

**Developing Mobile application for the E-commerce for the UUM
students community**

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ABSTRACT

Additionally, internet commerce continues to grow rapidly, with growing customers. The new integrations nowadays, obtained for customer to browse their certain information via Web and Wap services. This study has been suggest the using of WAP technology to help UUM students for browsing their enquire about the different items, otherwise, the reason of this services can simply presents the easily way and flexibility to access the information at any time in any location. This research introduces a WAP application that provides the UUM students with the service of the other information that most of the students need it in order to reduce the time and the effort for them. By using this technology, students can easily get necessary information about the item information, name, description, and prices. Moreover, the system supports students to add new item to the system. Mobile E-commerce guide system for UUM students has been tested to and evaluated to identify the system usability.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

Today there is a fast development of information technology that can be used to support user's mobility (Andrews T., et al., 2003). The very fast development in the area of telecommunications, which makes it possible to browse information to and from different mobile units, e.g. cellular phones and PDAs. This new technology is forming a new industry with a focus on IT and mobility (Abowd, 1997). The systems which are built with this new technology combine: such as WAP technology, and Mobile device.

The Wireless communication, especially personal mobile devices, has seen tremendous growth over the past few decades. As a consequence, value-added data services, WAP based applications and Web services are in high demand (Mitra, et al., 2004). But given the fact that it is the responsibility of the technology to ensure that its benefits reach the maximum number of people (Polylab, 1998); (Teng et al., 2007).

With the development of wireless technology and mobile phone technology the exchange of data and information has become easier and with the proliferation of telecommunications networks in the world, to contact any place and at any time to obtain information has become easy (Stuckman, P., 2001).

The spread of the evolution of the mobile phone in the world rapidly imposed on the programmer to think about how to exploit this proliferation of community service through the improvement and development of services which has saved a lot of valuable time to the society in the process of obtaining information (Sheldon, P., 2004). Many programming languages began supporting mobile phone or PDA devices, and many of the programmers have begun to develop new languages compatible with the rapid advances in the mobile computing field of languages programming that support mobile phone programming languages such as: ASP.NET, J2ME, WML, PHP, etc (Svanas D., 2001). With this development it is incumbent on us to facilitate user access to data from anywhere and at any time through the development of programs. Moreover, to facilitate the retrieval of user data through phone networks, an emerged idea here is to develop a system mobile application (World Wide Web Consortium, 2003); (Zipf A., Malaka R., 2001).

Our system basically is an application on the E-commerce that allow UUM students to search for anything they need to buy or post anything they have for sale, the four main categories are (Housing, Vehicles, Books, and Electronics), for example a student finish his study at UUM and he want to sell his car or any electronic devices that he don't need or his books, all what he need to do is upload all the information about this object and a brief description about it and the desirable price and his contact information. So it will be easy for search, all what you need to do is choose the category that you looking for and search for the service that u need.

1.2 Research Questions

- What are the requirements for designing mobile application for E-commerce for the UUM student community?
- What are the user requirements towards the use of design mobile application for E-commerce for the UUM student community?

1.3 Problem Statement

The problem can simply consider for big communities like UUM community to supports and provides UUM students with the last e-commerce details. However, it is hard that everyone know everyone, so by using mobile application such our application will make it easy to be updated with last services and without wasting time to go out and search and look for the posters on the walls or search for it in the newspaper or any other traditional ways.

Otherwise most of those students unable to identify the prices and other related information for the items that need to enquire about. Hence, the study suggested to use the mobile device for more flexibility guide and the easy access anytime and anywhere for their enquires.

1.4 Research Objectives

The objectives of this study can classify to:

- To identify the students and system requirements of designing mobile application for E-commerce for the UUM student community.
- To design the proposed mobile application for the E-commerce for the UUM student community.
- To develop and evaluate the mobile e-commerce application.

1.5 Research Scope

In the process of development the proposed Mobile application for E-commerce for the UUM Student Community, the scope of the research is limited on UUM students by provides those students with the appropriate facilities for e-commerce information through their mobile device, the ability of the environments to support and develop the mobile units for communication with the different unites are conducted for more supporting to these services. The main limitation of this research is the deployment of the new application since the deployment process of the application may be costly.

1.6 Research Significance

The project aims to solve the problems that are facing UUM students, through the use of mobile or PDA (A personal digital assistant is a handheld computer, also known as a palmtop computer) for inquiry about the latest e-commerce details.

The importance of E-commerce and its application that the student will use a new method of search for the goods in any time they need and get rid of the traditional ways and get more involved with new mobile technologies.

1.7 Thesis Structure

Chapter One:

Explains and identifies the background of the study and the research problems that need to be solved which gives motivation to this study. The objective, scope and its significance has been identified and described well.

Chapter Two:

In this chapter the discusses and the practices of this service will identify from the related literature reviews to the issue of Design mobile application for E-commerce for the UUM Student Community by using WAP technology.

Chapter Three:

Describes and discusses the research methodology which is adapted in this study.

Overview of the methodology and the discussed.

Chapter Four:

Discusses the implementation of the Design mobile application for E-commerce for the

UUM Student Community system.

Chapter Five

This chapter provides the proposed system discussion and evaluation using the questionnaire to measure the user acceptance.

Chapter Six

The final chapter gives the conclusion to the study. Recommendations and directions of future work are discussed.

1.8 Summary

The first chapter gives and insight of the project by describing the motivation factors that lead to the selection of the area studied. It also explains the objectives of conducting the study, as well as its significances to the real world situation. These elements are important as it ignites the implementation of the project. The next chapter deals with the

literature review which elaborates on related works that have been established in the same field.

CHAPTER TWO

LITERATURE REVIEW

The technology today can help the tourist by provide them with the flexible application, to deal with the details changing, one of these application which can used or integrate such as Wireless Application Protocol (WAP) is defined by International Engineering Consortium as an application environment and set of communication protocols for wireless devices to communicate with each other and with any external application by (WAP Forum, 2001).

2.1 Introduction to WAP

Wireless Application Protocol (WAP) refers to an application environment and set of communication protocols for wireless devices to communicate with each other and with any external application. It was designed to enable the manufacturers, vendors and technology users around the world to independently access to the Internet and advanced telephony services. The grandest and most beautiful thing in wireless applications protocols is to provide anyone to get the service they want quickly anywhere and everywhere.

2.2 The WAP Protocol Stack

The aim of the mobile services occupied the various fields such as (business, educations, health care, and etc..) all of these services can obtain to implements and browse via the mobile devices which contain the tiny mobile devices such as mobile phone, and devices which need special operating systems such as the pocket PC, which can be able to provide many applications. In another hand mobile devices include the most competitive technology such as the Personal Digital Assistants (PDAs) with or without networking capabilities and mobile phones that may or may not be able to access the Web (Norbayah M., and Norazah M., 2007)

The WAP application can be used to reduce the processing operation on the client side effect, which embraces the client and server approach in order, where a mobile phone equipped with other communications technologies such as a micro browser communicate with a WAP Gateway reside on a server, therefore only a simple browser that capable of displaying contents were placed in the phone while all the intelligent and processing done by the server (Stuckman. P. et al., 2001); (WAP Forum, 2001).

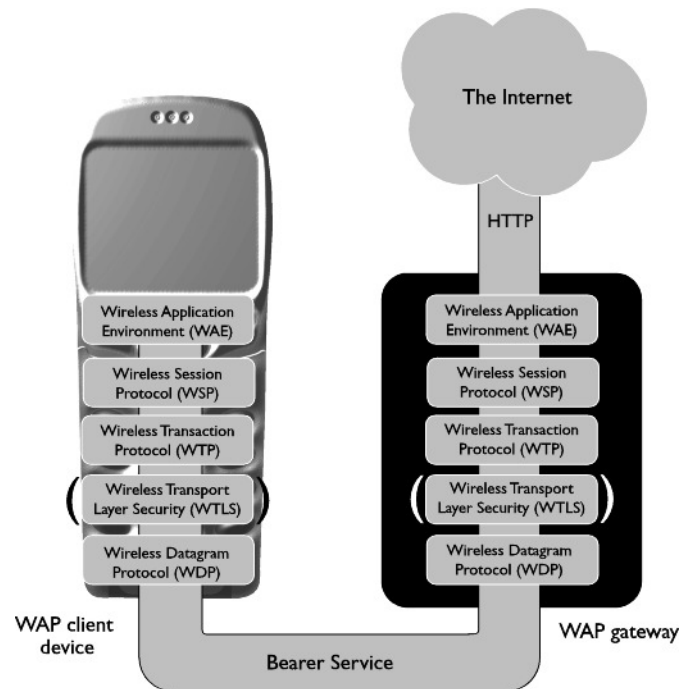


Figure 2.1: WAP Protocol Stack (WAP Forum, 2000)

As shown in figure 2.1, the WAP layer stack contains the following items:

- **Wireless Application Environment (WAE):** This protocol embraces the tools that the wireless Internet content developers utilize. These tools include WML and WMLScript, which is a scripting language used in combination with WML.
- **Wireless Session Protocol (WSP):** This protocol provides two types by work with WTP to provide connection oriented service and connectionless service that provides above WDP.

- ***Wireless Transaction Protocol (WTP)***: This protocol organizes the traffic. It also classifies the request of the transaction into three classes, the reliable two-way, reliable one-way, and unreliable one-way.
- ***Wireless Transport Layer Security (WTLS)***: This protocol provides an optional layer. It related to the security, data integrity and the user authentication, and this will be important for some applications like WAP-banking.

2.3 Mobile Information Society

The large used of mobile devices and its application increase day after day. However, mobile device provide and support the multi users to access different services at the same time. Furthermore, mobile devices opportunities for developing and enhances the economies and the information society in the communities and other areas. According to Ashok J., 2008 which present the using of the WAP technology to achieve the flexible communicates between the people in different areas (Ljungstrand P., 2001).

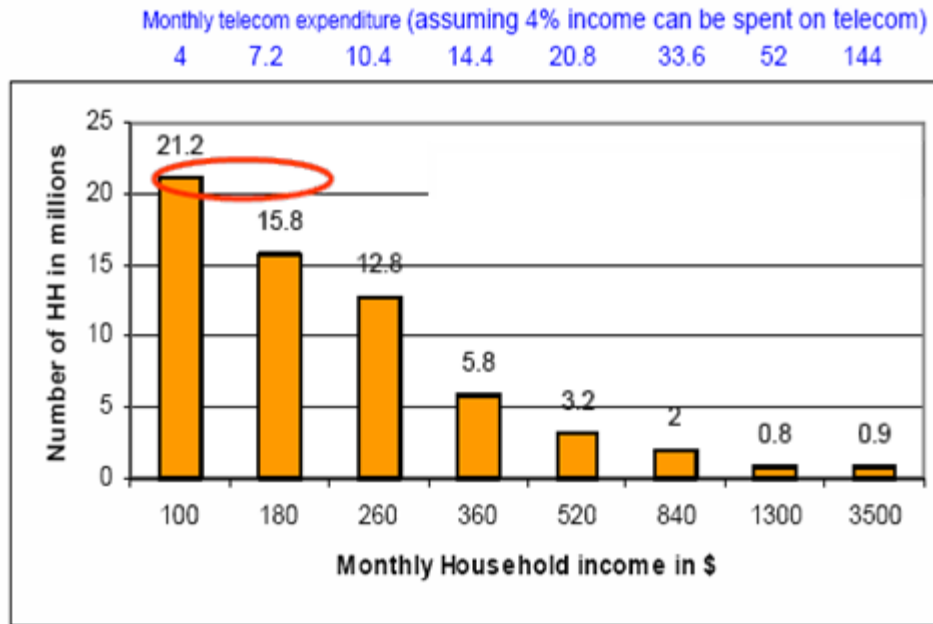


Figure 2.2: Mobile Society (Ljungstrand P., 2001)

As shown in figure 2.2. The high range of using the mobile devices can predict that more than 60% of the urban areas can spend amount less than 7% per the month on the facilities that available.

Otherwise, the mobile society range can clarify that more that 30% the range of developing the economics of the urban area.

2.4 M-Government Services

The appropriate way to browsing and searching the customers needs can easily obtain by the services of M-government. The huge number of users and customers that having access to mobile phones and mobile internet connection is increasing rapidly. The reason

of that increasing can imply back to the ability of mobile to access anywhere any time, which becoming a natural part of daily life. Hence, the government has to transform their activities according to this demand of convenience and efficiency of interactions for all parties (Agarwal K. & Tom L., 2001).

Amitava M. & Agnimitra B. (2005), they proposed the implementation of framework for m-commerce services to different parties like citizens, businesses and governments. The proposed framework contains two guidelines namely the network architecture for m-commerce services and the implementation methodology for its services to different parties particular to citizens. Users and customer always need to provide them with the latest update for the products prices via mobile services.

Barbara, D. (1999) discussed the role of mobile technology in democratic processes. Further and he outlines the legal restrictions as well as technical and political requirements. In particular he analyze where the use of mobile devices can weaken shortcomings of the democratic process supported by non-mobile devices.

They explore a new data mining capability for a mobile commerce environment. To better reflect the customer usage patterns in the mobile commerce environment, they propose an innovative mining model, called mining mobile sequential patterns, which takes both the moving patterns and purchase patterns of customers into consideration (Ching & Chen, 2007).

However, Mobile devices services become the appropriate way for the faster and safety enquire in use, however, this information needs interpretation guidebooks need to be in their place. What the guidebook says has to be combined with other information, in particular information on maps, or advice from locals, to be usable (Matthias, 2005). Frequently tourists hold a map and a guidebook, and used these in combination. Guidebooks were also collaborative artifacts; conversation would take place around the guidebook with tourists pointing at the guidebook, and then pointing either at a map or in a direction, so as to link together the establishments being discussed with their position. Guidebooks thus need to be converted from general prose to activity (Andrews, 2003).

2.5 Related Works

2.5.1 Mobile Services with Health Care

Accordng to Kushchu and M. H. Kuscu (2003) that developed a conceptual classification for mobile services that depicts the special nature of mobile services and gives indications how to categorize services from a customer centric perspective. The classification is based on the type of consumption, the context, the social setting, and the relationship and it represents aspects that influence the overall value of mobile services.

They showed details into classification grids that differentiate mobile services from one to another by describing the aspects in a two-dimensional way. Its require to provide examples of existing mobile services in each classification grid. The term mobile service denotes all services that can be used independently of temporal and spatial

restraints, and that are accessed through a mobile handset (mobile phone, PDA, smart phone etc.). The resulting classification gives implications for further empirical research in mobile area and helps managers and service developers to differentiate and group their mobile service offerings in a meaningful way that is especially useful for marketing purposes.

El-Masri (2005) examined an application of Mobile Web Services into the health sector and specifically to the emergency system where the communication between a numbers of parties is critical in terms of time, efficiency and errors.

The proposed application was implemented on a mobile system based on cellular phone network in ambulances and equipped doctors with mobile devices that have the capability to be connected to the Internet network with a bandwidth that makes it feasible for the doctor and the ambulance to access the health record of a patient from the database and to communicate with hospitals with enough speed. In his paper he showed the new proposed Mobile Comprehensive Emergency System (MCES) application that is based on Web services provided by static and mobile servers. The implementation of this new system enhances the current system communication and makes it more reliable, consistent, and quick and free of human errors as the system take over from the humans.

2.5.2 Mobile Applications with Transportation

According to Barbara, (1999), Dunham (1995), Heide B. (2003), in these days the mobile device are rapidly growing and spreading their application areas, the useful application and the attractive services could help to supporting human activities in outdoor environment is one of the principal applications of mobile computing.

According to Koichi and Yahiko (2003), Bhattacharyya (1997), the study preset the mobile transportation to determine the user location in order by using some function to calculate the user destination and mapping the current user location. This function is very useful for visually or aurally handicapped passengers because the guide information is given by visual or voice messages in the public transport and these passengers cannot use some of them by Goto, K., & Kambayashi, Y. (2002).

This study can provide the gap of the tourists during the travel the mobile terminal has the concrete travel plan and tickets of the passenger. The mobile terminal gets the several information such that the current location of the passenger, operation schedule of vehicles, information about the facilities of stations and so on. During the travel, the mobile terminal checks the travel plan and offers the passenger appropriate guidance as the human attendant behavior (Cheverst, 2000).

2.5.3 Mobile Services with Tourism Guide

Guidebooks services provides the users and other customers who interest in using the mobile devices for their enquire or searching on the various information that Guidebooks can provide. The two quintessential tourist publications are the guidebook and the map by the Organization for the Advancement of Structured Information Standards (OASIS, 2004). These are often used in combination when tourists navigate and find out about what to do in different places and how to get between them. While guidebooks have been given some attention in tourism studies, they have generally been seen as texts to critique. There is little discussion of how guidebooks become incorporated into activity (IBM, 2006).

Mobile tour guides are the result of years of research in the areas of recommenders, ambient intelligence and pervasive computing. Cyber guide (Abowd, 1997) was one of the first mobile tour guides. Personal preferences are not analyzed to compute a tour plan but the user can retrieve information or request a route to a desired Point of Interest (PoI). GUIDE (Cheverst, 2000) is a mobile tour guide very similar to the hereby presented Dynamic Tour Guide (DTG) (Kramer, 2005).

The visitor chooses attractions from various categories. These attractions are then sequenced taking into account the opening hours, best time to visit and the distance between attractions. The sequence can be modified manually. Navigation is achieved by a map with a list of instructions. Differences to the DTG are the use of cell based

positioning instead of GPS and the selection of concrete sights instead of deriving the selection from generic preferences.

The Crumpet project (Schmidt-Belz, 2003) is one of the few projects having performed a usability evaluation for its personalized, location aware multi-agent system, which recommends tourist attractions and provides interactive maps and directions to find a selected sight. Users had to complete several tasks observed by a research assistant.

The majority recognized the system as added value to conventional information sources. Examples for user studies on spatial behavior without human observation are the path analysis of shoppers in a supermarket with RFID tags located on their shopping carts by Larson et al. (2005) and an analysis of visited locations within a city via GPS by Fritsch D. (2001).

According to Svanas D. (2001), this study present the variety of mobile devices is growing and the users expect to be able to use the same or the same kind of services on the different devices. Otherwise the study provide the methods to locate the user location, however these technical and service infrastructure may differ and they may even change.

According to Davies et al. (1998), these methods can give the facilities to the users from the point of view of the service; the simplest method of locating the user is to let him/her tell the location. From the point of view of the user, this method requires extra

effort because the user needs to define his/ her location and input it to the system as a part of the search.

2.6 Mobile with Other Applications

According to Kushchu & Kuscu (2003) they illustrated the differences between telecommunication services based on the traditional, i.e. RPC-based client server paradigm, and service implementations based on mobile service agents. They also discuss architectural principles and requirements of a distributed agent environment supporting mobile service agents. To show the benefits of mobile agent technology and specifically its application for the realization of mobile service.

However, M-government services provide the most services that requires to other fields. The technology and the services landscape presented above are slowly taking its place in various m-government implementations. Some of the early adopters of m-government services include law enforcements, fire fighting, (Francica J., 2001) emergency medical services, education, health and transportation (Heide, 2003).

Researchers such as Nor S., et al. (2006) proposed the mobile communication technologies for library services in university. Lim D. (2004) proposed the student's academic results system by using the mobile communication technology. The attendance management subsystem, attendance history management subsystem, short examination

subsystem, questionnaire subsystem and assignment delivery subsystem in education field.

According to Imielinski, T. & Badrinath, B. (2005), mobile advertising in the context of pervasive computing environments presented a list of challenges and possibilities as well some ideas of solutions for advertising in pervasive environments. The challenges include: reaching the people with the right ads, delivering ads at the right time, serendipitous advertising, means for users to follow up on the ad, and how to collect revenue for ads.

2.7 Usability Testing

In accordance to Jokela et al. (2000), usability can be defined as a software quality attributes. Similarly, usability is also defined as an extent to which the product can be used by the user to achieve specified goals. Ravden and Johnson (1989), defined usability as the extent to which an end-user is able to carry out required tasks successfully, and without difficulty, using the computer application system. Usability, in turn can be decomposed into a number of attributes. According to Nielsen (1993), usability is a multidimensional concept that is traditionally associated with five attributes: learnability, memorability, efficiency, errors, and subjective satisfaction.

According to Nielsen (1998) the dimensions of usability are: Effectiveness: the accuracy and completeness with which users achieve specified goals. Efficiency: the

resources expended in relation to the accuracy and completeness with which users achieve goals. Satisfaction: the comfort and acceptability of use.

However, the generally accepted meaning is that usability attribute. To achieve user's satisfaction, the provider should improve accessibility property (Nielsen, 1993); (Holcomb et al., 1991).

2.8 Summary

The introduction and the main features presented in this chapter to provide the reader with the highlight on the aim of this research, otherwise this chapter discussed related literature review to the issue of mobile technologies and its applications in the other field in Malaysia and other countries which proved that application of Mobile commerce services for UUM students communities with the useful accessing the different information by the mobile devices to delivery services.

The research methodology which is adapted by Vaishnavi & Kuechler (2004) to this study in order to achieve the objective is discussed in the next chapter. This methodology has been carefully chosen to make sure that it is suitable for developing the proposed application.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter presents an overview about the methodology used to Design Mobile Application for E-commerce for the UUM Student Community; the design research methodology which adapted to (Vaishnavi & Kuechler, 2004) has been used.

3.1 Introduction

According to (Vaishnavi & Kuechler, 2004), the design research methodology or sometimes called "Improvement Research" contained the major phases as shown in (Figure. 3.1). These phases are: Awareness of Problem, Suggestion, Development, Evaluation and Conclusion.

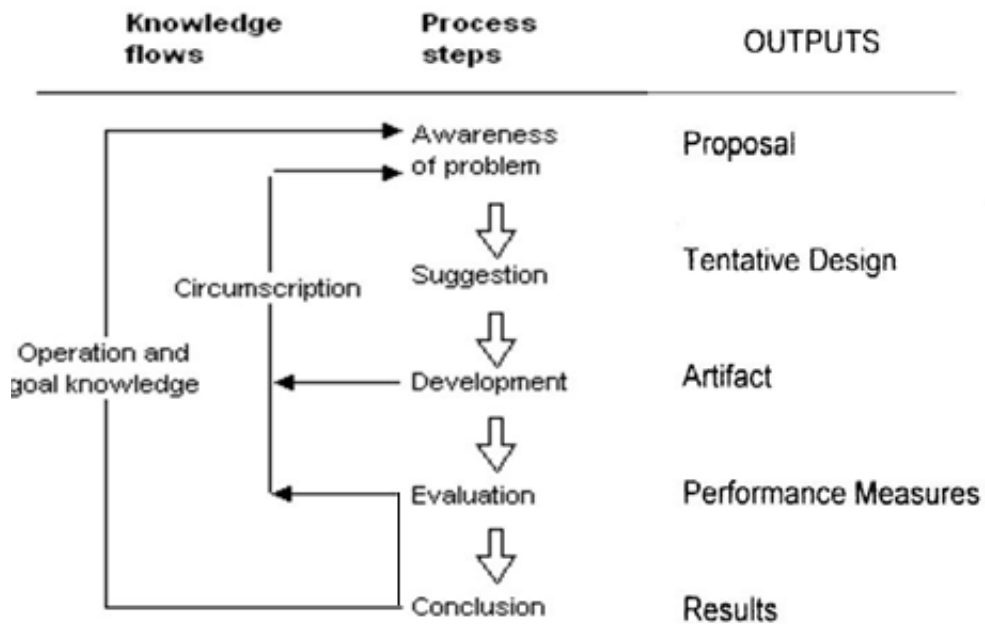


Figure 3.1: Research Design Methodology (Vaishnavi & Kuechler, 2004)

3.1.1 Awareness of problem

The first stage of this methodology is to identify the requirement of the prototype; requirement identification is a major phase in the prototype, also understanding the objectives and the scope of study, as well as the problems which are to be solved. The requirement of the system gathered using two techniques (Interview and review of the current system). In this case, the awareness of the problem raises because of the need to retrieve the latest e-commerce information through mobile devices any where any time. After defining the problem statement, the objective and the scope had been defined clearly.

As shown in (Fig. 3.1), the proposal is the out put of this phase, and that accomplished through the interviews, discussion, and the literature review. In this stage the Awareness of the problem has been solved through interviews with students in the UUM every where they are to get the most correct awareness of problem.

3.1.2 Suggestion

The study suggests Design mobile application for E-commerce for the UUM Student Community in which the students can easily access the content and get the commerce information using their mobile phones. This suggestion proposed based on literature review and interviews that have been done in the previous phase. The output of this phase is the Tentative Design as shown in (Figure 3.2). The design of the system includes UML diagrams. The UML diagrams involved are general use case diagrams, detailed sequence diagrams for each use case, and class diagrams. These diagrams will be presented in chapter four.

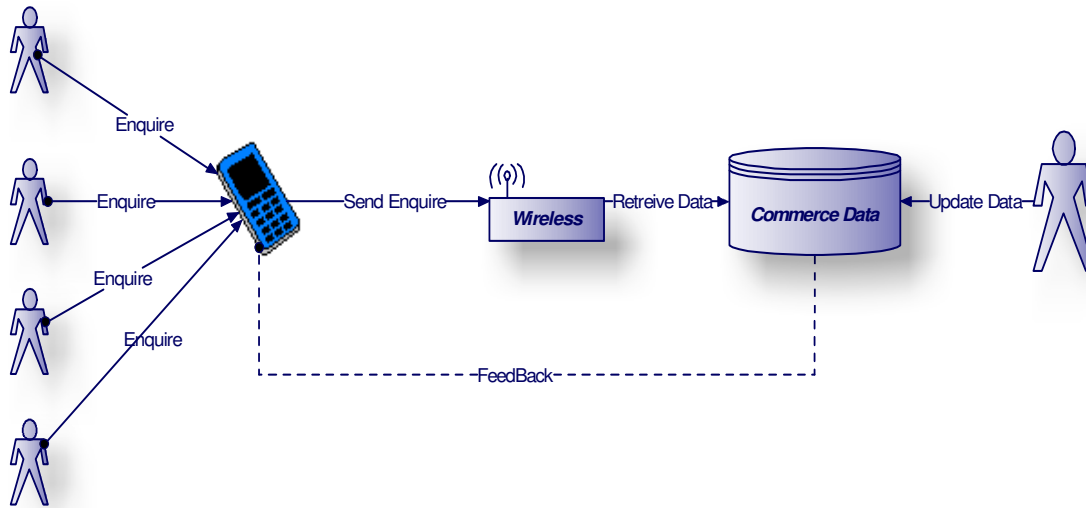


Figure 3.2: Mobile application for E-commerce for the UUM Student Framework

3.1.3 Development

In this phase the Design mobile application for E-commerce for the UUM Student Community developed to validate the requirement, also UML model diagrams used to analyze the requirement of the system, prototyping is a technique that involves developing a small-scaling working model of a system or sub-system (Bentley, & Dittman, 2001). It uses prototyping approach as its method; the prototyping process contains three main steps which were adapted from (Laudon & Laudon, 2000), as shown in (Figure 3.3).

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 (Laudon & Laudon, 2000).

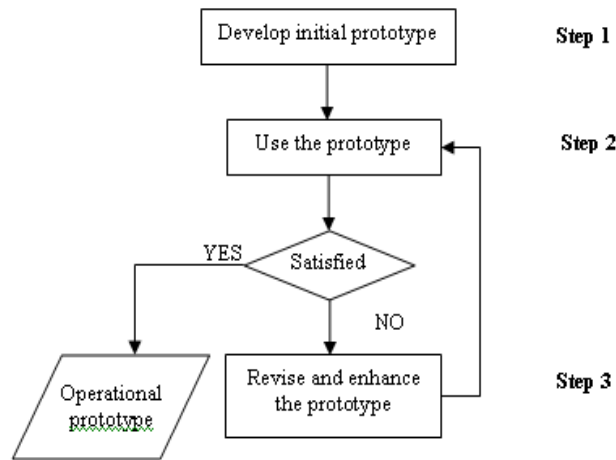


Figure 3.3: The Prototyping Processes Adapted from (Laudon & Laudon, 2000)

➤ **Develop Initial Prototype**

Based on the requirements that had been identified in the awareness of problem step, Design Mobile Application for E-commerce for the UUM Student Community was built.

➤ **Use the Prototype**

In this step, students are encouraged to use the Mobile Application for E-commerce for the UUM Student Community in order to identify errors and measure the efficiency of the functionalities provided.

➤ **Evaluate as Operational Prototype**

In this step, a sample of about 30 users has been selected randomly to measure the user satisfaction toward the Mobile Application for E-commerce for the UUM Student Community.

3.1.4 Evaluation

During this phase, the prototype has been evaluated for its usability aspects. Questionnaire is chosen as a method to measure users' satisfaction. It is adapted from the Perceived user acceptance (Davis, 1989). Perceived user acceptance should not be ignored by those attempting to design or implement successful systems (Davis, 1989).

All data that gathered from questionnaire were analyzed by using the Statistical Package for the Social Sciences (SPSS) program. Data analysis is carried out in the form of descriptive statistic. The analysis of the data that gathered from the questionnaire will be discussed in chapter five.

3.1.5 Conclusion

This phase is the final step in the research effort. The results consolidated and lead to the future works that may unify with this application to implement the overall Design Mobile Application for E-commerce for the UUM Student Community.

CHAPTER FOUR

ANALYSIS AND DESIGN

The requirements for designing and developing the proposed system have been identified in the previous chapter, which presented the methodology of this study; furthermore, the selected methodology consists of five phases. This chapter consists the analysis and design step. Moreover, implementation discussed in a more detail elaboration. Among others, it explains on the requirements determination and structuring activity as well as the production of system's design according to functional requirements. After everything was designed, the physical system specifications were ready to be turned over to programmers for the last phase which is the implementation phase.

4.1 System Requirements

The important in this step that, all the system requirements that need to build the proposed system will presents in this step to give the highlight about the system components in order. The starting point for capturing system requirements and reflects how the system wants to operate. Therefore, it is critical to capture, analyze, and understand the system requirements before trying to create system specifications.

4.1.1 Students Requirements

- 1) The proposed system provides students to login through their userID and password.

- 2) The proposed system supports students to search about their information that he/she want to enquire about though the system search page. Students require selecting the category for item searching.

- 3) Otherwise, students will be able to view the different information about their enquires by viewing item name, item description, and item price, based on the selected category.

- 4) The students will be able to manage the items by adding the items details such as item name, item description, and item price.

4.1.1.1 Detailed Functional System Requirements

The main functions that illustrated among the proposed system are:

Login

Operator define the students by mobile phone to verifications of viewing and searching about the items, and using the system by matching user name and password with those that are saved in the data base.

Search

The students can do the search by using mobile phone, students can looking for other related information that this application can not provide it.

View Services

In this function the students can view various items services such as; item name, item description, and item price.

Add Items

The student able to add the item details be inserting the item name, description, and price, otherwise student require selecting their category.

Logout

Enable both of the students to exit from the system.

4.1.2 Non Functional Requirements

This step shows how the system is useful to use, there are various test types that could be used to evaluate this application:

The benefit of the WAP application can be easily obtained by the users; there are different methods to test the usability of the system such as scalability, availability, maintainability and reliability (Bentley, L., & Dittman, K., 2001).

Scalability:

Scalability of an application has two independent aspects (e.g. scale up and scale out). Scaling up involves upgrading the hardware or optimizing the software to ensure that a single server machine set can support more users. Scale out is when more servers that perform the same functions can be added, without disturbing the software, to increase the number of users supported by the application (Bentley, L., & Dittman, K., 2001).

Availability:

Availability is generally used synonymously with high availability. A highly available application is the one that is up and running most of the time in a year, hence high availability is measured in terms of downtime throughout the year (Bentley, L., & Dittman, K., 2001).

Maintainability:

An application is considered maintainable if it can cater to the needs of the users over its lifetime. If an application can increase the number of users as needed, upgrade the features that users need, and add new features to the application as needed, and then the application is maintainable (Bentley, L., & Dittman, K., 2001).

Reliability:

Downtime of an application due to bugs in the software is called the unreliability factor. It is very important for an application to have a high reliability factor to ensure that it is also highly available. Availability is reduced with any kind of downtime, including downtime for software bugs (Bentley, L., & Dittman, K., 2001).

4.2 Use Case Diagram

The use diagram used to identify the system functionality, use case diagram presents an system analysis level. The proposed system as shown in Figure 4.1, verify the students to access their pages after the login. The students able to search about their items enquire to get the appropriate details about these items. However, the proposed system provide the student to post or add new items to the system by adding item name, item description, and item prices. Finally, students will be able to exit from the system by the logout function.

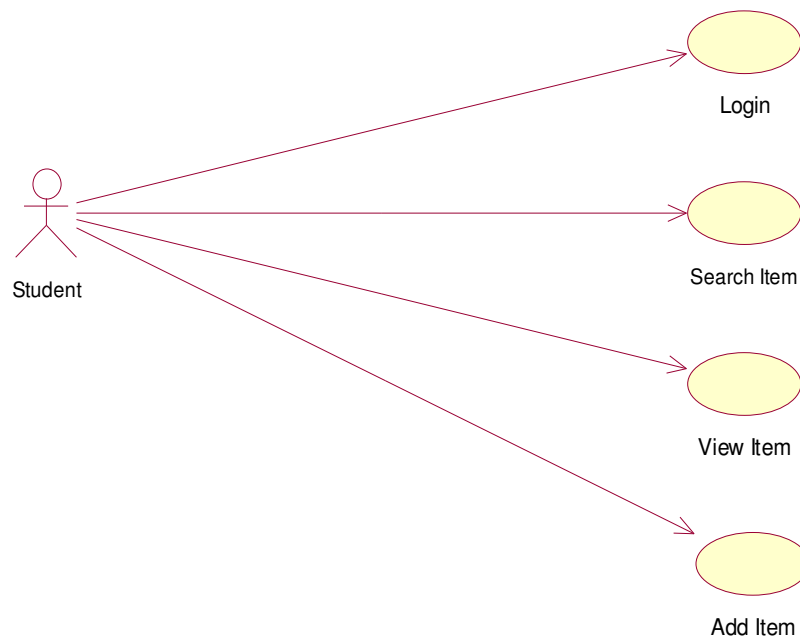


Figure 4.1: Use Case for Students Guide Application

4.2.1 Identifying Use Cases

Use cases represent sequences of actions carried out by the system, and actors represent the people or other system that interact with the system being modeled. Use case diagrams are supported by behavior specifications, which defined the interaction within a particular use case.

By identifying the system, visiting some sites and talking to some related people to cover the system behavior.

Those are the most important use cases:

- a)** Login Students
- b)** Search Item
- c)** View Item
- d)** Manage Item
- e)** Logout

4.3 Use Case Specification

This type of the UML diagram provided for the use case to identify the system ability to work and the other related functionality such as the error messages.

4.3.1 Login Use Case Specification



Brief description: This use case initiated for the students to access their page through inserting their username and password.
Basic flow: a) Students will insert their username and password. b) Students will press the login button. c) System will respond to the student's login request and will send them to their pages. d) Students will be able to access their pages.
Alternative flow: a) If the students did enter either his user name or password wrong the system will alert him by show "Wrong login information".
Pre-condition: a) Enter the user name and password
Post condition: a) View student's page.

Table 4.1: Use Case Specification for Login

4.3.2 Search Use Case Specification

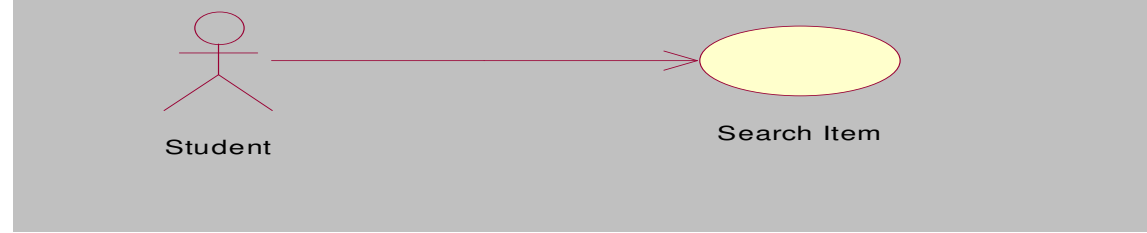
 <p>The diagram shows a stick figure actor labeled 'Student' on the left and a yellow oval use case labeled 'Search Item' on the right. A horizontal line with an arrowhead at the right end connects the actor to the use case.</p>
<p>Brief description: This use case initiated for the students to do their search about the items, the search result about the items will show, item name, item description, and item price.</p>
<p>Basic flow:</p> <ul style="list-style-type: none">a) Students will select the item category for searching, and then insert the item name.b) Students press the search button.c) System will respond to the student request for viewing the item details.
<p>Alternative flow:</p> <ul style="list-style-type: none">a) The system will view “Item not found” in case of unavailable item.
<p>Pre-condition:</p> <ul style="list-style-type: none">a) Select the item category
<p>Post condition:</p> <ul style="list-style-type: none">a) View item name, item description, and item price.

Table 4.2: Search Use Case Specification

4.3.3 View Item Use Case Specification

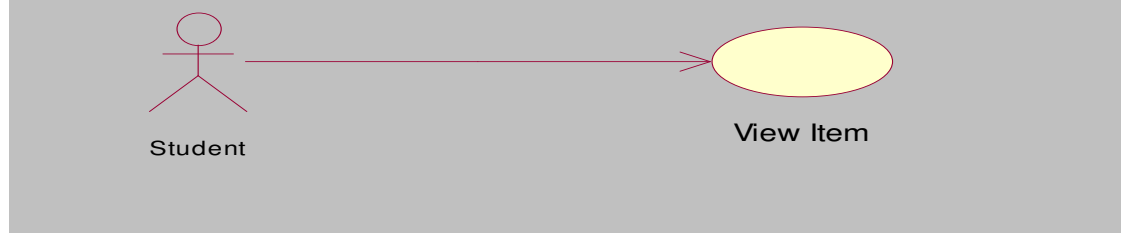
 <p>The diagram shows a stick figure actor labeled 'Student' on the left and a yellow oval use case labeled 'View Item' on the right. A red arrow points from the actor to the use case.</p>
<p>Brief description: This use case initiated for the students to view the item details, students will view, item name, item description, and item price.</p>
<p>Basic flow:</p> <ol style="list-style-type: none">Students will select the item category for searching, and then insert the item name.Students press the search button.System will respond to the student request for viewing the item details.Students will be able to view the item details.
<p>Alternative flow:</p> <ol style="list-style-type: none">Not Applicable
<p>Pre-condition:</p> <ol style="list-style-type: none">Select the item category
<p>Post condition:</p> <ol style="list-style-type: none">View item name, item description, and item price.

Table 4.3: View Item Use Case Specification

4.3.4 Manage Item Use Case Specification


 <p>The diagram shows a stick figure actor labeled 'Admin' on the left. A horizontal line with an open arrowhead points from the actor to a yellow oval use case labeled 'Manage Items' on the right.</p>
<p>Brief description: This use case initiated for the student for managing the item details by adding the item category, item name, item description, and item price.</p>
<p>Basic flow:</p> <ol style="list-style-type: none">Student will select add item button.Student will insert the item details.Student will press add buttonThe system will respond to the student add request.
<p>Alternative flow:</p> <ol style="list-style-type: none">The system will view “Item existed” in case of entire the same item details.
<p>Pre-condition:</p> <ol style="list-style-type: none">Select the item category
<p>Post condition:</p> <ol style="list-style-type: none">Item added

Table 4.4: Manage Item Use Case Specification

4.4 Sequence and Collaboration Diagrams

In this step of UML diagram, that shows the processes that execute in sequence, the sequence diagram shows the sequence of message, which are exchanged among roles that implement the behavior of the system, arranged in time, it shows the flow of control across many object that collaborate in the context of a scenario.

However the sequence diagram (interaction) it captures the behavior of single use case showing the messages passed between those object of the case and describe the sequence of operation in that use case.

4.4.1 Login Process

The students in this sequence diagram can login to this service by inserting his or her username and password.

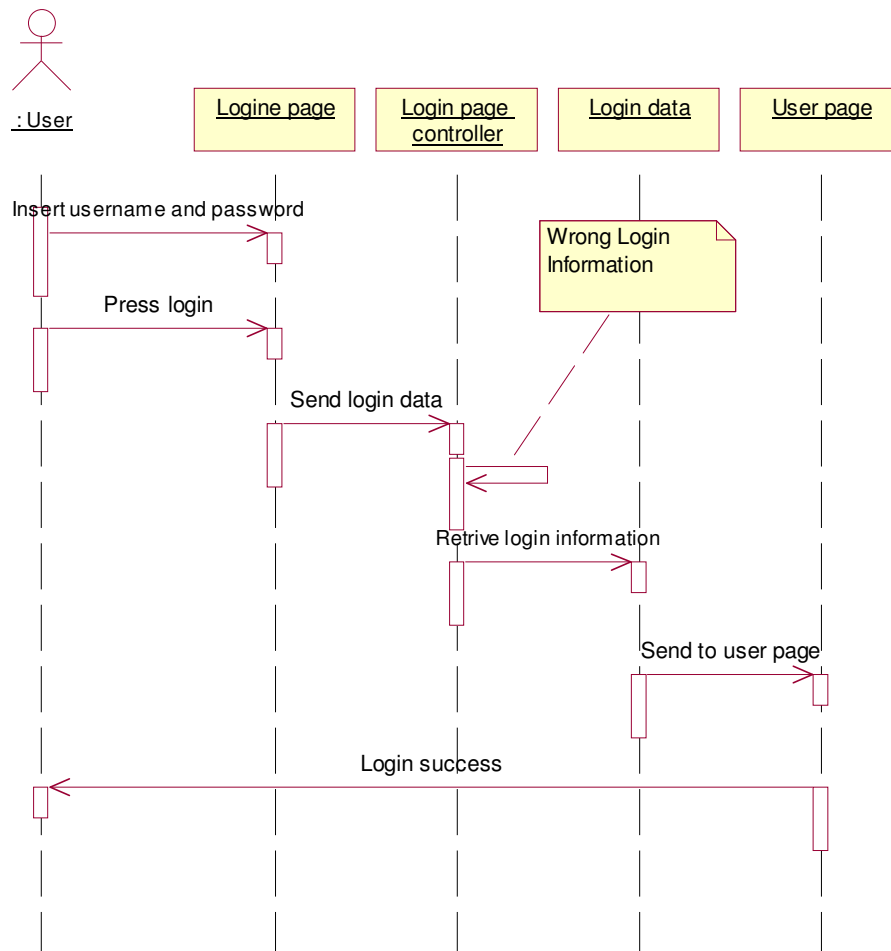


Figure 4.2: Login Process Sequence Diagram

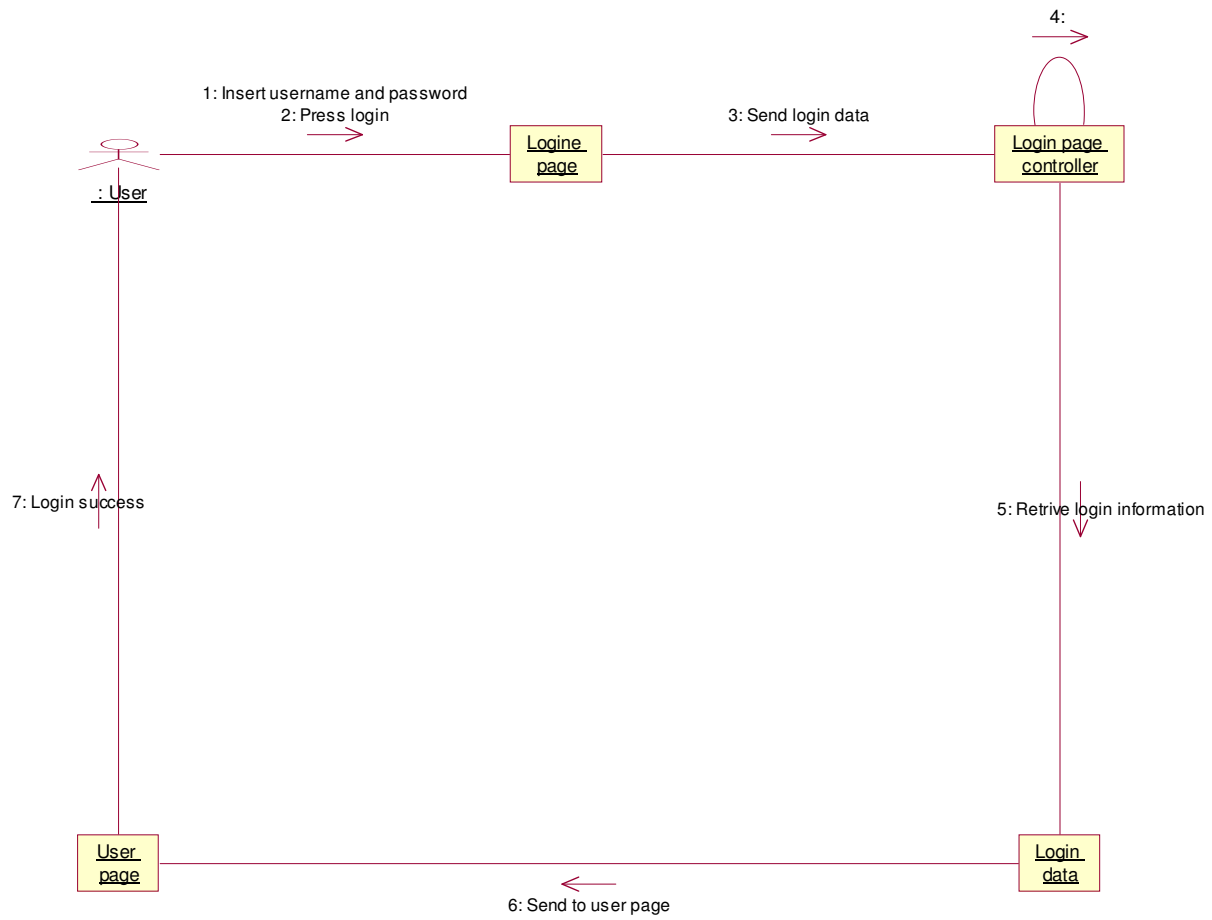


Figure 4.3: Login Collaboration Diagram

4.4.2 Search Item

The students in this sequence diagram will search about any item information; the student will be able to view item name, item description, and item price.

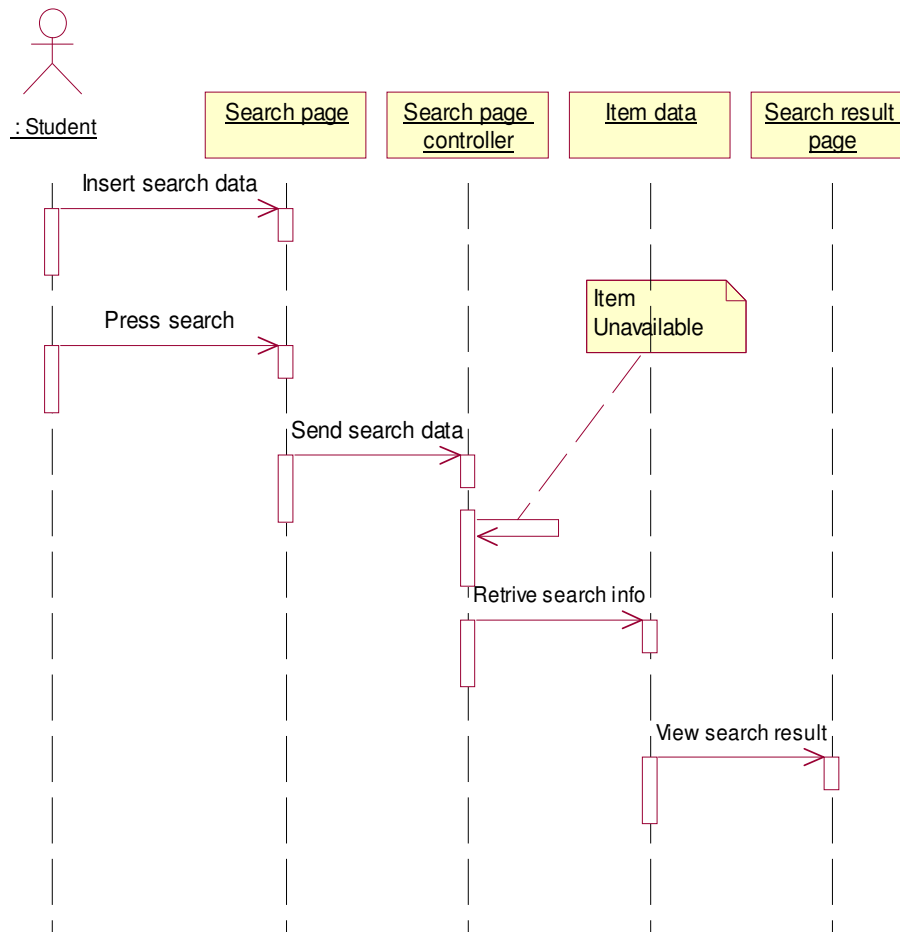


Figure 4.4: Search Item Sequence Diagram

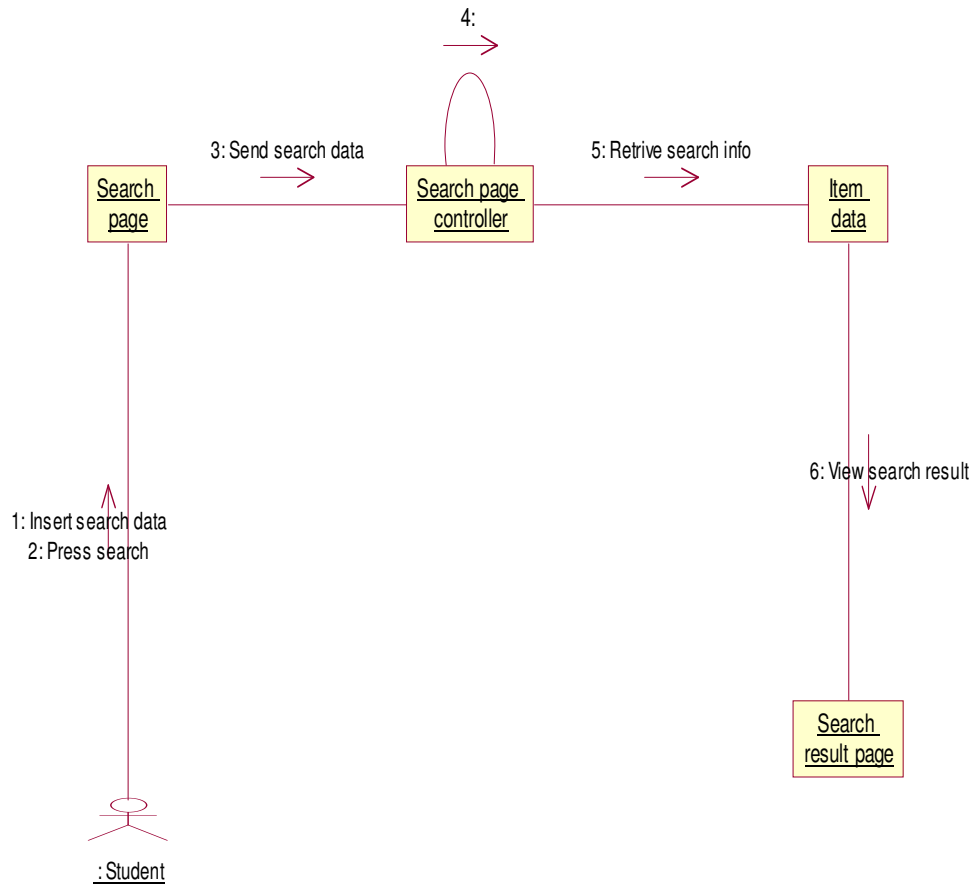


Figure 4.5: Search Item Collaboration Diagram

4.4.3 View Item

In this sequence diagram the students have the ability to view the information about the items that this service provided to them such as item name. Item description and item price.

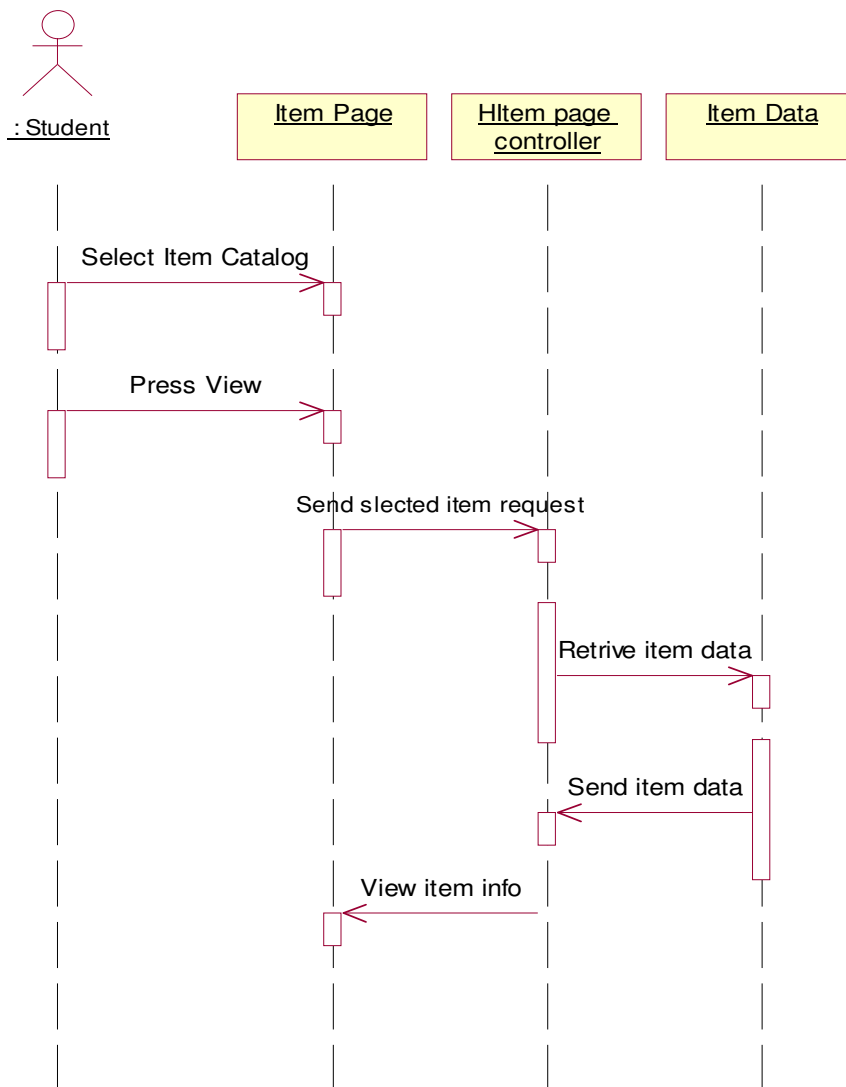


Figure 4.6: View Services Sequence Diagram

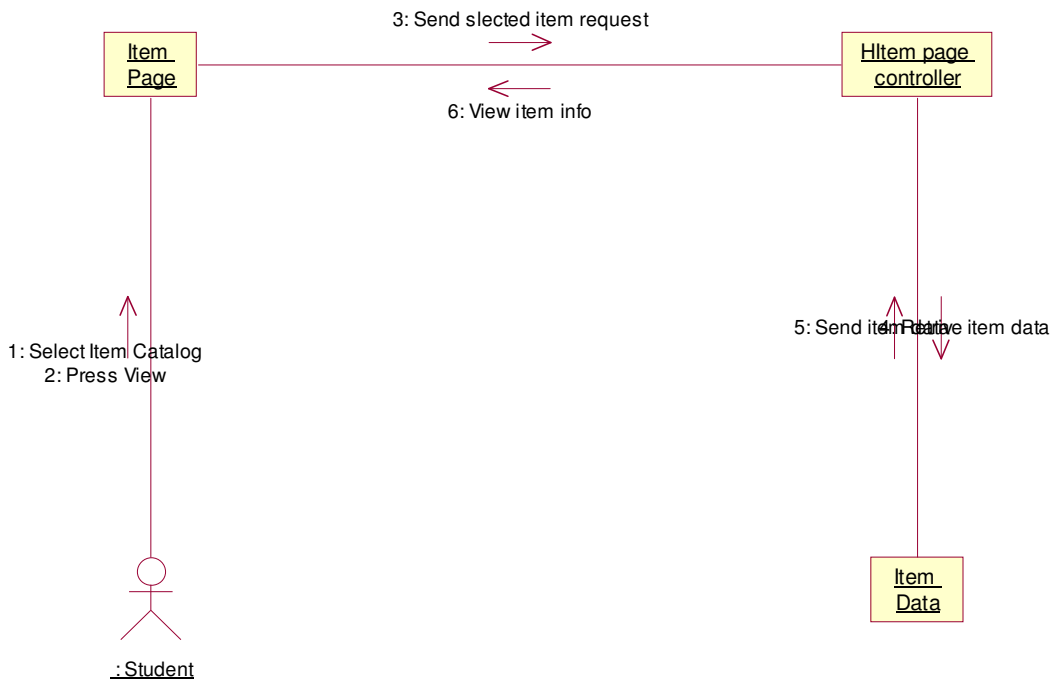


Figure 4.7: View Item Collaboration Diagram

4.4.4 Add Item

This sequence diagram the students have the ability to add new item to the system by pressing add new item, the system provides students to add the item details based on item name, item description, and item price.

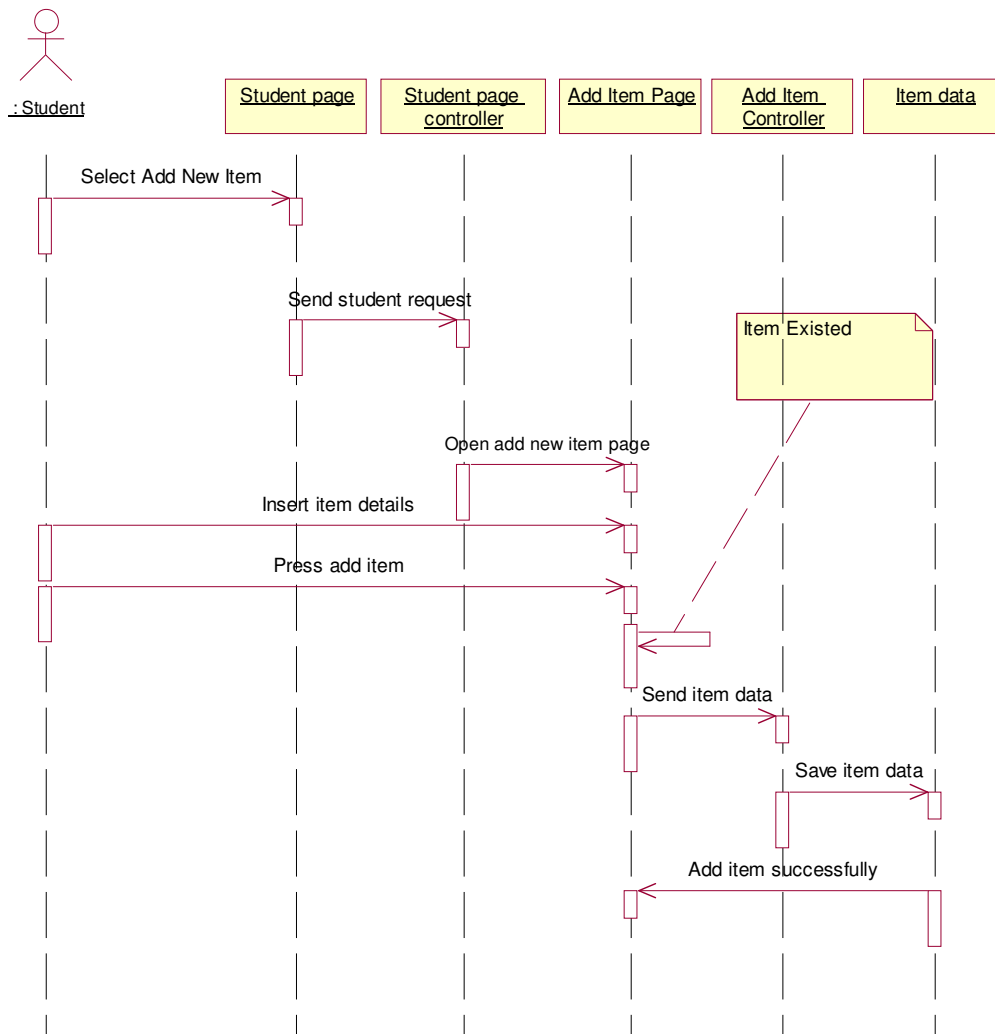


Figure 4.8: Add Item Sequence Diagram

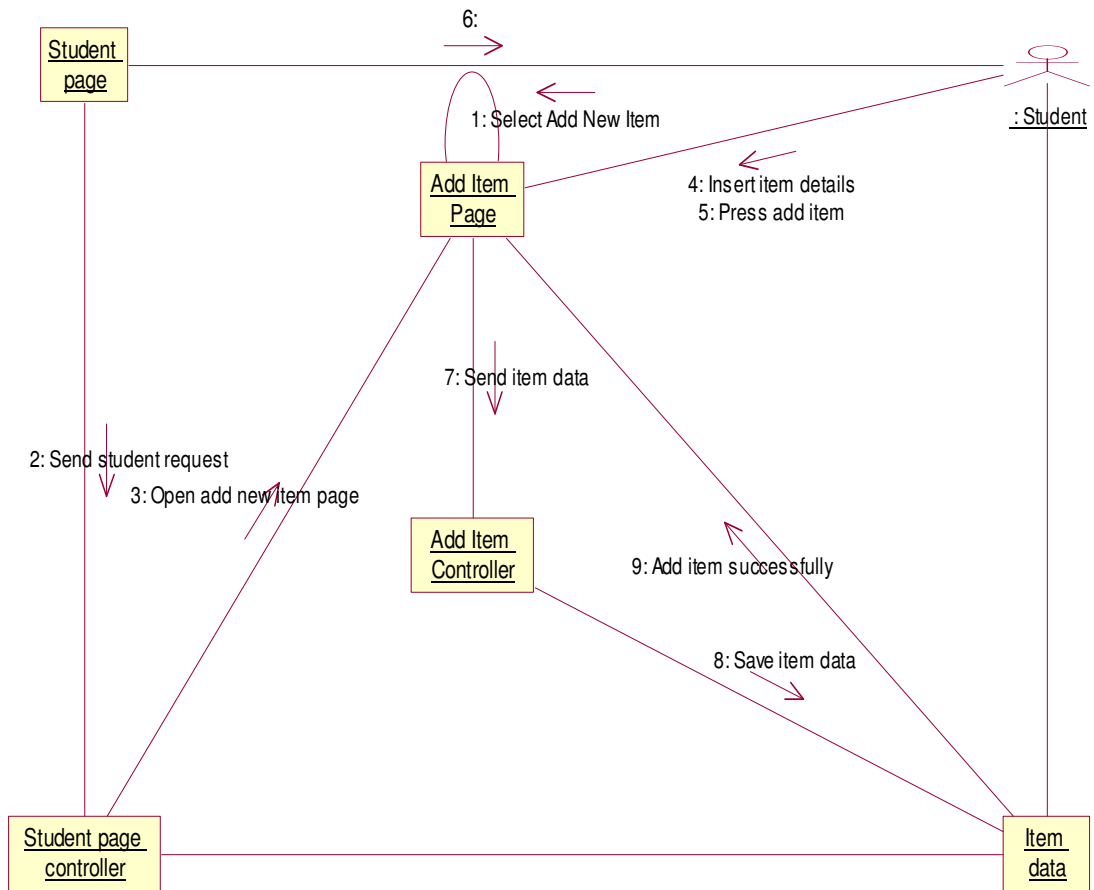


Figure 4.9: Add Item Collaboration Diagram

4.5 Class Diagram

The class diagram used in this stage to show the ability of the proposed system to save and retrieve the student's, and the item information from the database that used the MYSQL server.

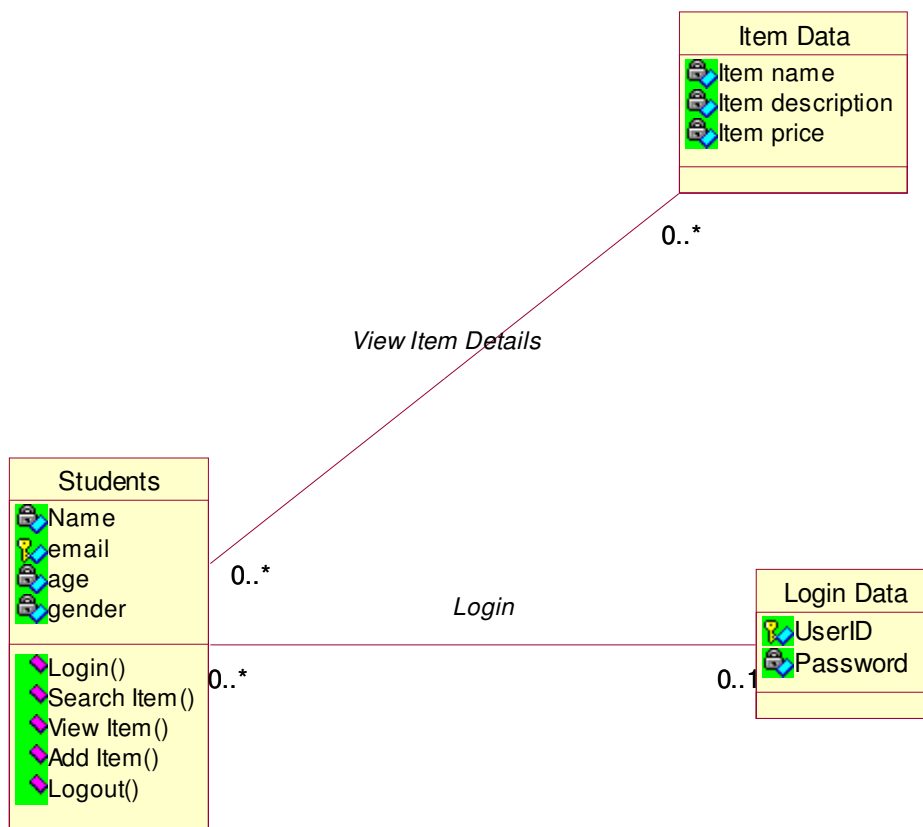


Figure 4.10: Class Diagram for Students Guide Application

4.6 FINDING AND RESULT

As soon as the design becomes a real and design model is established, here comes the time to convert the established design into code, in other words to a real system. Before this conversion takes place pre-steps should be done, such as the definition of the programming language, the State Transition Diagram.

4.7 System Development

The system development presented the language that used to build this application in order, the ASP.NET and MYSQL server used to develop this application. Since ASP is in such wide use, however, Microsoft ensured that ASP scripts execute without modification on a machine with the .NET Framework (the ASP engine, ASP.DLL, is not modified when installing the .NET Framework). Thus, IIS can house both ASP and ASP.NET scripts on the same machine.

4.7.1 Login Page

The login page provides user (Students) with the facility to access their pages after the correct login through their username and password.

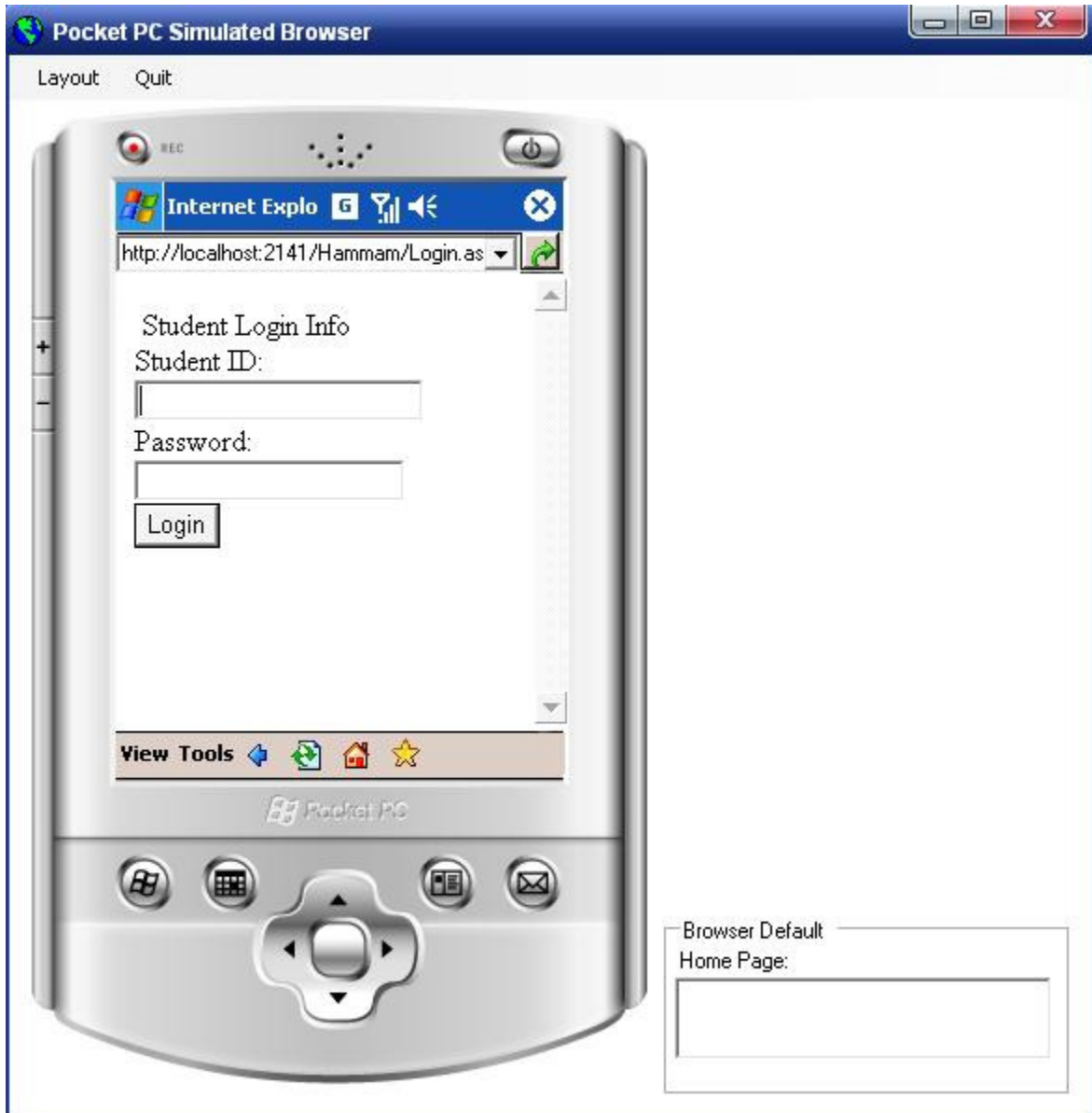


Figure 4.11: Login Page

4.7.2 Search Item Page

The search page provide students to search on their item information by inserting the item name, the student require to select the item by catagory or by name.

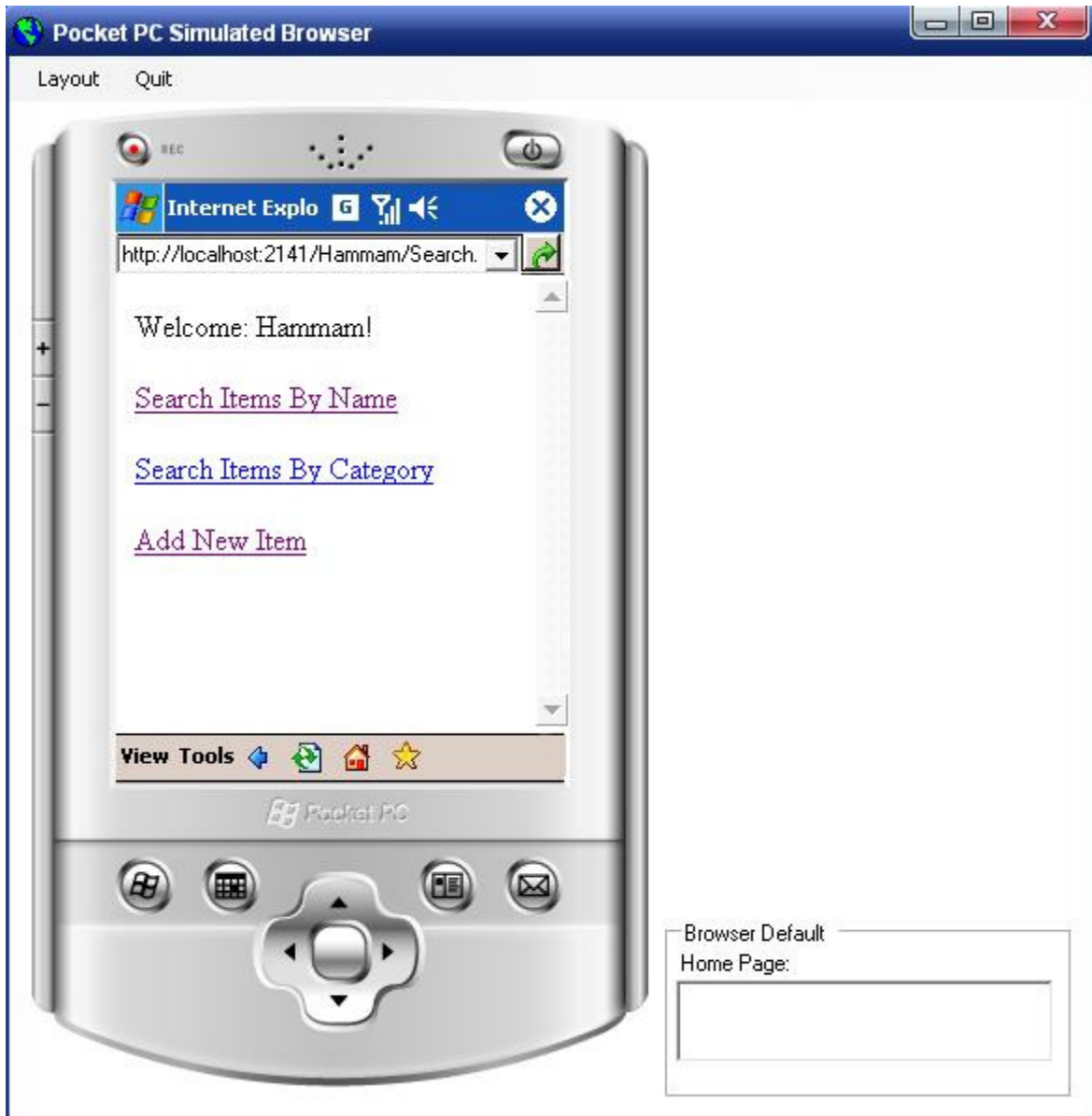


Figure 4.12: Search Item Page

4.7.3 View Item Page

In this selection, the user will have the choice to select the item that he/she desires to view the item name, description and item price, based on item name and category.

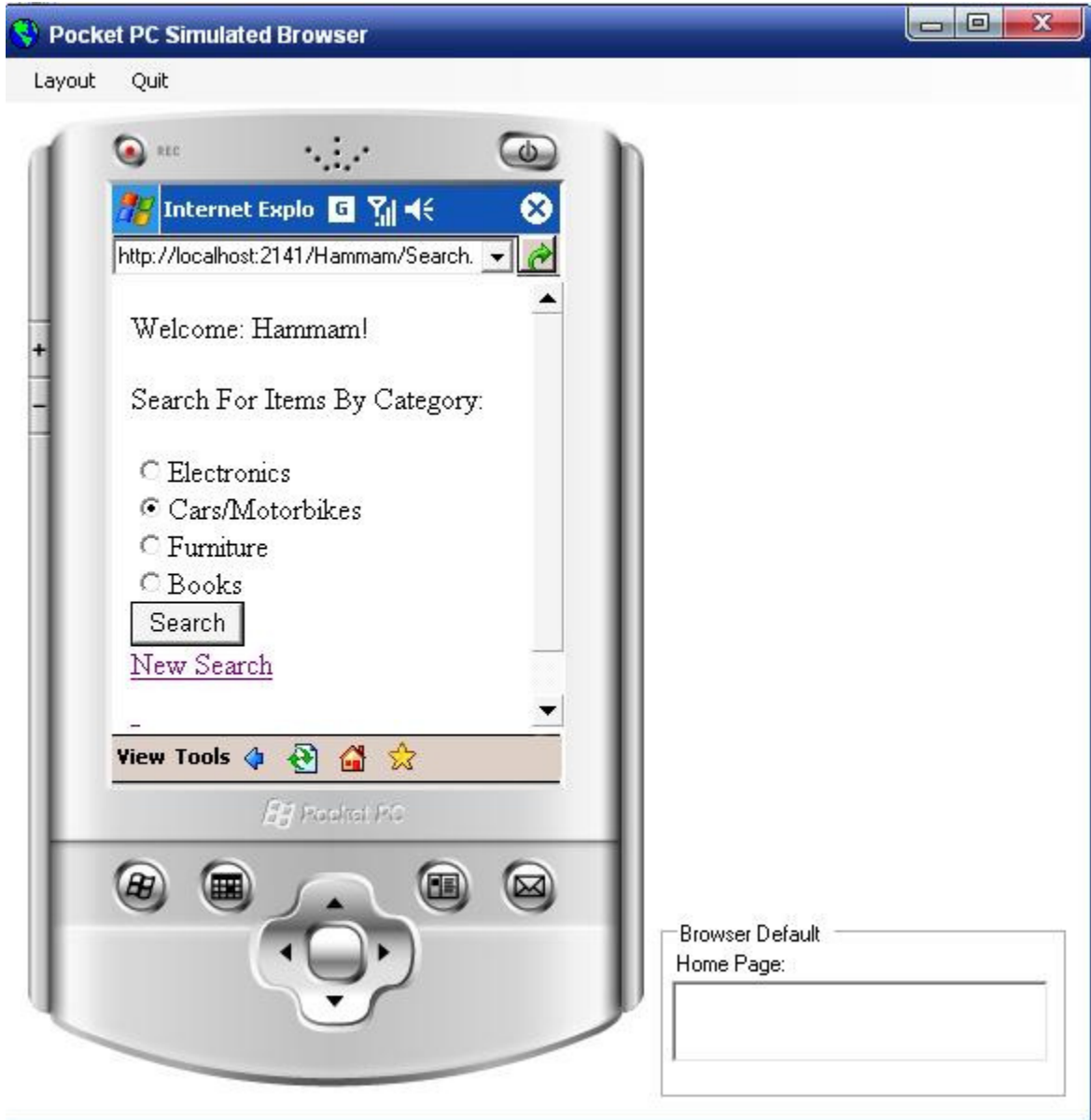


Figure 4.13: View Item Page

4.7.4 Add Item Page

The students in this page can add new item information to the system database to be view by different students. The student requires filling the item name, description and the item price.

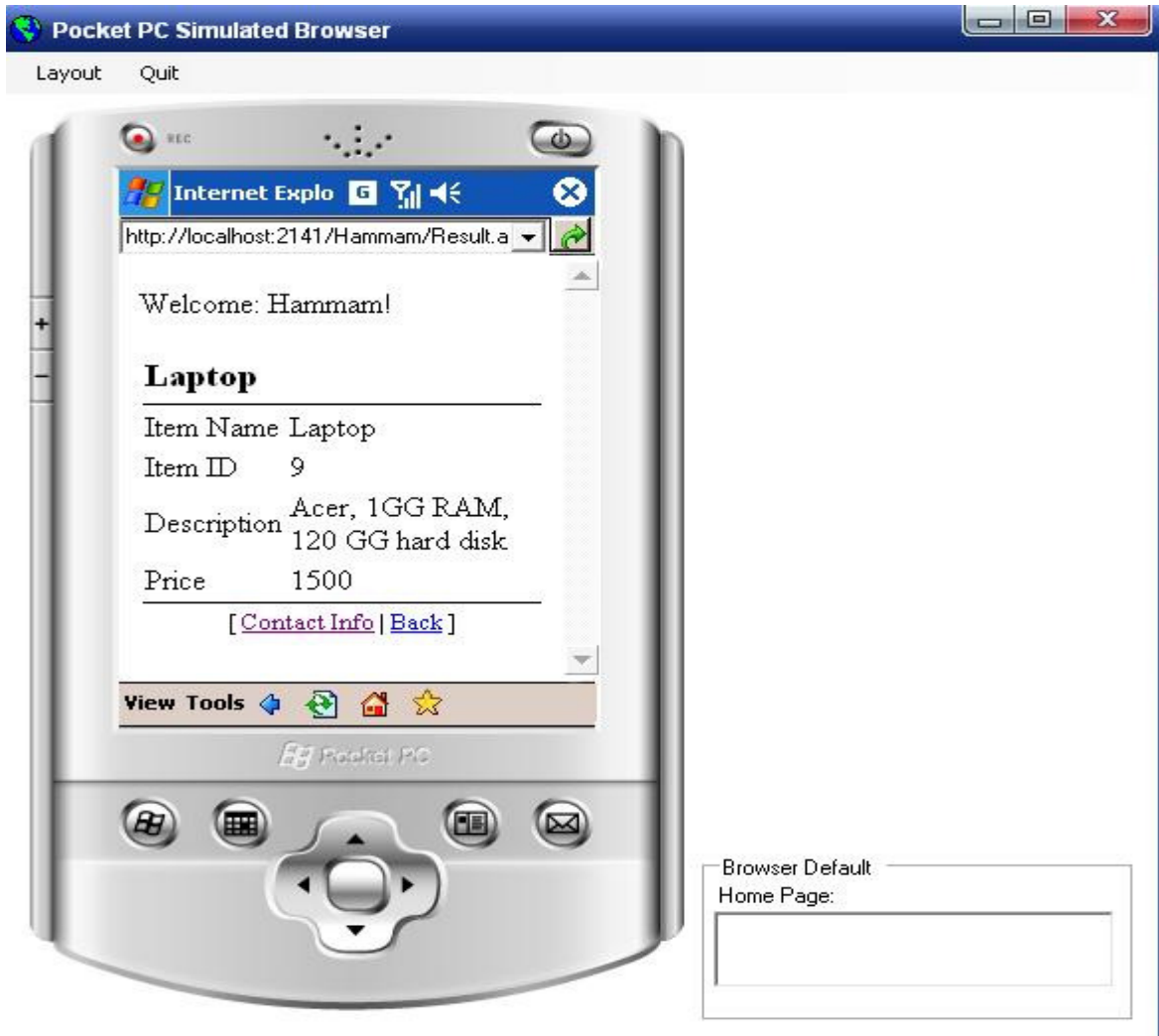


Figure 4.14: Add Item Page

CHAPTER FIVE

DISCUSSION AND EVALUATION

The execution of this project was motivated by the intention of providing more flexible and enhanced method of gathering information among the tourism area in Malaysia. Although the application of mobile technology is not that popular among the society, but it is believed that one of the main methods used by people to communicate and share information. With the purpose of giving alternatives to UUM students who familiar with the mobile devices for browsing and searching information. The proposed application of mobile commerce for UUM students was developed with the capability of providing information on several selected features.

5.1 Introduction

According to Nielson (2000) the evaluation uses usability testing based on the standard tests followed by interview in a closed environment with video equipment. Testing with potential users can obtain as efficient feedback as possible in a short time frame and with the available resources. It is also irrelevant to ask people in a focus group to predict whether they would like something they have not tried, so the only way to get valid data is to let users experience the technology before opinions are sought (Nielson, 1998).

The system evaluation measures the system usability that achieved the proposed objective which is:

- To identify the requirement for designing mobile application for E-commerce for the UUM student community.
- To design the application for designing mobile application for the E-commerce for the UUM student community.
- To develop and evaluate the prototype.

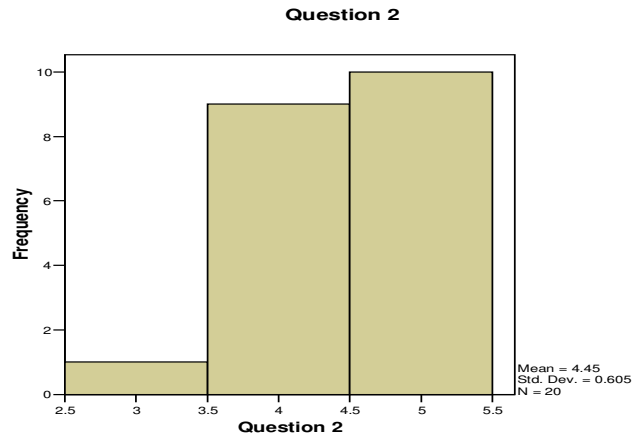
The requirement gathered by the interviewed with different groups of students to obtain these objectives in order. The evaluation questions distributed to hose group to get their opinion about the proposed application. Moreover, the prposed mobile e-commerece has been evaluated, refer to (Appendix A and B) for students interview and questionnaire.

Table 5.1: Descriptive Statistic for mobile commerce for UUM students

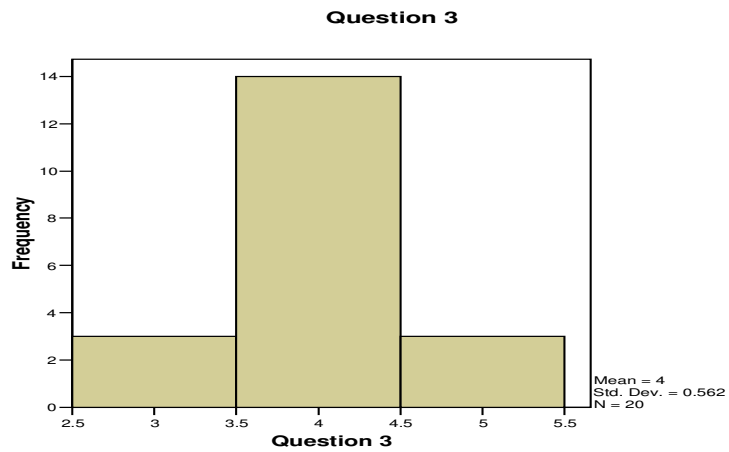
	N	Minimum	Maximum	Mean
Question 1	60	1	5	3.90
Question 2	60	3	5	4.45
Question 3	60	3	5	4.00
Question 4	60	2	5	3.85
Question 5	60	3	5	4.10
Question 6	60	2	5	3.60
Question 7	60	2	5	3.85
Question 8	60	3	5	3.80

According to the table above that shown the main schema (Minimum, Maximum and the Mean).The system evaluation measure the usability of using the WAP application to supports UUM students for viewing and browsing various information related to e-commerce via mobile anytime and anywhere. The illustrated result from analyzed the questionnaire showed the acceptance from the different respondents (students). However, the higher agreement was the easy to provide the information which was (mean= 4.45 from 5).The most questions that presented the high agreement are (Q2, Q3 and Q6).

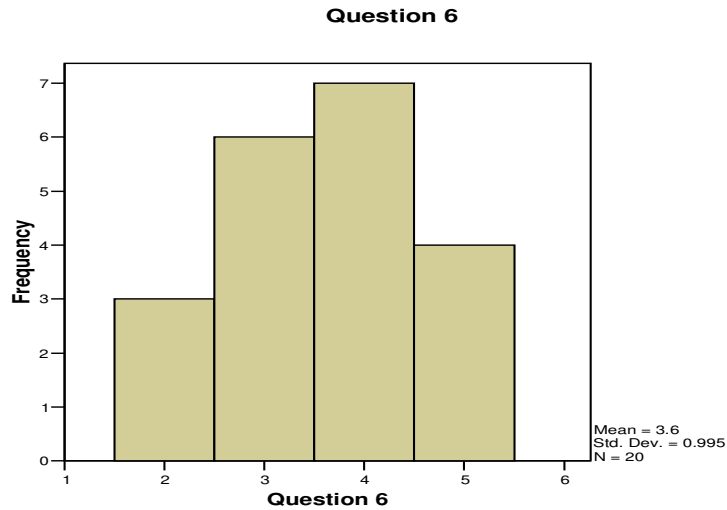
Q2. Most of the services provided simple and easy to follow.



Q3. It is easy to find the information which I needed.



Q6. The application has the ability to give the appropriate features that satisfy with my requirements



5.2 Conclusion

Evaluation takes focus on the development process and can uncover usability deficits early during the design. In future works, more usability tests for the redesign application with UUM students should be conducted. Interviews with those persons and evaluation to reach more people will help to shape application and better meet the user's opinion, requirements and expectations. The overall results were encouraging but improvement is definitely needed.

CHAPTER SIX

CONCLUSION

This chapter focuses on the conclusion and recommendation of this study. The Conclusion will explain how this study achieved the goals, according to the objectives and problem statements of this study. Finally, brief recommendations given as contributions to future enhancements also discussed.

6.1 PROBLEMS AND LIMITATIONS

- Mobile application for the E-commerce for the UUM student community developed using WML and ASP mobile. However, the open wave simulator is used to utilize this application. The use test case used in this research.
- The application tested using local host mobile server, namely Internet Information Services (IIS). However, with limited financial resources make it hard to provide an actual web server to testing the proposed application.

6.2 RECOMMENDATIONS

The application of the mobile e-commerce was successfully developed using WML language. However, there are some problems and limitations encountered such as:

- Need to provide this system to browse anytime and anywhere.
- The proposed application was developed for and tested on Mobile open wave 0.7, therefore some of the test and illustration may be inconsistency on other mobile versions, such as open wave 0.6 version, open wave explorer, that need to identify the system requirement.
- The application is just simulating on the local PC. It has not been uploaded to the real server due to high airtime cost for testing and time constraints

6.3 FUTURE WORK

Due to the time frame that is not sufficiently enough to assure the entire functionalities of the system, future works can be carried out to overview the researches that came upon during the work of this project. It would be more suggestive to advice the one who needs to pursue some future works to follow every single step included in the project. Mobile application for the E-commerce for the UUM student community has the following features that will benefit the other users except UUM students:

- Check available e-commerce services by different users, to make it easy and more flexibility to deal with.
- Provides direct, simple access to the focused valuable content via few keystrokes or photo views.
- Information regarding this system is trimmed page-to-page navigation down to a minimum and hyperlink buttons are used to navigate back and forth within the pages/ screens.
- Reduces the amount of vertical scrolling by simplifying the text to display.

6.4 CONCLUSION

As was explained though chapter one, the objectives of this study are to develop Mobile application for the E-commerce for the UUM student community and do usability testing. In order to make requirements more understandable the requirements have been modeled by using some of UML diagrams such as use case diagram ,use case specification and sequence diagram to design the system requirement in order to illustrate the research objectives. However, the other features has been added to provide those users with the appropriate enquire about the via their mobile. Finally the application has been

implemented using WML technology according with Mobile application for the E-commerce for the UUM student community.

APENDIX (A)

Mobile application for the E-commerce for the UUM student community Interview

- How the current system for e-commerce enquires is done?

- Do you think the current system able to manage the huge number of the students?

- What are the must things that requested by the UUM students?

- Is there any method or any tools help the UUM students to get their e-commerce enquires?

- Do you think the current system need to modify or need to enhance?

- Do you think the Mobile application for the E-commerce can help to simplify the UUM student's requests process?

APPENDIX (B) QUESTIONNAIRE



Mobile application for the E-commerce for the UUM student community

This study aims to build an application for the tourist, to help them by provide them with the appropriate e-commerce services via mobile.

Our system basically is an application on the E-commerce that allow UUM students to search for anything they need to buy or post anything they have for sale, the four main categories are (Housing, Vehicles, Books, and Electronics), for example a student finish his study at UUM and he want to sell his car or any electronic devices that he don't need or his books, all what he need to do is upload all the information about this object and a brief description about it and the desirable price and his contact information. So it will be easy for search, all what you need to do is choose the category that you looking for and search for the service that u need.

The objective of this study can be:

- To identify the requirement for designing mobile application for E-commerce for the UUM student community.
- To design the application for designing mobile application for the E-commerce for the UUM student community.
- To develop and evaluate the prototype.

Thank you very much for your time cooperation.

Sincerely

Your Name.....

Master of

Graduate Department of Computer Science

College of Arts and Science

University Utara Malaysia

Please put (√) your answers to the given statements.

- What is your Gender?

Male

Female

- What is your Age?

18-25 Years old

26-34 Years old

35-44 Years old

45-54 Years old

Above 55 Years old

- What is your Race?

Malay

Muslim

Indian

Other

- Marital Status

Married

Single

- **Usability Testing**

Please circle on the appropriate answer.

This section contains eight questions to assess e-commerce mobile application usability.

Strongly Disagree *Disagree* *Neutral* *Agree* *Strongly Agree*

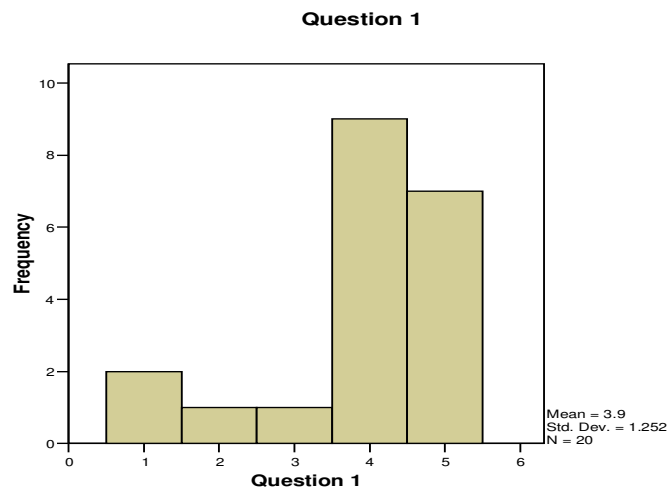
1 **2** **3** **4** **5**

	Statements					
(1)	The information provided for the WAP application form is easy to understand.	1	2	3	4	5
(2)	Most of the services provided simple and easy to follow.	1	2	3	4	5
(3)	It is easy to find the information which I needed.	1	2	3	4	5
(4)	I would find it easy to use this application to get what I want.	1	2	3	4	5
(5)	E-commerce mobile application consider as user friendly.	1	2	3	4	5
(6)	The application have the ability to give the appropriate features that satisfy with my requirements.	1	2	3	4	5
(7)	The E-commerce mobile application give me a brief and simple information about the different places	1	2	3	4	5
(8)	However, the E-commerce mobile application useful to guide me to the useful services.	1	2	3	4	5

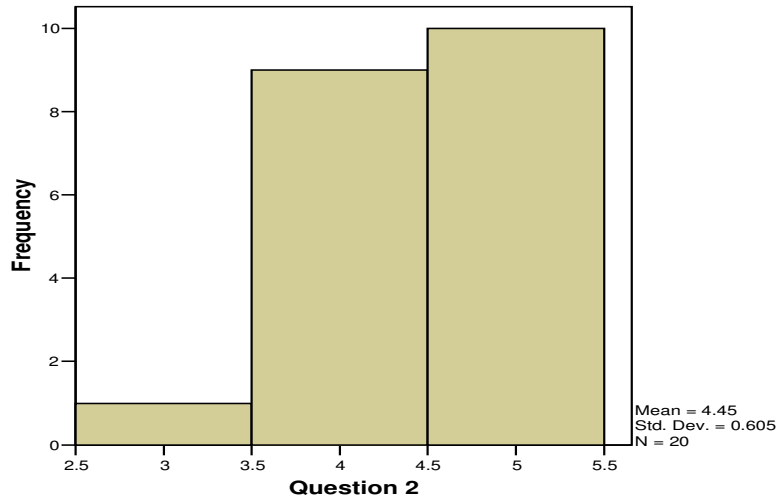
APPENDIX (C) DESCRIPTIVE STATISTICS

	N	Minimum	Maximum	Mean
Question 1	60	1	5	3.90
Question 2	60	3	5	4.45
Question 3	60	3	5	4.00
Question 4	60	2	5	3.85
Question 5	60	3	5	4.10
Question 6	60	2	5	3.60
Question 7	60	2	5	3.85
Question 8	60	3	5	3.80
Valid N (listwise)	60			

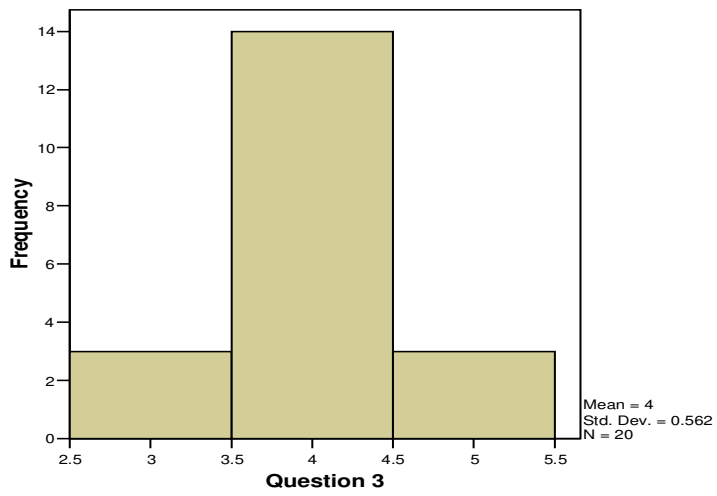
APPENDIX (D) EVALUATION DIAGRAMS



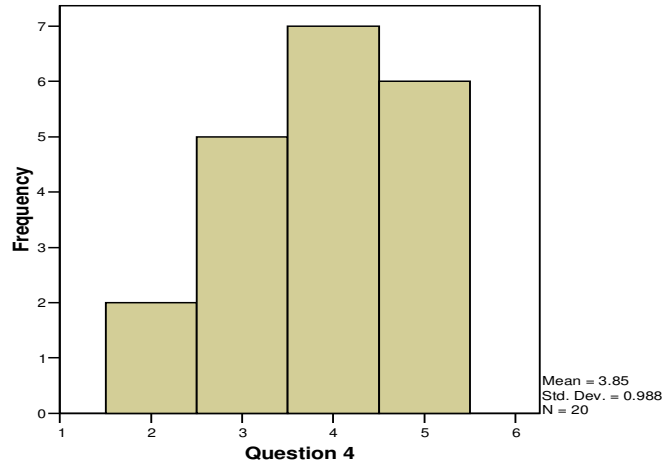
Question 2



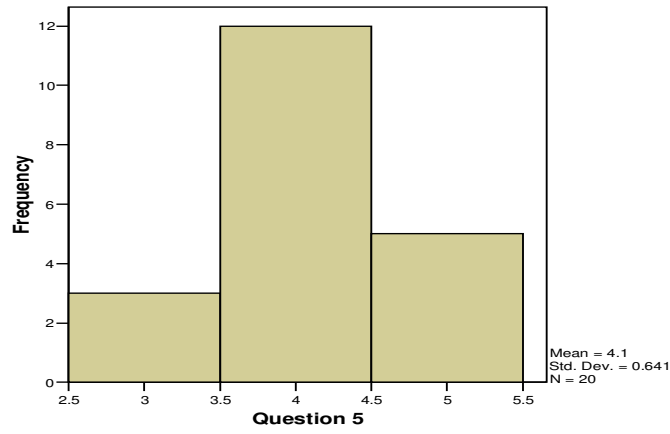
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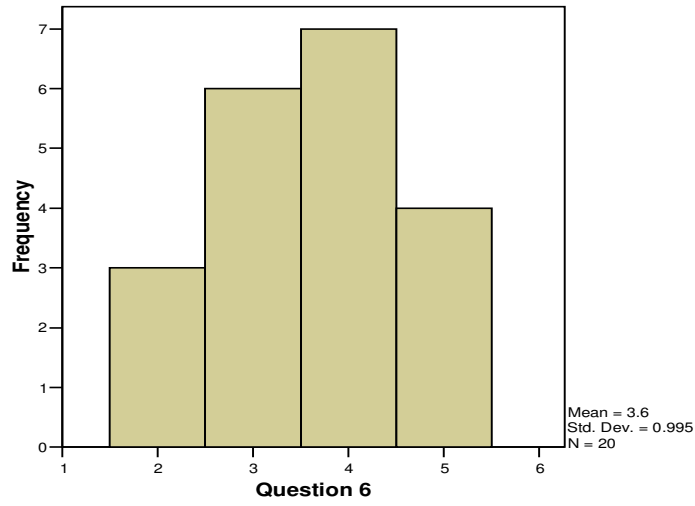
Question 4



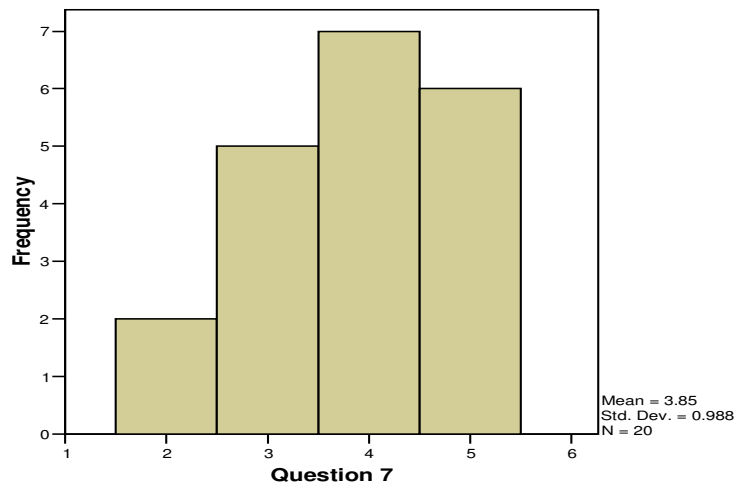
Question 5



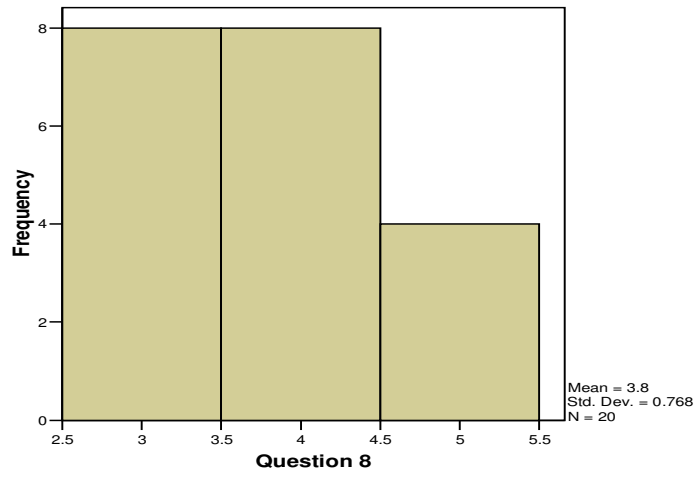
Question 6



Question 7



Question 8



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