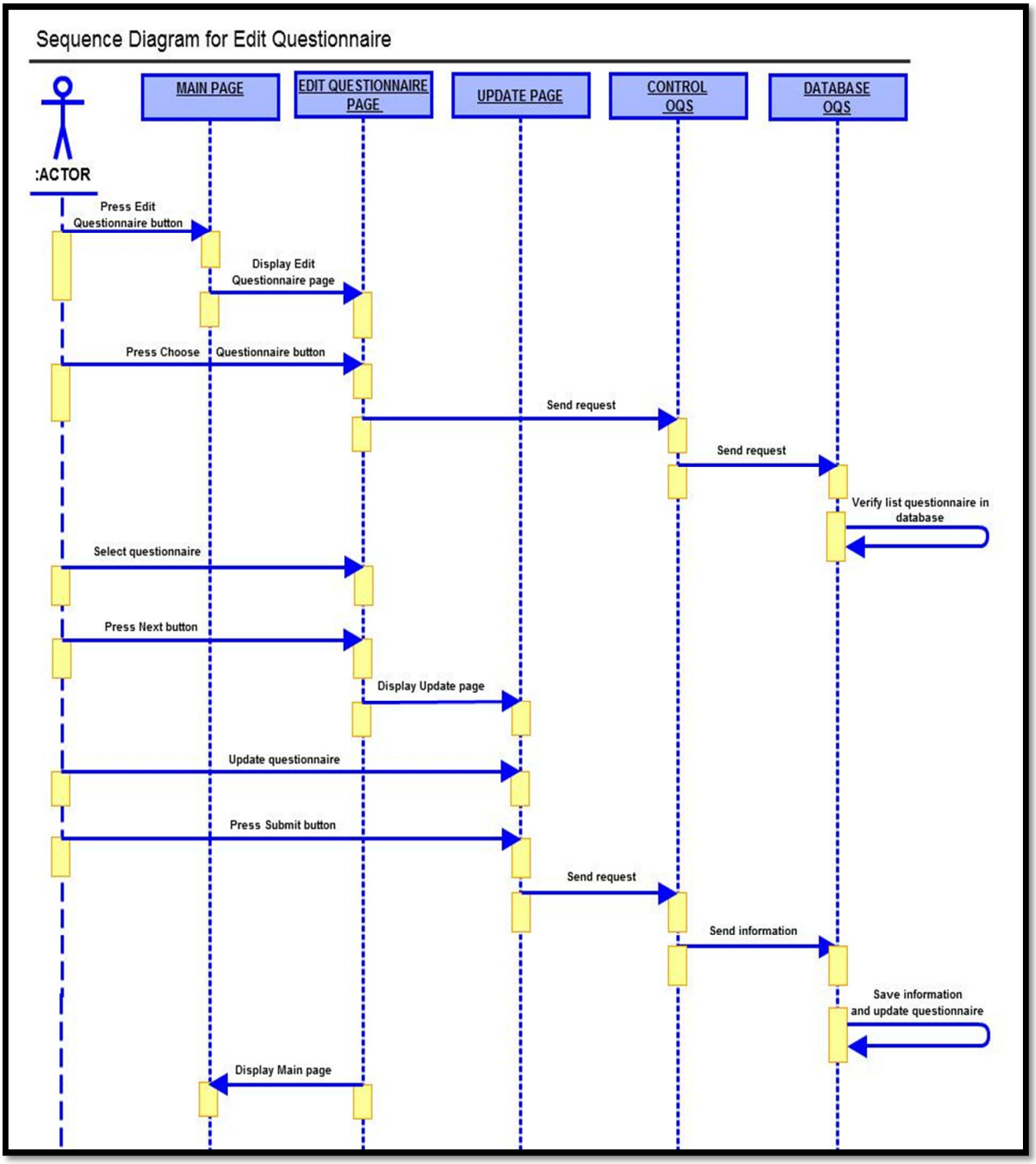

Figure 4. 16: Edit Questionnaire Sequence Diagram.

4.3.3.5 Sequence Diagram for Manage Respondent

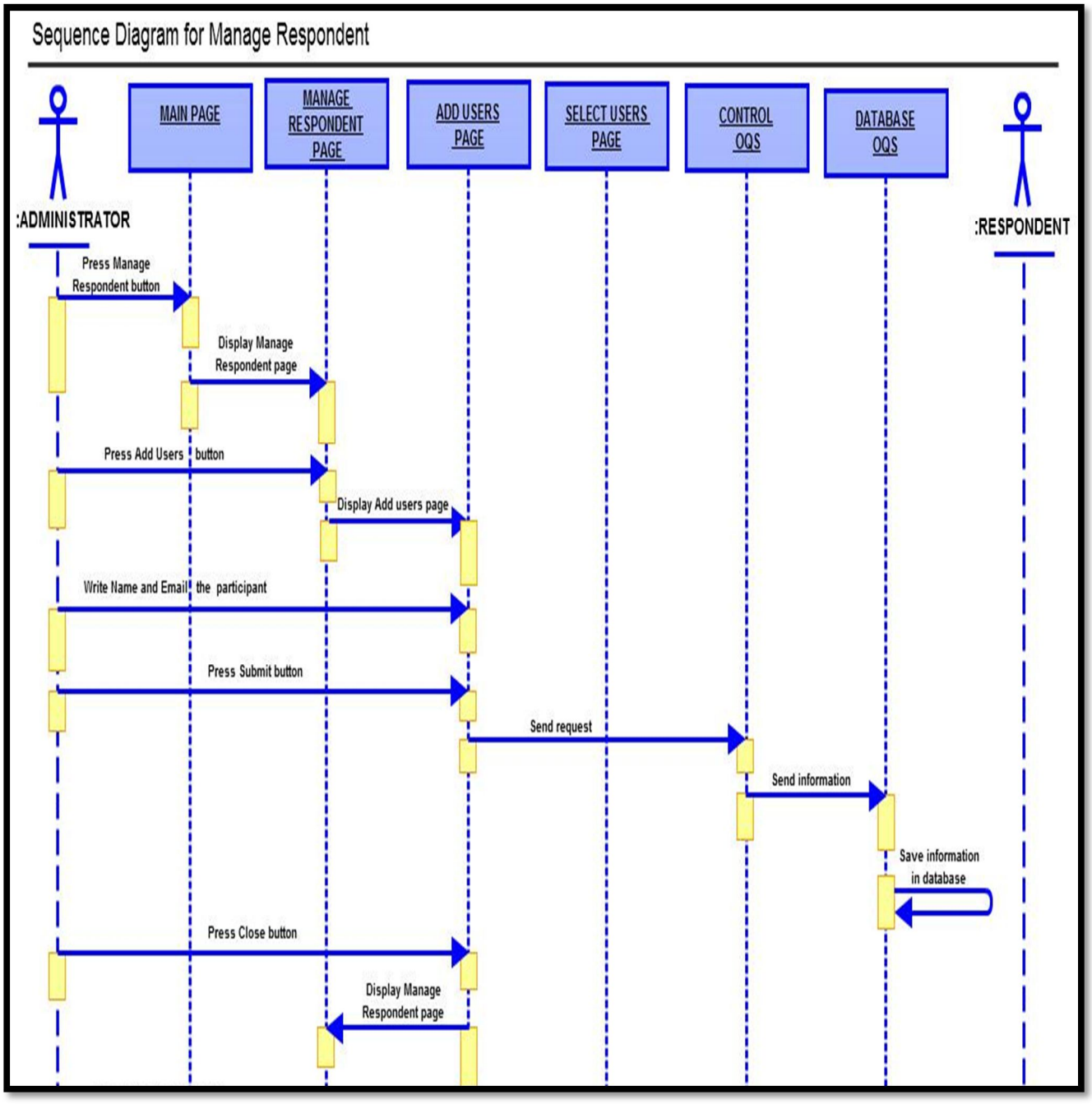

Figure 4. 17: Manage Respondent Sequence Diagram for Add users.

This sequence diagram has shown how the administrator enable to send Email to participant to inform them about the questionnaire to inform them of the possibility to answer the questionnaire through enter to OQS website by username and password.

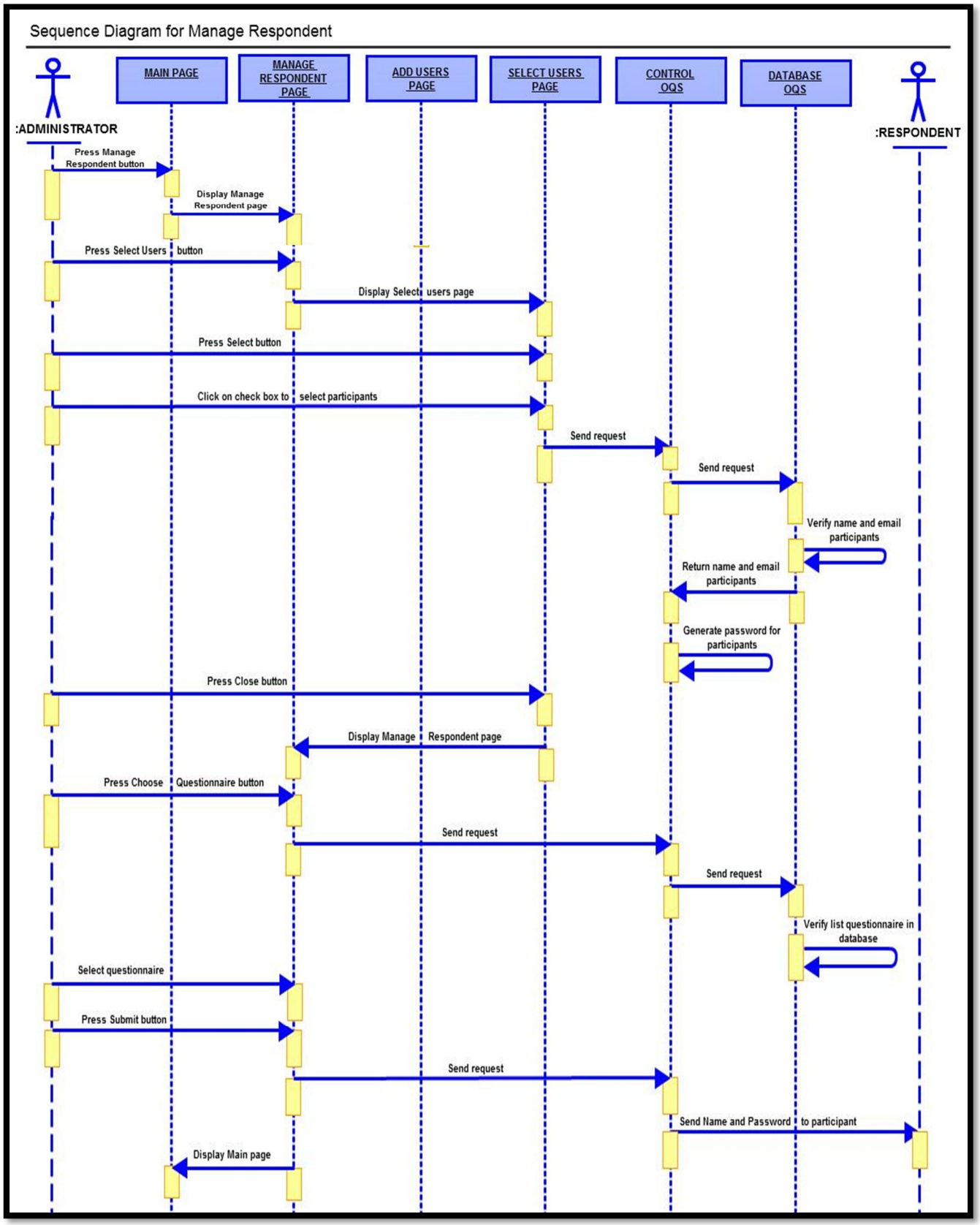

Figure 4. 18: Manage Respondent Sequence Diagram for Select users.

4.3.3.6 Sequence Diagram for Answer Questionnaire

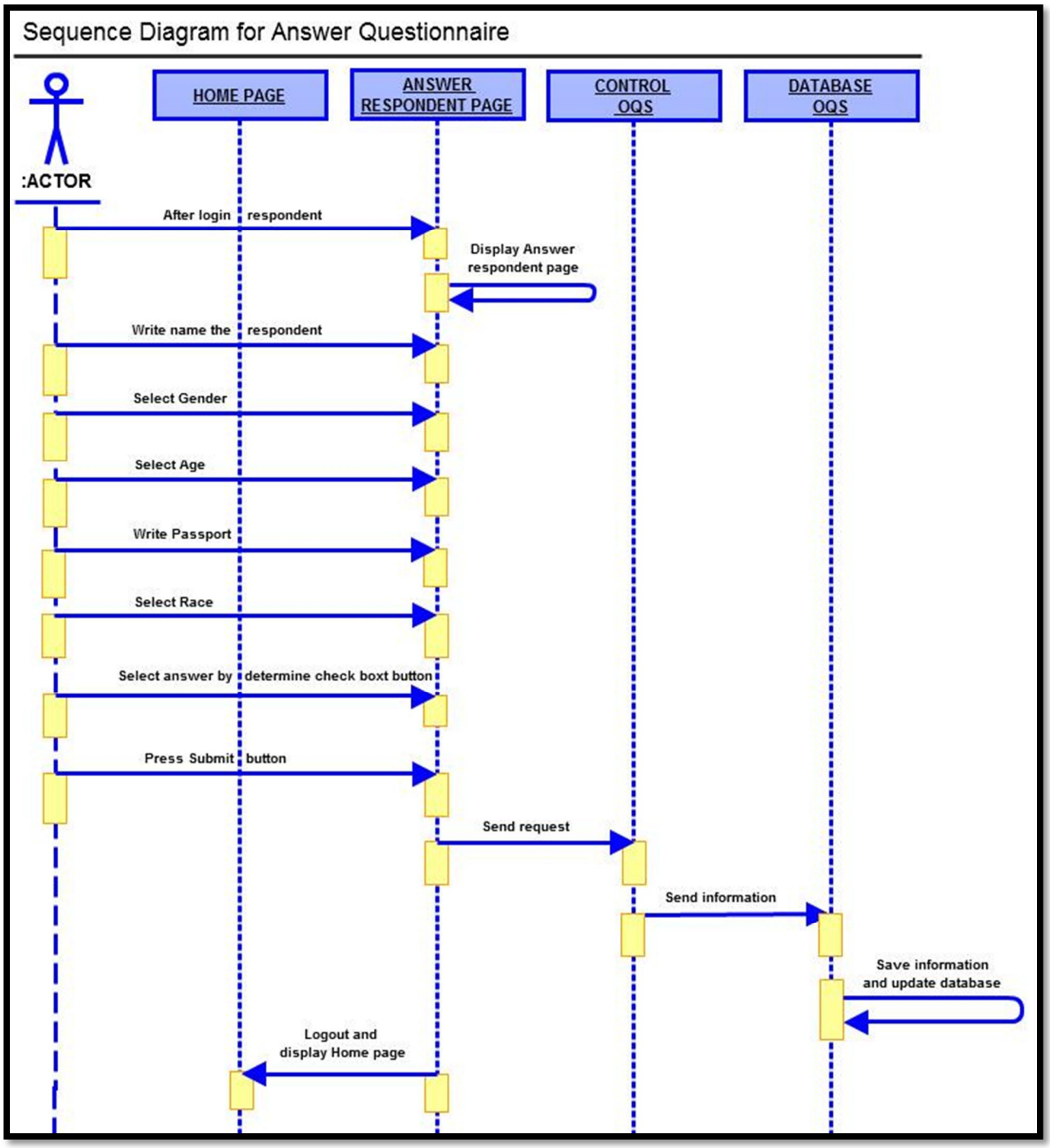

Figure 4. 19: Answer Questionnaire Sequence Diagram.

This sequence diagram has shown how the participant enable to answer the questionnaire after receive inform from researcher.

4.3.3.7 Sequence Diagram for Analysis Questionnaire

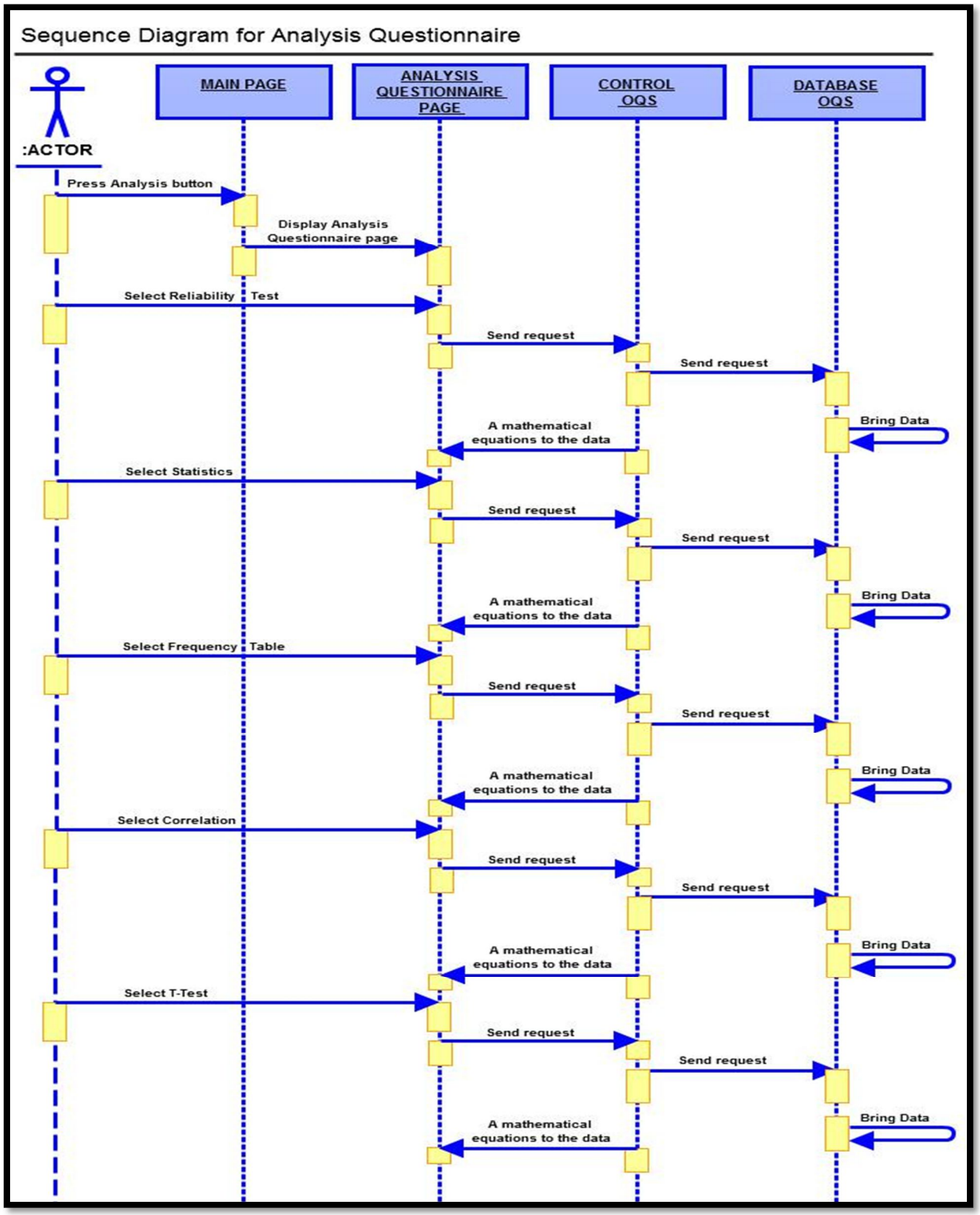

Figure 4. 20: Analysis Questionnaire Sequence Diagram.

4.3.3.8 Sequence Diagram for Print

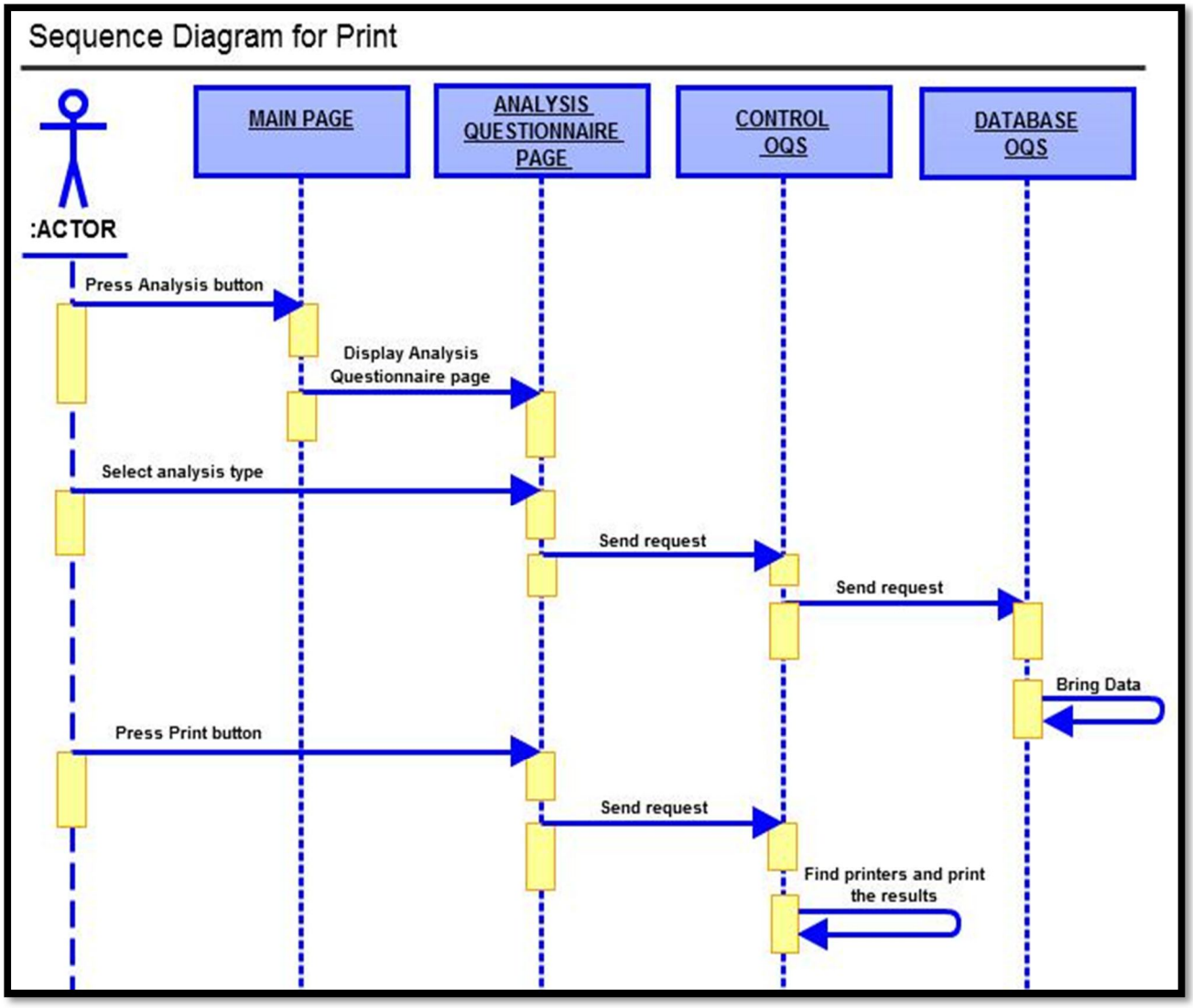

Figure 4. 21: Print Sequence Diagram.

This sequence diagram has shown how the system help the administrator by enable to print the result of analysis questionnaire. The system is working analysis questionnaire automatically, and the administrator can print the results.

4.3.3.9 Sequence Diagram for Logout

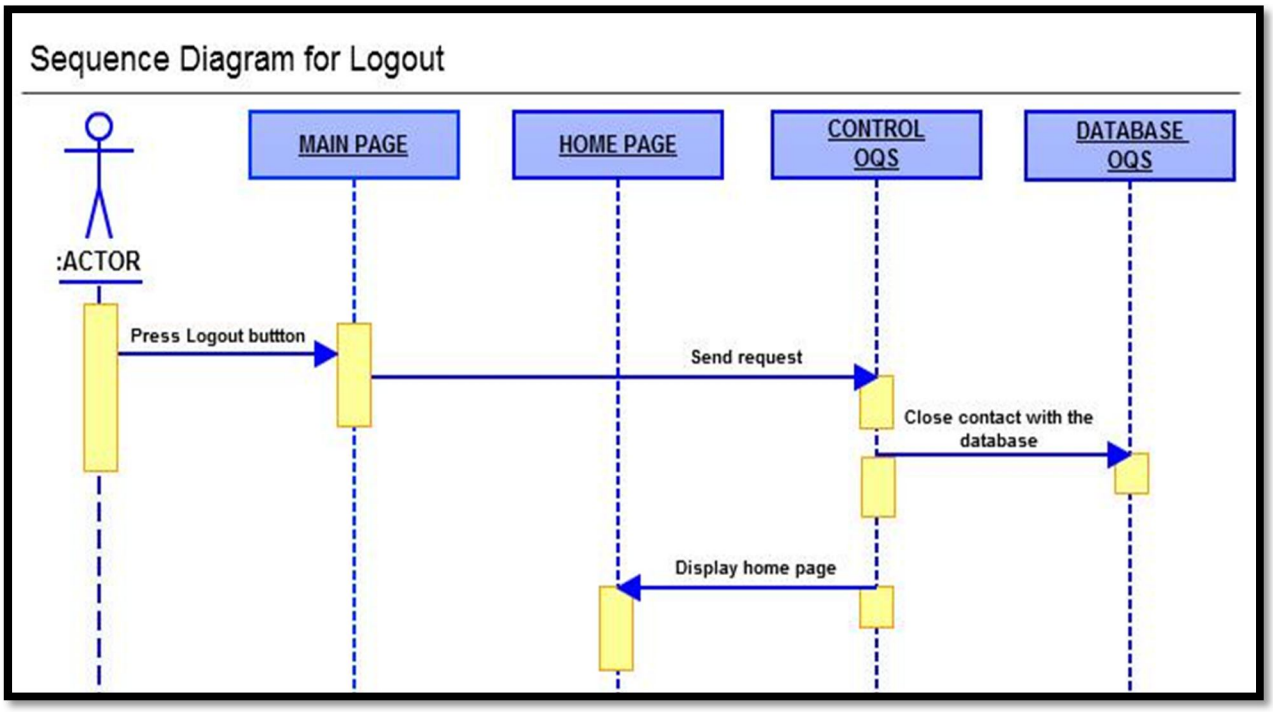

Figure 4. 22: Logout Sequence Diagram.

4.3.4 Class Diagram

Class diagrams are used to represent the classes within a model. According to Martin (Martin, 2003), classes have attributes (member variables), operations (member functions) and relationships with other classes. The UML class diagram can illustrate all these things fairly easily. Moreover, class diagrams show the classes of the system, their relationships, and the operations and attributes of classes. So class diagrams are used to interpret and simplify the concepts and show details of the system design.

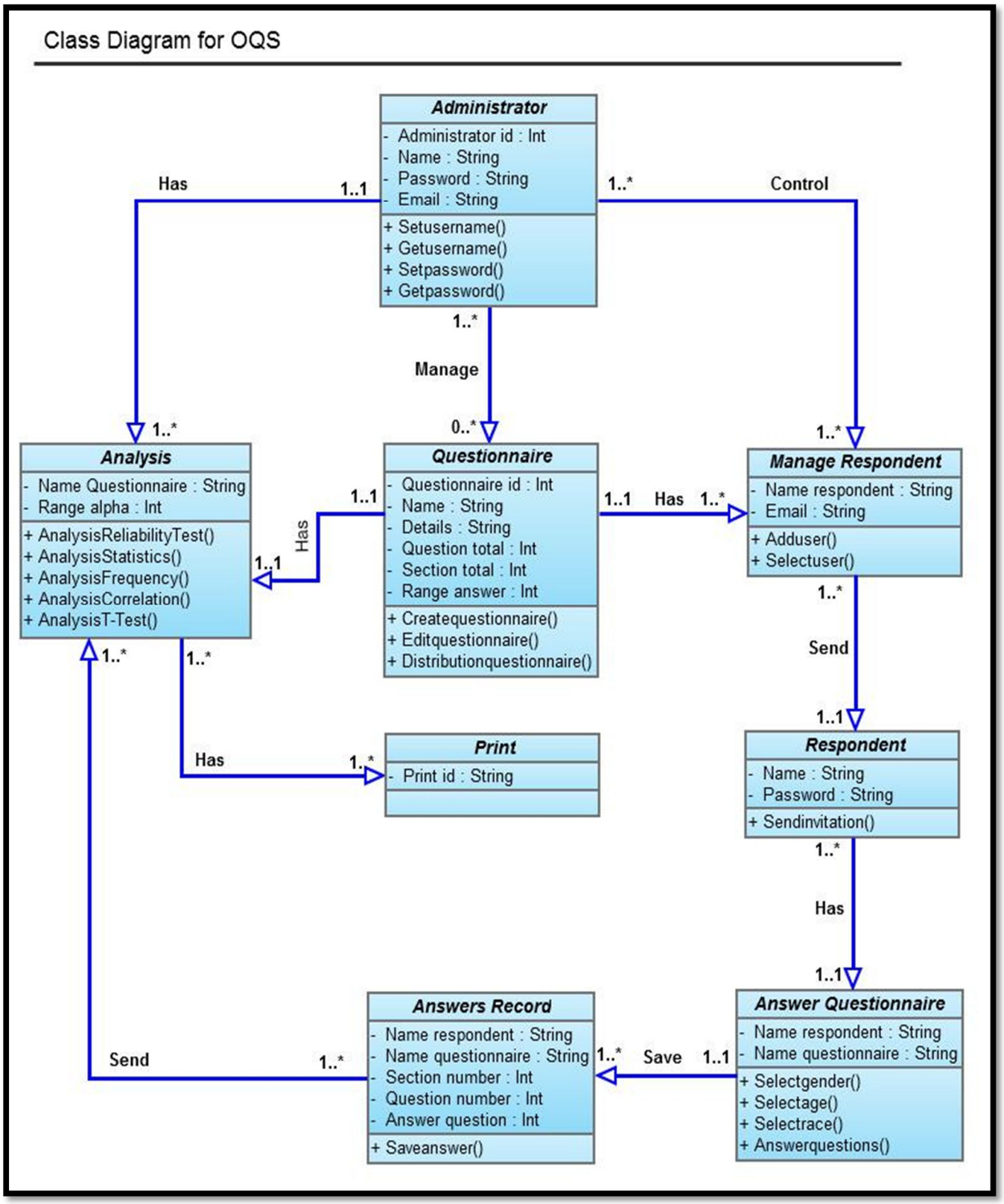

Figure 4. 23: Class Diagram for OQS.

4.3.5 Database Design

This study uses MySQL, because it contains a set of qualities and characteristics that could be clarified, as follows:

a. The MySQL enables users to create tables, queries, forms and reports.

b. Tables represent a template for the storage of relevant information and connect to the database.

c. Queries enable users to get specific information.

The database of the OQS system consists of seven tables, these tables are:

4.3.5.1 Login Table

Table 4.3 show components of login table. This table contains all the username and password for administrator and respondent.

Table 4. 3: Login Table.

Field Name	Data Type
Login_ID [PK]	Varchar
Password	Varchar
Questionnaire_ID [FK]	Varchar

4.3.5.2 Staff Table

Table 4.4 show components of staff table. This table contains all information about the administrator.

Table 4. 4: Staff Table.

Field Name	Data Type
Staff_ID [PK]	Varchar
Name	Varchar
Email	Varchar

4.3.5.3 Questionnaire Table

Table 4.5 show components of questionnaire table. This table contains all information about the questionnaire.

Table 4. 5: Questionnaire Table.

Field Name	Data Type
Questionnaire_ID [PK]	Varchar
Questionnaire_Name	Varchar
Questionnaire_Details	Varchar
Question_Total	Int

Section_Total	**Int**
Range_Answer	**Int**
Staff_ID [FK]	**Varchar**

4.3.5.4 Question Table

Table 4.6 show components of question table. This table contains all information about questions.

Table 4. 6: Question Table.

Field Name	Data Type
Question_No	**Int**
Section_Name	**Varchar**
Question_Details	**Varchar**
Questionnaire_ID [FK]	**Varchar**

4.3.5.5 Respondent Table

Table 4.7 show components of respondent table. This table contains all information respondents.

Table 4. 7: Respondent Table.

Field Name	Data Type
Respondent_ID	Varchar
Name	Varchar
Gender	Varchar
Age	Varchar
IC/Passport	Varchar
Race	Varchar
Questionnaire_ID [FK]	Varchar

4.3.5.6 Answer Table

Table 4.8 show components of answer table. This table contains all answer respondents for all questionnaires.

Table 4. 8: Answer Table.

Field Name	Data Type
Answer_No	Varchar
Question_No	Int

Questionnaire_ID [FK]	**Varchar**
Respondent_Name	**Varchar**

4.3.5.7 Answer Record Table

Table 4.9 show components of answer record table. This table contains all answer for respondent.

Table 4. 9: Answer Record Table.

Field Name	Data Type
Respondent_ID [FK]	**Varchar**
Question_No	**Int**
Answer	**Int**
Questionnaire_ID [FK]	**Varchar**

Figure 4.24 presents the relationship between these tables. As we show in this figure the table Questionnaire is considered the main table in the OQS, because all tables connected with him.

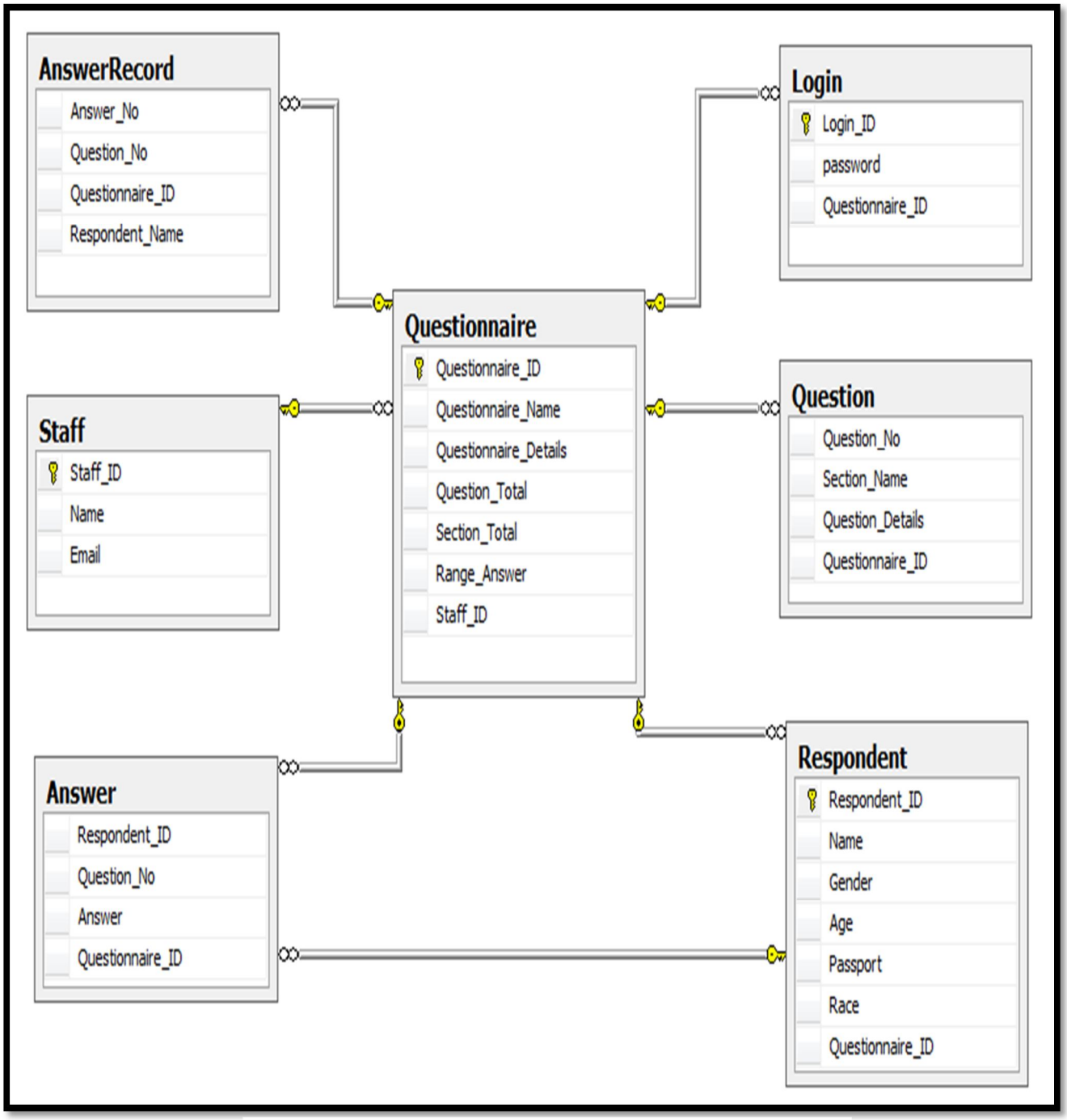

Figure 4. 24: Relationship between tables in OQS.

4.4 Development Prototype

The prototype of OQS is developed by using a Java application programs and MySQL Community Server. The work of Java with MySQL has provided an appropriate environment work for this system. JSP technology provides a simplified, fast way to create dynamic web content. JSP technology enables rapid development of web-based applications that are server-and platform-independent (Nakaike, Kondoh, Nakamura, Kitayama, & Hirose, 2004). The JSP provides the ability to write queries directly within the code JSP which can be write inside Java program.

Navicat Premium is one of the programs that we need with the database. Navicat is a multi-connections database administration tool allowing us to connect with MySQL databases OQS simultaneously within a single application. This helped the database administration to multiple kinds of database easily (Navicat, 2011). The Apache HTTP Server Project is another program we need to connect with the internet. The Apache is an effort to develop and maintain an open-source HTTP server for modern operating systems. The goal of this project is to provide a secure, efficient and extensible server that provides HTTP services in sync with the current HTTP standards (Apache, 2011). Dreamweaver program is used to design interfaces the OQS website. In Figure 4.25 shows operations performed between Tomcat Apache and MySQL Database in OQS.

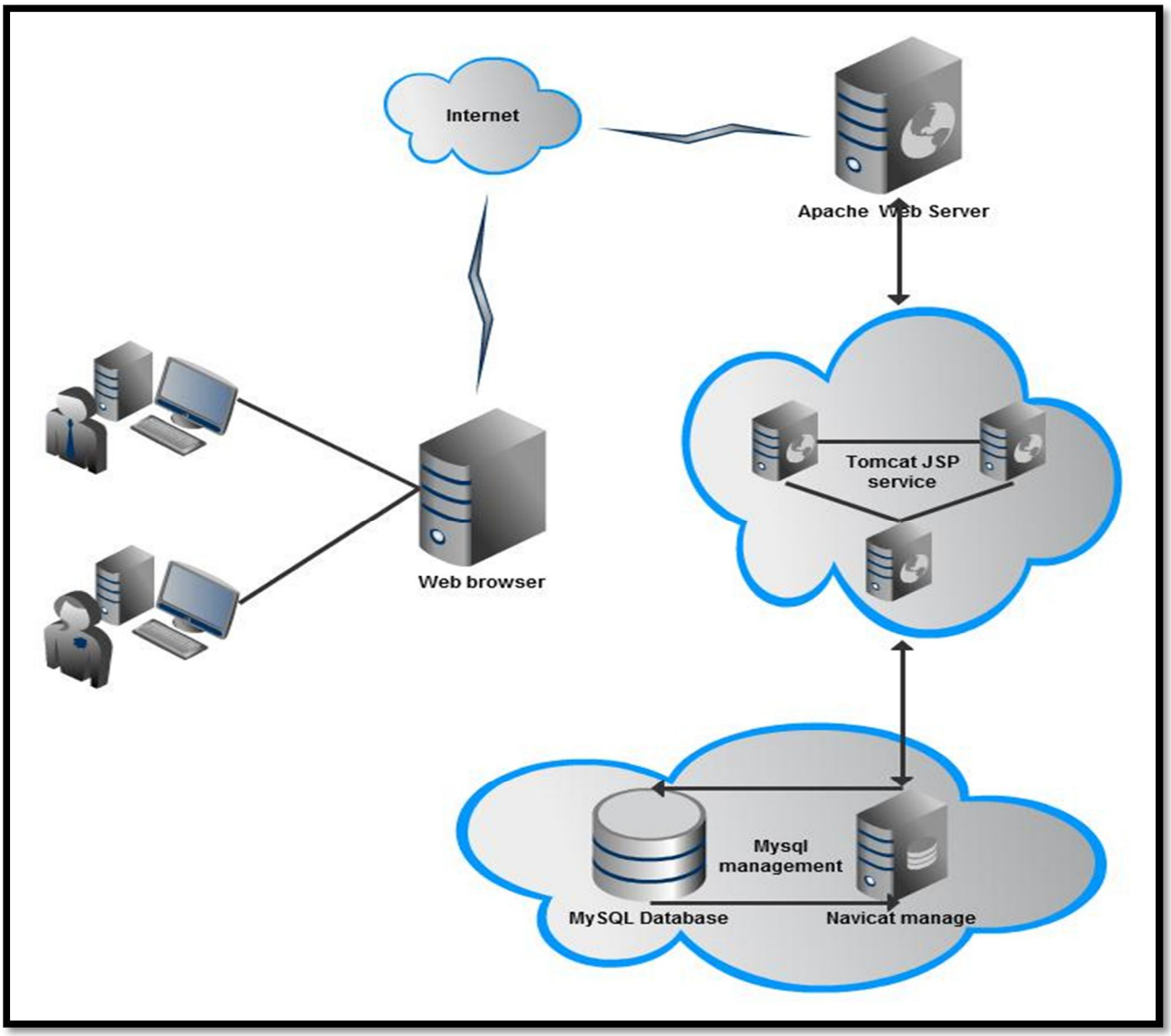

Figure 4. 25: Interact the users with the operations OQS.

4.4.1 Statistical Analysis Functions

Statistical analysis refers to a collection of methods used to process large amounts of data and report overall trends (Cowan, 1998). Statistical analysis is particularly useful when dealing with surveys that have huge data and to provide appropriate reports to give a final conclusion about the information and data collected. In OQS we have many functions to analysis the questionnaire. This function is Reliability Test, Statistics,

Frequency Table, Correlation and T-Test, for each analysis function has special equations which can be illustrated as follows (Peck & Devore, 2010):-

Reliability Test: - To find the alpha value for any question you must apply the following equation: -

$$\boldsymbol{\alpha = \frac{k^2 \times sp^2}{k^2 \times sp^2 + ks^2}}$$

Where k represents the answer options for each question, it can calculate the value of sp^2 from the following equation: -

$$\boldsymbol{sp^2 = \frac{(kp_1 - \mu)^2 + (kp_2 - \mu)^2 + \cdots + (kp_i - \mu)^2}{k}}$$

As can be calculated s^2 from the following equation: -

$$\boldsymbol{s^2 = \frac{(kp_1)^2 + (kp_2)^2 + \cdots + (kp_i)^2}{k}}$$

Statistics: - In this function, we have many from function types.

Mean: - where equation the mean is:

$$\mathrm{X'} = \frac{\sum_{i=1}^{n} Xi}{\mathrm{n}}$$

Standard deviation: where equation the standard deviation is:

$$\mathrm{Std.deviation} = \sqrt{\frac{\sum_{i=1}^{n} (Xi - X)\text{^}2}{N-1}}$$

Minimum is representing the small value in the data.

Maximum is representing the large value in the data.

Sum is representing the total value in the data.

Frequency Table: - A table represents the percentage of respondents in a specific field and uses tally marks to record and show the number of times they occur (For example if we have 10 respondents in questionnaire, what is percentage male and female?).

Correlation: - To find correlation we use this equation: -

$$r = \frac{\sum(x - \overline{x})(y - \overline{y})}{(n-1)(s_x)(s_y)}$$

Where X,Y the values that we need to find correlation for them.

$\overline{x}$: mean to x.

$\overline{y}$: mean to y.

N: number of participation.

s_x : Standard deviation to x.

$$x^s = \frac{\sqrt{\Sigma i = 1\ (Xi - X)\text{^}2}}{n-1}$$

s_y : Standard deviation to y.

$$y^s = \frac{\sqrt{\Sigma i = 1\ (yi - y)\text{^}2}}{n-1}$$

Correlation that use to measurement the correlation among variables X and Y (from -1 to 1), if correlation close to 1 become the strongest correlation between the variables in other hand, if the correlation Away from 1 becomes weakest, if the correlation = 1 it's Called optimal correlation.

T-Test: - TO find T-Test, we use the equation: -

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n(\sum x^2) - (\sum x)^2][n(\sum y^2) - (\sum y)^2]}}$$

Where:

N: represent number of question in each section.

X: represent the first value that we need to test in each section.

$\sum x$: Represent total x for each section.

Y: represent the second value that we need to test in each section.

$\sum y$: Represent total y for each section.

After find r, we can find T-Test by this equation:-

$$T = r\sqrt{\frac{n-2}{1-r^2}}$$

4.4.2 Programming the Questionnaire

Programming the questionnaire is a collection of coding that are built and assembled to form OQS system. This is done by bringing together the four components:

- Design a Questionnaire: - To create a questionnaire, must take into account the researcher, who will create questionnaire simple and easy to manage the questionnaire and selecting an answer type, which could be Text Box, Radio Buttons, and Checkboxes.
- Publish the Questionnaire: - Once a questionnaire is completed, researchers can publish it by sending the survey link out via email. Responders on the Internet will then be able to view the questionnaire via a browser.
- Submit the Data: - By clicking a relevant link on a browser, responders can view the questionnaire. If they satisfy the information they provide on the questionnaire, they can click the "Submit" button. Then, data will be delivered via the Internet to the web server and inserted to the database.
- Analysis the Data: - Researchers can perform data analysis at anytime. The system provides summary of the submitted data by providing the statistics results, such as the total number of responders for the questionnaire, and the total number of responders for each male and female.

4.5 Summary

In this chapter, we dealt three phases of development methodology that used Extreme Programming (XP). These phases are analysis, design and development prototype. The researcher used this methodology to improve and test the prototype. Furthermore, the interface of the system will be presented in the next chapter.

CHAPTER FIVE
PROTOTYPE DEVELOPMENT AND IMPLEMENTATION

5.1 INTRODUCTION

This chapter aimed to illustrate the development of prototype system based on the proposed model as discussed in chapter four. This explains in detail how the users and participants can interact with the OQS. The interaction is due through use interfaces, which we designed according to the user requirements.

5.2 Interface Design

The interface design refers to interfaces pages for the OQS system. Which we will explain the details and their relationship between the researcher and the participant.

5.2.1 Login Page

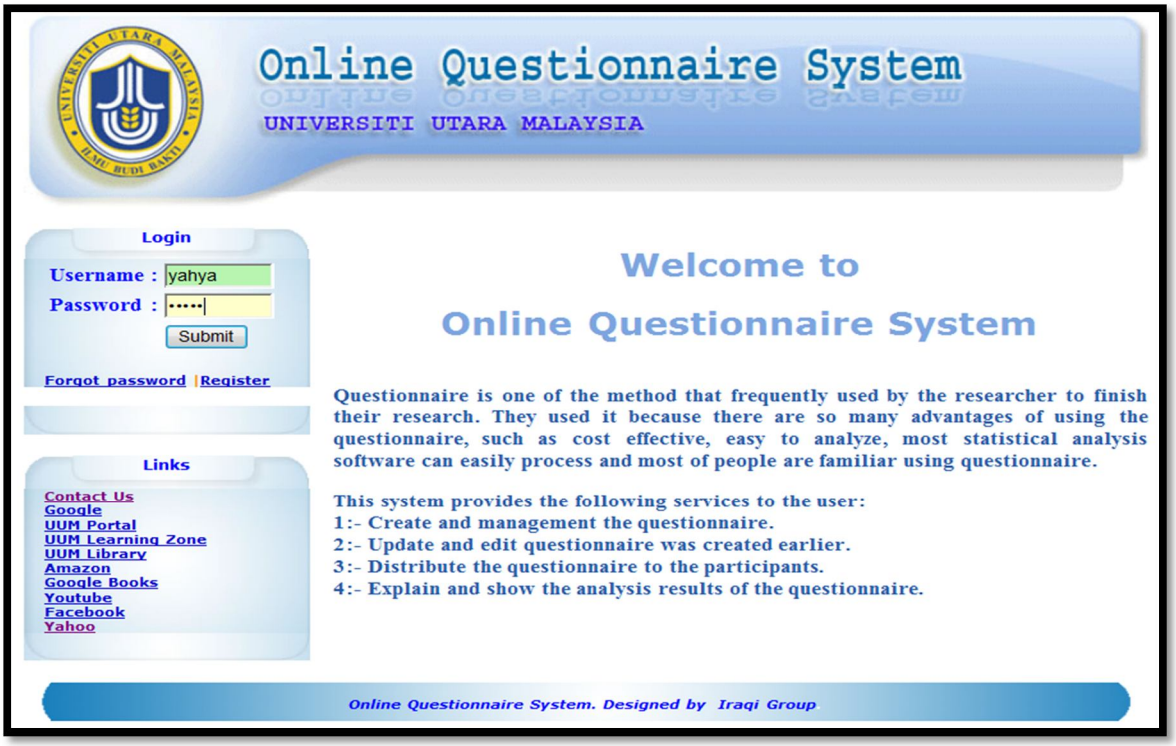

Figure 5. 1: Login page.

The user inserts user name and password and presses the Submit button. If incorrect the system will display an error message “Wrong Username or Password!”. For the participant, if the participant answers the questionnaire, the system will display an error message "Your ID is already answer this Questionnaire!". In this page the user has option to choose, either for forget password or need to register.

5.2.1.1 Forgot Password Page

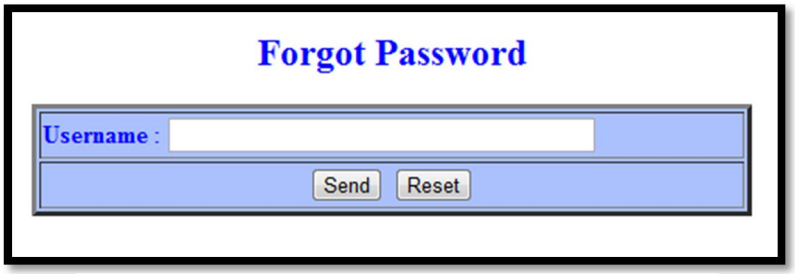

Figure 5. 2: Forgot Password page.

In this page, the user insert name and presses the Send button. The system automatically send password to the user via email.

5.2.1.2 Register Page

Figure 5. 3: Register page.

In this page, the user insert all information in fields as shown in Figure 5.3, and presses Register button. The system automatically verify registration information with the

database, and display successful message if the information user not exist in database, Then, display an error message “Wrong Username or Password!” on the main page.

5.2.2 Home Page User

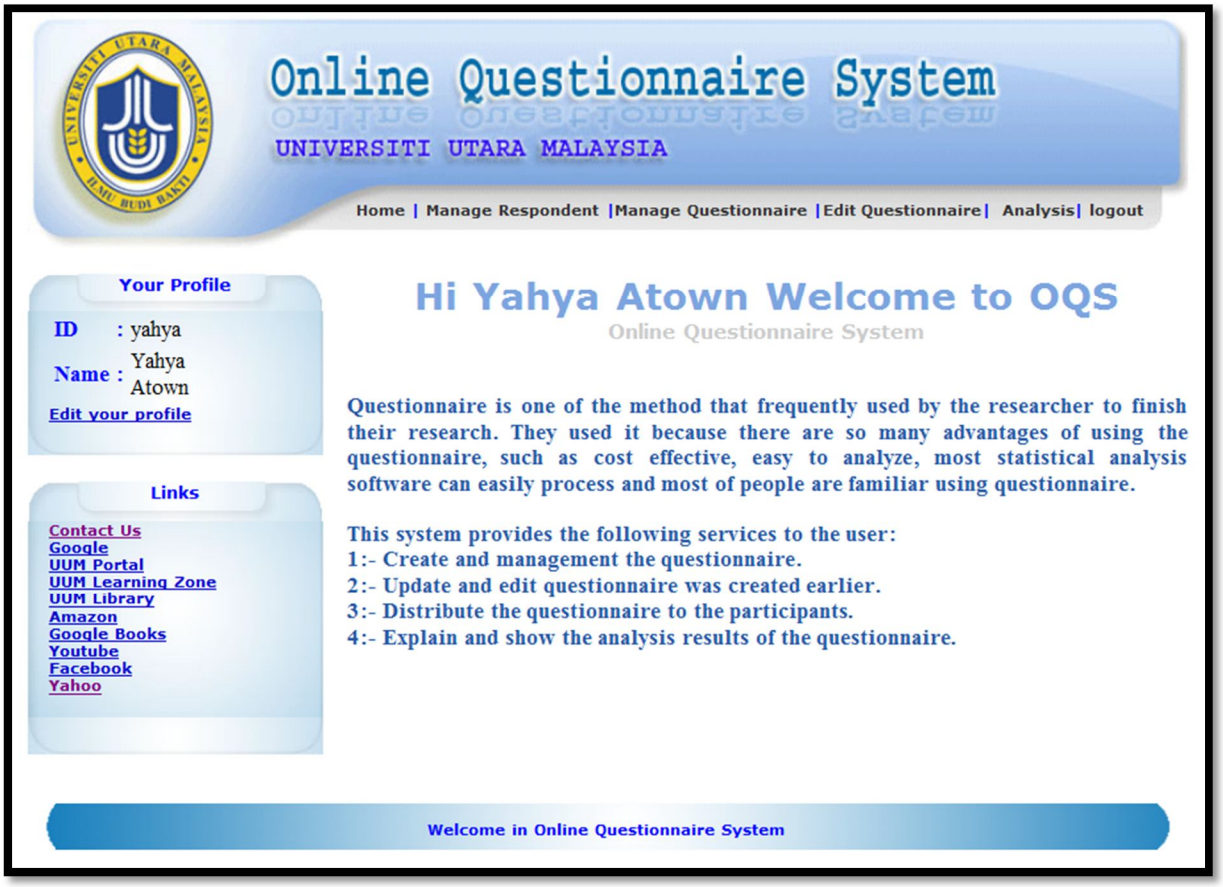

Figure 5. 4: Home Page User.

In this page, the user can move freely and choose the partition that he works on. The next pages explain the work of some important partitions.

5.2.2.1 Manage Questionnaire Page

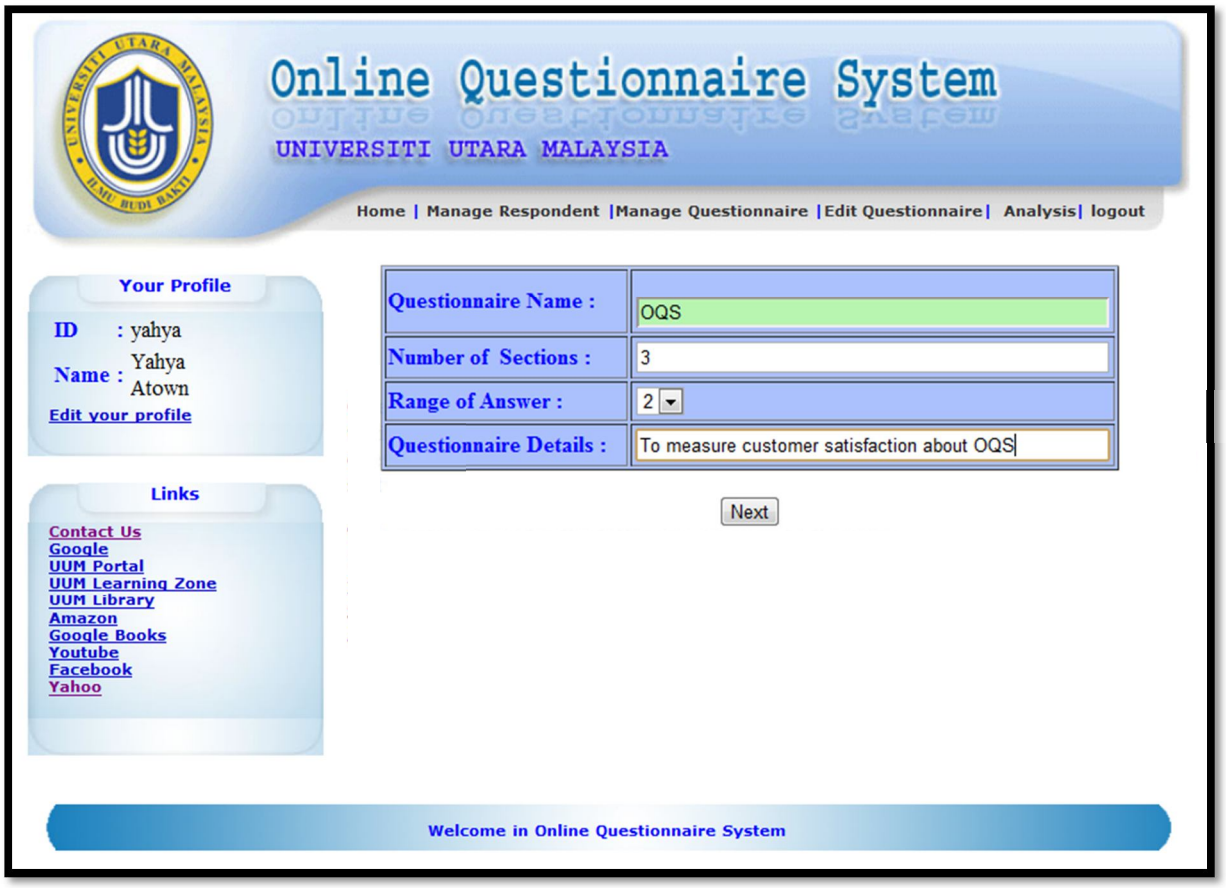

Figure 5. 5: Manage Questionnaire Page.

In this page, the user can manage questionnaire by create questionnaire and selected number of sections and selected range of answer and write detail of questionnaire and presses Next button. In the page as shown in Figure 5.6, the user is required to complete questionnaire and presses Next button.

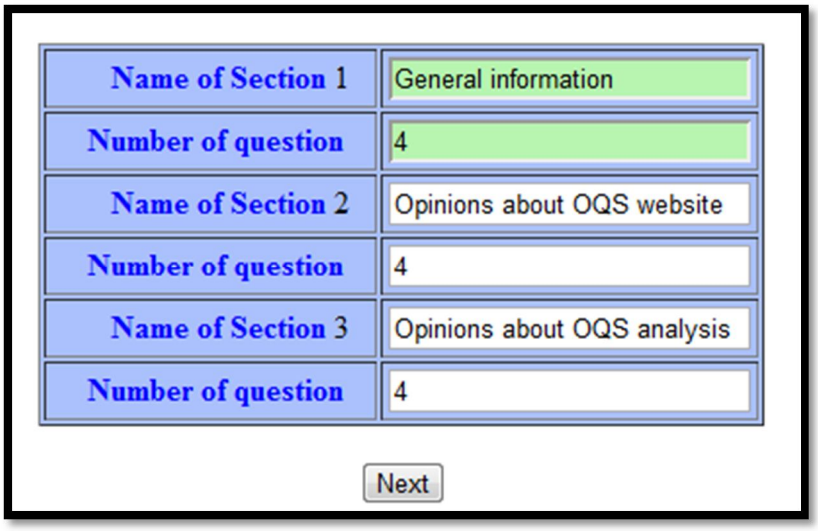

Figure 5. 6: Sections Page.

In the next page as shown in Figure 5.7, the user need to complete the questionnaire and presses Next button to save in the database.

Figure 5. 7: Questions Page.

5.2.2.2 Manage Respondent Page

Figure 5. 8: Manage Respondent Page.

In this page the user can manage respondents by add and select the participants and determined the questionnaire. The user must select the participants by two ways, first insert name and Email the participants by presses "Add users" button as shown in Figure 5.9.

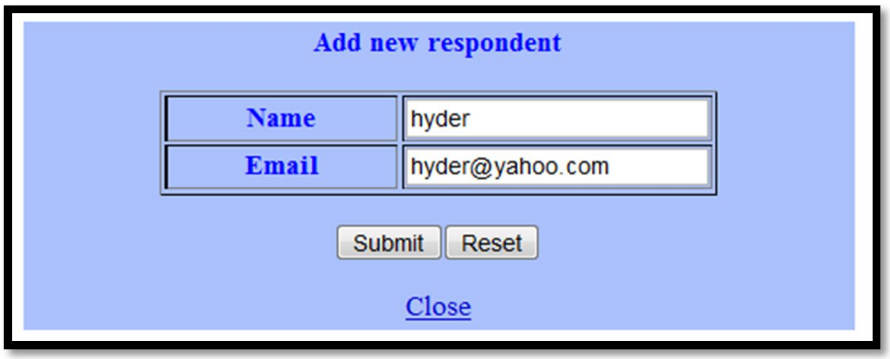

Figure 5. 9: Add New Respondent Page.

Second, select participants from the list by press "Select users" button and check box the participants as shown in Figure 5.10.

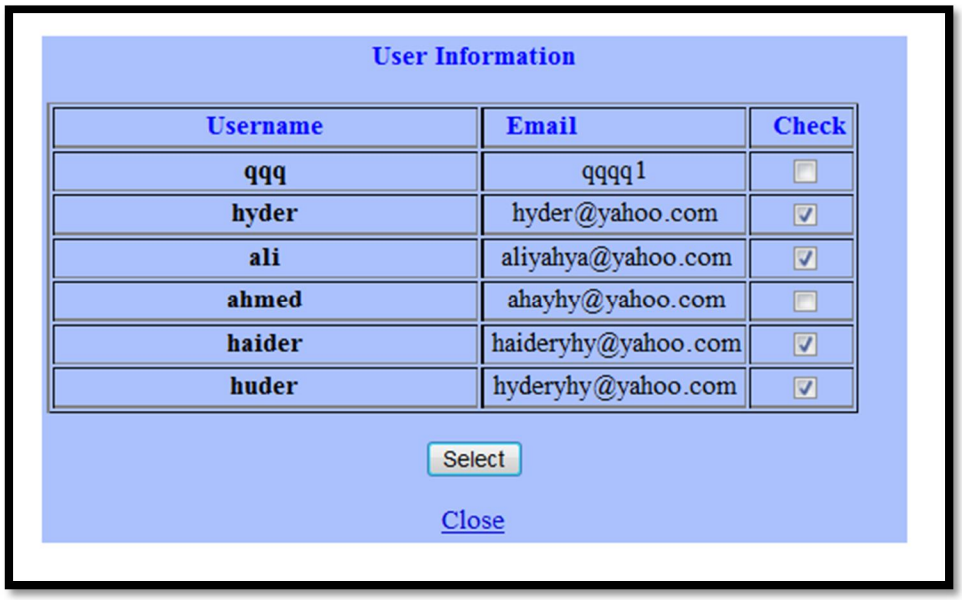

Figure 5. 10: Select Respondent Page.

The user must choose questionnaire that who wishes from the participants to answer them and press "Submit" button to send username and password to participants as shown in Figure 5.11.

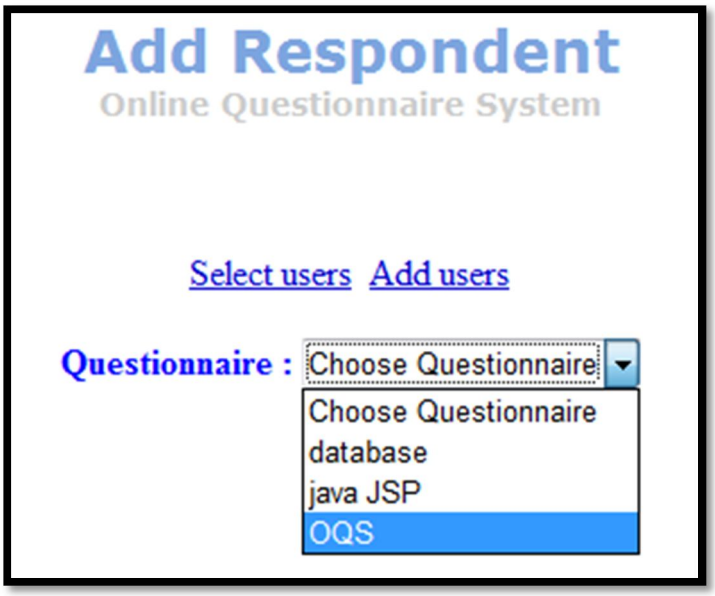

Figure 5. 11: Select Questionnaire Page.

5.2.2.3 Analysis Page

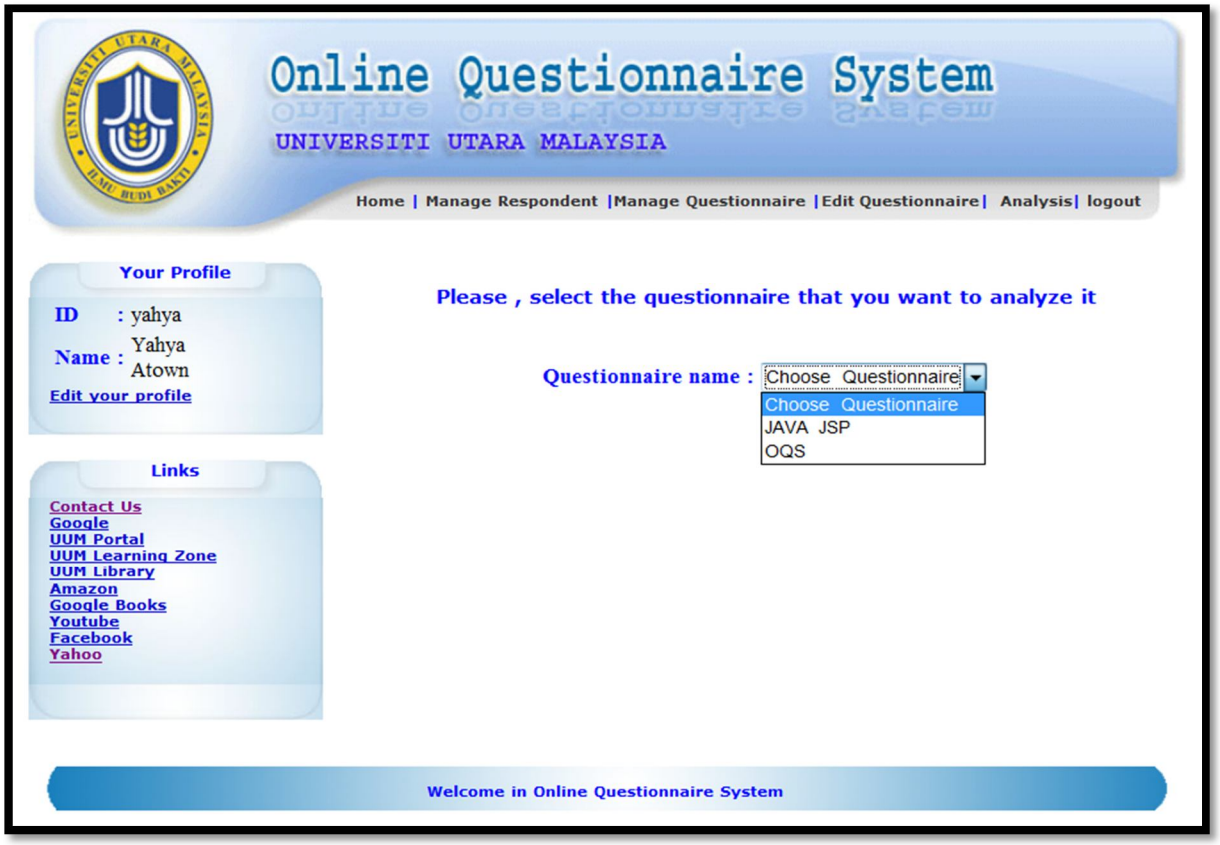

Figure 5. 12: Analysis Page.

The user can see the results of the analysis questionnaire through this page. The user must specify the name of the questionnaire in order to display the results of the analysis of this questionnaire. There are types of analysis on this page are shown in Figure 5.13: -

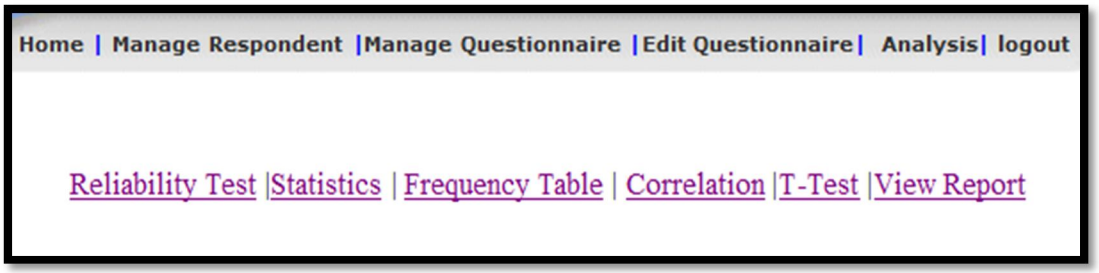

Figure 5. 13: Types of Analysis Page.

5.2.3 Home Page Participant

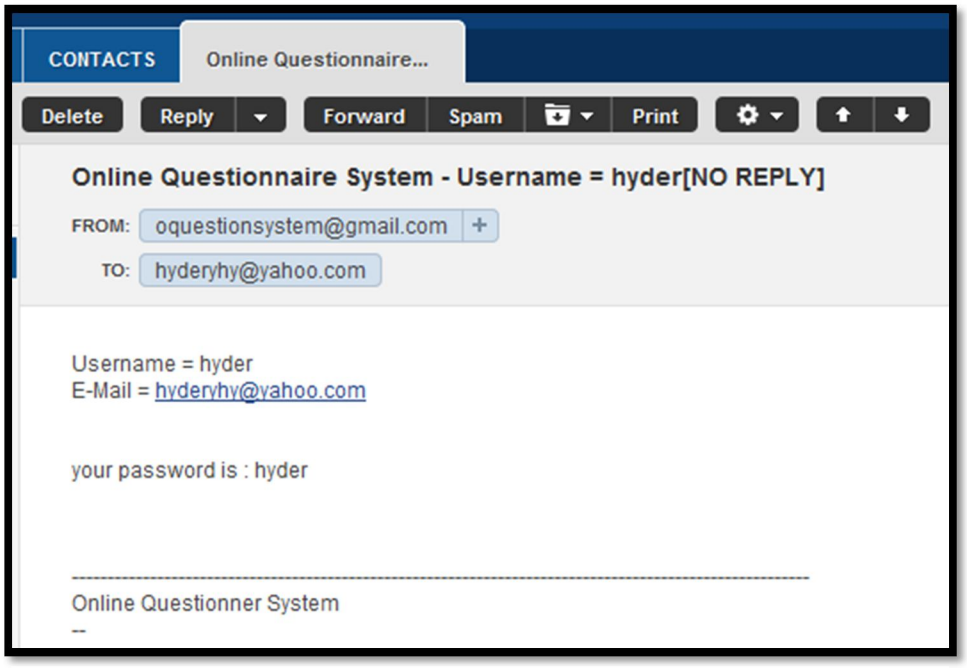

Figure 5. 14: Respondent Email Page.

The participant will receive an email from the OQS as shown in Figure 5.14. The contents of this email are the username and password, and the participant will be able to enter to the OQS website through this username and password and proceed to answer the questionnaire as shown in Figure 5.15.

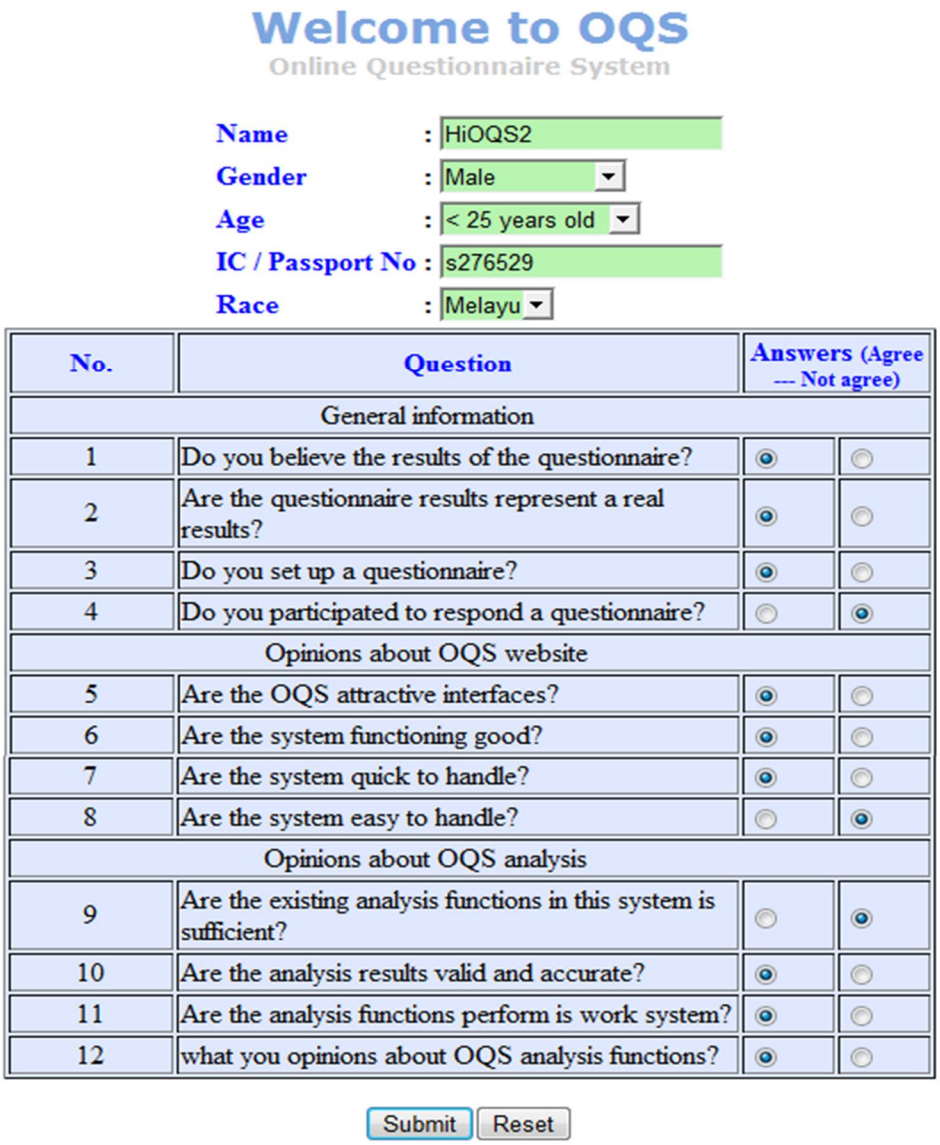

Figure 5. 15: Home Page Participant.

5.3 Implementation

5.3.1 Physical Architecture

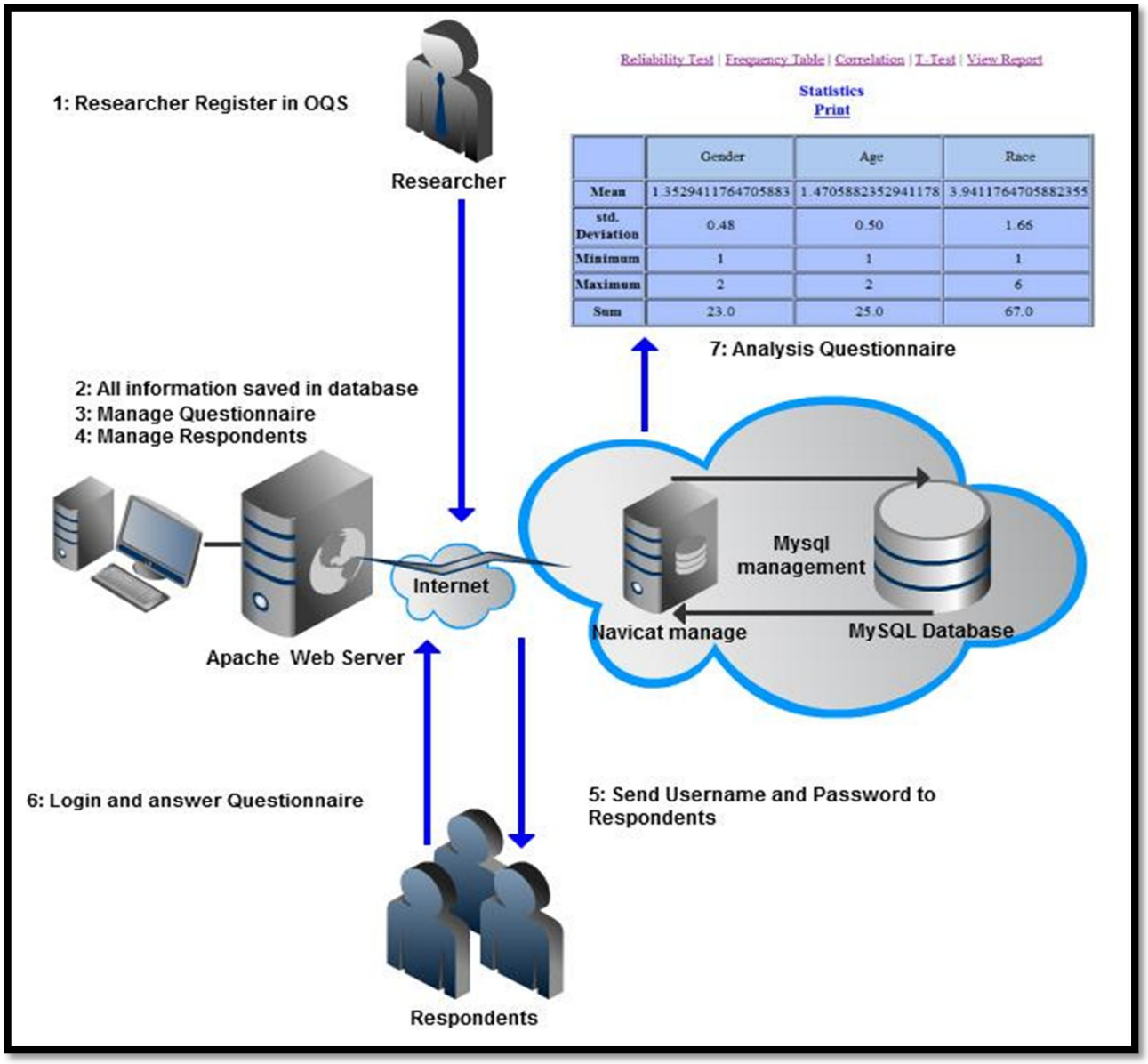

Figure 5. 16: OQS Architecture.

As shown in Figure 5. 16, OQS architecture that has been adopted to describe the activity of designing OQS system, Which descriptive the relationship between the researcher and the respondent with the system and also show how to interact and work the system to show the desired results.

5.3.2 Users for the System

5.3.2.1 Researcher

The researcher in this system refers to any person who wants to establish a questionnaire and distributed to a group of participants. This system can announce in the university websites because of their direct association with researchers. The researcher can access to this system through the registration step. The researcher can manage and distribute a questionnaire to the participants for the purpose of answering a questionnaire and conduct the appropriate questionnaire analysis.

5.3.2.2 Participants

The participants in this system refer to any person who wants to answer a questionnaire. The researcher after manage questionnaire and distribute it to the participants, the system send username and password to participants via email, the participants can access to the system through the login phase.

5.4 Summary

In this chapter, we dealt with a simple explanation for interfaces design the OQS, then, explain the implementation of the OQS.

CHAPTER SIX
VALIDATION AND EVALUATION

6.1 Introduction

The aim of this chapter is to discuss the validation and evaluation of the OQS prototype. It explains detail about the usefulness of the OQS. The evaluation phase consists of two parts which are: the usability test for the OQS prototype and user's satisfaction. A usability testing is one of the most accepted methods that used in the evaluation phase, because the users are asked to use the real data of the product. The users are usually asked to think while doing the testing.

The evaluation is based on usability testing questionnaires (Williams, 2003). The questionnaires have to section, general information and existing practice on using statistical analysis functions. The prototype was assessed through a statistical analysis that distributed of questionnaire for a sample of 29 respondents. SPSS version 17 was used to perform descriptive statistics analysis for the collected information. Descriptive analysis is used for a description the basic features of the data that collected.

6.2 Demographic Data

The first section of the questionnaire focuses on general information about the respondents. The gender as illustrated in Table 6.1 and Figure 6.1, 17 (58.6%) of the respondents were male and 12 (41.4%) were female.

Table 6. 1: Gender of sample.

Gender	Frequency	Percent
Male	**17**	**58.6**
Female	**12**	**41.4**

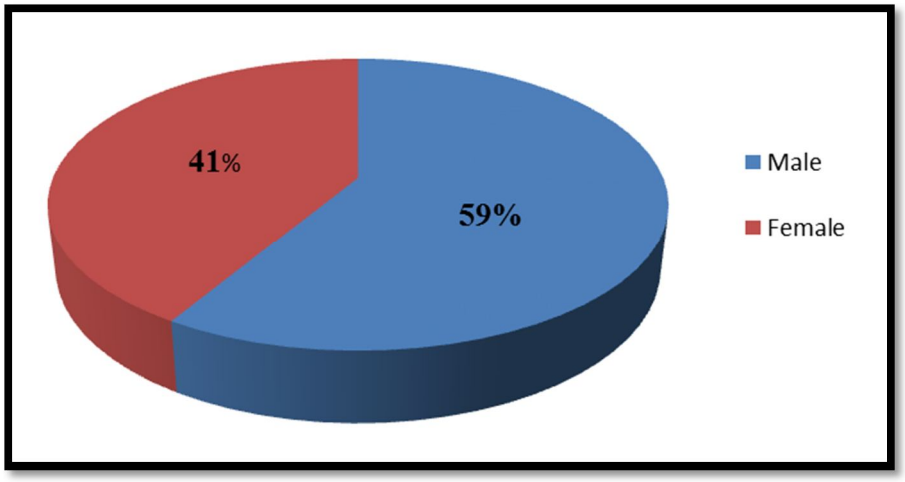

Figure 6. 1: Picture chart to represent gender.

As shown below in Table 6.2 and Figure 6.2, most of the sample age ranges between 20-24 years old with 7 (24.1%), 25-29 years old with 9 (31.1%), 30-34 years old with 8 (27.6%) and 35-39 years old with 5 (17.2%).

Table 6. 2: Age of sample.

Age	Frequency	Percent
20-24 years old	7	24.1
25-29 years old	9	31.1
30-34 years old	8	27.6
35-39 years old	5	17.2

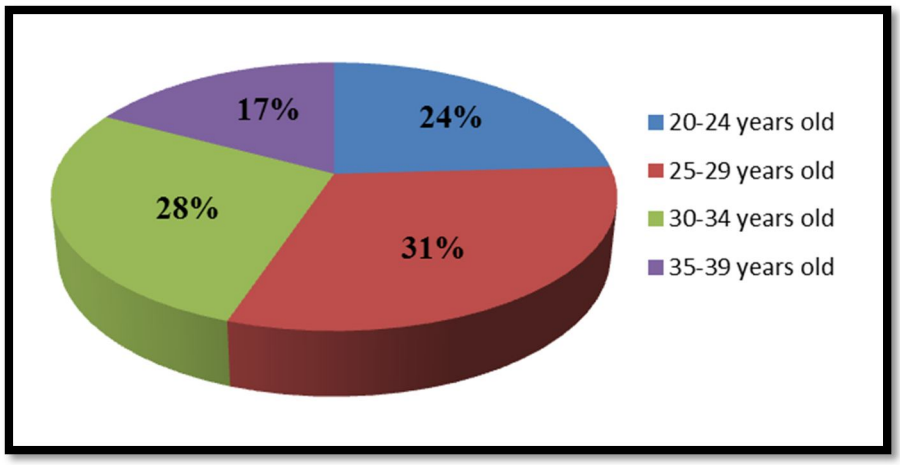

Figure 6. 2: Picture chart to represent age.

As shown in Figure 6.3, most of the sample degree of scientific is 7 (24.1%) of the respondents were B.Sc., 17 (58.6%) of the respondents were Master and 5 (17.3%) were PHD.

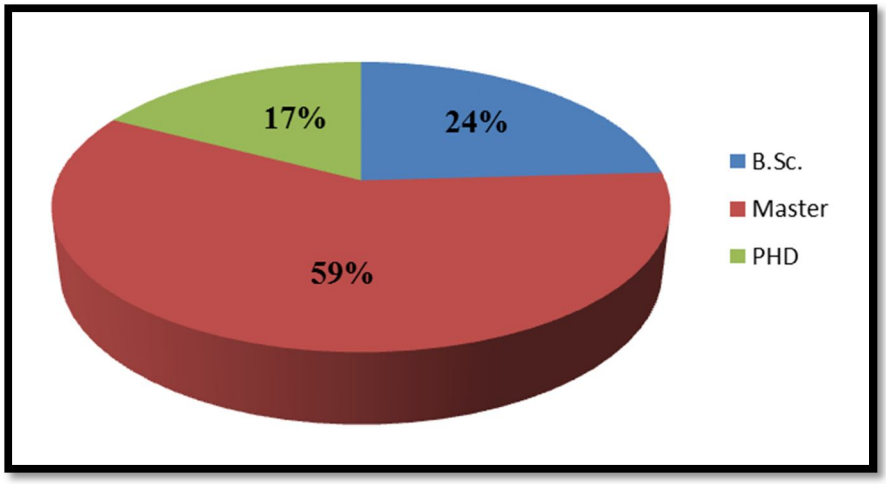

Figure 6. 3: Picture chart to represent degree of scientific.

Most participants who had previously participated in questionnaire are 27 (93.1%) and tow of the respondents (6.9%) did not participate. Most of the participants who had previously established the questionnaire is 17 (58.6%) and 12 (41.4%) did not established the questionnaire.

6.3 Statistical Analysis Functions in OQS.

The summary of the descriptive statistic of the variables is shown in Table 6.3. All variables were measured using 2, 3 and 4 points Likert scale.

Table 6. 3: Descriptive Statistics.

Questions	Mean	Median	Std. Deviation	Minimum	Maximum
Is the questionnaire on the Internet the best way from the way normal?	**1.2759**	**1**	**0.4549**	**1**	**2**
Do you think the use of the Internet to collect data from participants the best possible way?	**1.2414**	**1**	**0.4355**	**1**	**2**
Are the statistical analysis functions that provide Online Questionnaire website is sufficient?	**1.3103**	**1**	**0.4708**	**1**	**2**
Do you conduct the analysis necessary to complete the usefulness of the questionnaire?	**1.2414**	**1**	**0.4355**	**1**	**2**
What is the appropriate method used to analyze the data questionnaire?	**1.5172**	**2**	**0.5086**	**1**	**3**
What is your opinion on send an invitation to answer the questionnaire via e-mail?	**1.6897**	**2**	**0.6038**	**1**	**4**
What is your opinion on having statistical analysis functions in Online Questionnaire website?	**1.5517**	**2**	**0.5061**	**1**	**4**
Do you agree if the statistical analysis functions are used in Online Questionnaire website?	**1.6897**	**2**	**0.6038**	**1**	**4**

The following tables and charts described the result of this study. The greatest number of respondents (72.4%) said the Internet is the best way to establish the questionnaire (Table 6.4).

Table 6. 4: Question 1.

Is the questionnaire on the Internet the best way from the way normal?				
		Frequency	Percent	Valid Percent
Valid	Yes	21	72.4	72.4
	No	8	27.6	27.6
	Total	29	100.0	100.0

The feedback for question two is shown in Table 6.5. The highest number of respondents (75.9%) agreed that the Internet is the best way to collect data from participants.

Table 6. 5: Question 2.

Do you think the use of the Internet to collect data from participants the best possible way?				
		Frequency	Percent	Valid Percent
Valid	Yes	22	75.9	75.9
	No	7	24.1	24.1
	Total	29	100.0	100.0

The responses for question three is shown in Table 6.6. Most participants (69%) said statistical analysis functions that provide in OQS is sufficient, on the other hand nine of the participants (31%) said no it is not sufficient.

Table 6. 6: Question 3.

Are the statistical analysis functions that provide Online Questionnaire website is sufficient?				
		Frequency	Percent	Valid Percent
Valid	Yes	20	69.0	69.0
	No	9	31.0	31.0
	Total	29	100.0	100.0

Most of the participants (75.9%) conduct the analysis questionnaire necessary to find results, with 24.1%, find it the analysis questionnaire not necessary. These data are illustrated in Table 6.7.

Table 6. 7: Question 4.

Do you conduct the analysis necessary to complete the usefulness of the questionnaire?				
		Frequency	Percent	Valid Percent
Valid	Yes	22	75.9	75.9
	No	7	24.1	24.1
	Total	29	100.0	100.0

The responses for question five is shown in Table 6.8. The results were comparable to the best means used for analysis of the questionnaire. The 15 (51.7%) said via computer software. On the other hand, the 14 (48.3%) said via internet website.

Table 6. 8: Question 5.

What is the appropriate method used to analyze the data questionnaire?				
		Frequency	Percent	Valid Percent
Valid	Via Internet website	14	48.3	48.3
	Via computer software	15	51.7	51.7
	Total	29	100.0	100.0

The answers for question six is shown in Table 6.9. The 55.2% of respondents think that send an invitation by e-mail to answer the questionnaire will be useful, and 37.9% of them say it is very useful. Only two participants (6.9%) said it is not useful.

Table 6. 9: Question 6.

What is your opinion on send an invitation to answer the questionnaire via e-mail?				
		Frequency	Percent	Valid Percent
Valid	Very useful	11	37.9	37.9
	Useful	16	55.2	55.2
	Not useful	2	6.9	6.9
	Total	29	100.0	100.0

The response for question seven is shown in Table 6.10. Most of the participants (55.2%) say that the useful to insert statistical analysis functions in Online Questionnaire website. On the other hand, (44.8%) said it is very useful.

Table 6. 10: Question 7.

What is your opinion on having statistical analysis functions in Online Questionnaire website?				
		Frequency	Percent	Valid Percent
Valid	Very useful	13	44.8	44.8
	Useful	16	55.2	55.2
	Total	29	100.0	100.0

The responses for question eight is shown in Table 6.11. Most of participants support the use statistical analysis functions in Online Questionnaire website. 55.2% of the respondents agreed with the suggestion and 37.9% said that they strongly agree with the idea. Only two participants (6.9%) said it is not agreed with the suggestion.

Table 6. 11: Question 8.

Do you agree if the statistical analysis functions are used in Online Questionnaire website?				
		Frequency	Percent	Valid Percent
Valid	Strongly agree	11	37.9	37.9
	Agree	16	55.2	55.2
	Not agree	2	6.9	6.9
	Total	29	100.0	100.0

6.4 Summary

Validation and evaluation is important take in the development process. The responses of eight questions is to find how the usefulness of OQS. Based on the feedback the view is very encouraging. 55.2% say that the useful is to insert statistical analysis functions in OQS website. On the other hand, 44.8% said it is very useful (see Table 6.10). 55.2% of the respondents agreed with use statistical analysis functions in OQS website and 37.9% said that strongly agree with this idea (see Table 6.11). These results above confirm the importance of this study and support the possibility of using OQS.

CHAPTER SEVEN
CONCLUSION AND FUTURE WORK

7.1 Introduction

This chapter reviews the finding and contributions of the project. The limitation of this study and the recommendations for future work we highlighted. The OQS system that helps researchers by establishment of a questionnaire and distributed it to the participants to answer this questionnaire, and analysis questionnaire by using statistical analysis functions that is present within the system.

7.2 Problems and Limitations

There are many limitations of OQS, such as the researcher must know who the participants and able to access the internet. In addition, respondents may have difficulty in reading or understand the questionnaire, this leads to random answers. In addition, there is cost of time to download and open e-mail and effort to establish and maintain the internet connection. The difficulty identity the participants email in order to send an invitation for the questionnaire is use of the crucial limitation.

7.3 Future Work

Based on the results obtained from the assessment, the future work is to use the OQS system with UUM learning zone. This well helps students and researcher to create questionnaire and distribute to a group of students, and stats in UUM database. Therefore, the researchers are able to collect and analyze information easily, which does not take much time when compared with the normal way.

7.4 Conclusion

The increasing of internet usage led to use an online questionnaire system to collect the data. The design depends on many factors. Each factor has an impact on quality of the data. The factors are available question formats, administration of the questionnaire, and analysis of the questionnaire results. OQS can be applied in to gather with the UUM learning zone and the researchers need to register to set service on this website. The OQS provides an efficient and effective system to help researchers to create questionnaire as online. The system also enables researchers to analyze questionnaires in a high level, without spend much time to run statistical functions, because the system has supported by SPSS features. According the results of the assessment system, the user prefers to use OQS for developing and using the questionnaire. This is proved the OQS can be used on the web environment.

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APPENDIX A: RELIABILITY TEST PAGE.

Statistics | Frequency Table | Correlation |T-Test |View Report

Print

Question NO	Alpha
1	0.986
2	0.977
3	0.945
4	0.986
5	0.972
6	0.961
7	0.972
8	0.778
9	0.958
10	0.972
11	0.961
12	0.986

APPENDIX B: STATISTICS PAGE.

Reliability Test | Frequency Table | Correlation | T-Test | View Report

Statistics
Print

	Gender	Age	Race
Mean	1.3529411764705883	1.4705882352941178	3.9411764705882355
std. Deviation	0.48	0.50	1.66
Minimum	1	1	1
Maximum	2	2	6
Sum	23.0	25.0	67.0

APPENDIX C: FREQUENCY TABLE PAGE.

Gender

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Male	11	64.70588235294117%	64.70588235294117%	64.70588235294117%
Female	6	35.294117647058826%	35.294117647058826%	100.0%
Total	17	100%	100%	

Age

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
>= 25 years old	9	52.94117647058824%	52.94117647058824%	52.94117647058824%
< 25 years old	8	47.05882352941176%	47.05882352941176%	100.0%
Total	17	100%	100%	

Race

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Others	1	5.88235294117647%	5.88235294117647%	5.882352941176478%
Melayu	4	23.52941176470588%	23.52941176470588%	29.411764705882348%
India	2	11.76470588235294%	11.76470588235294%	41.176470588235304%
Arabic	2	11.76470588235294%	11.76470588235294%	52.94117647058826%
English	4	23.52941176470588%	23.52941176470588%	76.47058823529414%
Cina	4	23.52941176470588%	23.52941176470588%	100.0%
Total	17	100%	100%	

APPENDIX D: CORRELATION PAGE.

Reliability Test | Statistics | Frequency Table | T-Test | View Report

Correlation
Print

Correlation	The R value
Age and Race	-5.416654805113294E-18
Age and Gender	9.346584400454846E-18
Gender and Race	-3.88953910783057E-18

APPENDIX E: T-TEST PAGE.

Reliability Test | Statistics | Frequency Table | Correlation | View Report

T-Test
Print

Question number	x(male)	x^2	y(female)	y^2	x*y
1	11	121	6	36	66
2	11	121	6	36	66
3	11	121	6	36	66
4	11	121	6	36	66
5	11	121	6	36	66
6	11	121	6	36	66
7	11	121	6	36	66
8	11	121	6	36	66
9	11	121	6	36	66
10	11	121	6	36	66
11	11	121	6	36	66
12	11	121	6	36	66
Sum	132.0	1452.0	72.0	432.0	792.0
T-Test result	NaN				

APPENDIX F: VIEW REPORT PAGE.

Details of Questionnaire

Questionnaire Name :	OQS	
Range of Answer :	2	
Total Sections :	3	
Total Questions :	12	
Total Respondents :	17	
Questionnaire Details :	To measure customer satisfaction about OQS	
Gender :	**Male :**	11
	Female :	6
Age :	**>= 25 years old :**	9
	< 25 years old :	8
Race :	**Others :**	1
	Melayu :	4
	India :	2
	Arabic :	2
	English :	4
	Cina :	4

No.	Question
1	Do you believe the results of the questionnaire?
2	Are the questionnaire results represent a real results?
3	Do you set up a questionnaire?
4	Do you participated to respond a questionnaire?
5	Are the OQS attractive interfaces?
6	Are the system functioning good?
7	Are the system quick to handle?
8	Are the system easy to handle?
9	Are the existing analysis functions in this system is sufficient?
10	Are the analysis results valid and accurate?
11	Are the analysis functions perform is work system?
12	what you opinions about OQS analysis functions?

View Respondent

APPENDIX G: VIEW DETAILS RESPONDENT ANSWER PAGE.

Respondent Name : hyder
Gender : 1
Age : 1
IC / Passport : r765677
Race : 2

No.	Question	Answer
1	Do you believe the results of the questionnaire?	1
2	Are the questionnaire results represent a real results?	1
3	Do you set up a questionnaire?	1
4	Do you participated to respond a questionnaire?	1
5	Are the OQS attractive interfaces?	1
6	Are the system functioning good?	2
7	Are the system quick to handle?	2
8	Are the system easy to handle?	0
9	Are the existing analysis functions in this system is sufficient?	1
10	Are the analysis results valid and accurate?	1
11	Are the analysis functions perform is work system?	1
12	what you opinions about OQS analysis functions?	1

APPENDIX H: QUESTIONNAIRE.

Analyzing Functionalities for Online Questionnaire System (OQS)

Thank you for participating in the Analyzing Functionalities for Online Questionnaire System (OQS). The survey is part of our research work to investigate the usefulness of the Online Questionnaire System by using statistical analysis functions. We appreciate your kind cooperation in completing this questionnaire, and we ensure you that the data you provided will be treated as confidential and will be used for research purposes only.

If you have any questions about this survey or need our assistance, please contact us by phone at (01119600717) or by email at (hyderyhy@yahoo.com).

Section A: Respondent Demographic Data.

Please fill the following information or check box your choice.

I. Gender.

Male ☐ Female ☐

II. Age. _____

III. What is your degree of scientific?

B.Sc. ☐ Master ☐ PHD ☐

IV. Did you participate in questionnaire?

Yes ☐ No ☐

V. Did you establish a questionnaire?

Yes ☐ No ☐

Section B: Existing Practice on Using statistical analysis functions on Online Questionnaire website.

Please check box your choice.

1. Is the questionnaire on the Internet the best way from the way normal?

   Yes ☐ No ☐

2. Do you think the use of the Internet to collect data from participants the best possible way?

   Yes ☐ No ☐

3. Are the statistical analysis functions that provide Online Questionnaire website is sufficient?

   Yes ☐ No ☐

4. Do you conduct the analysis necessary to complete the usefulness of the questionnaire?

   Yes ☐ No ☐

5. What is the appropriate method used to analyze the data questionnaire?

   Via Internet website ☐

   Via software computer (such as SPSS) ☐

   Other means ☐

6. What is your opinion on send an invitation to answer the questionnaire via e-mail?

   Very useful

   Useful ☐

   Not useful ☐

   Strongly not useful ☐

7. What is your opinion on having statistical analysis functions at Online Questionnaire website?

   Very useful ☐

   Useful ☐

   Not useful ☐

   Strongly not useful ☐

8. Do you agree if the statistical analysis functions are used in Online Questionnaire website?

   Strongly agree ☐

   Agree ☐

   Not agree ☐

   Strongly not agree ☐