Mobile Application to Apply for Official Document (MAOD)

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DEDICATION

....To My Family

ABSTRACT

Mobile application has taken an immense impact on organizations as it is able to input data and speed up the business process. Nowadays, handset manufacturers, mobile network operators and suppliers of mobile operating systems are opening storefronts on-line in attempts to capitalize on growing consumer demand. This study looks at the development of a mobile application that enables the student to apply for official document issued from the official document office of Awang Had Salleh Graduate School of Art and Sciences UUM. Within the study, the system requirement of users was developed as well as the prototype development of the mobile application. Furthermore, a usability testing was conducted to inquire about the functionalities of the system. Results of the usability test and recommendations for future research on the same topic were provided.

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CHAPTER ONE

INTRODUCTION

The primary explanatory view of this study is present in this chapter, the background of the study that explains the present efficiency of mobile technology in relation to this study. The problem statement is also stated, significance of the study and the scope of the study are also discuss therein.

1.1 Background of the Study

Mobile phones are no longer just an ordinary telephony tools, they have functionally transformed into a mini-computer, which made them mobile technology now. Zhifang, Xiopeng and Xiang, (2010) affirmed that, with the useful features that are added to the recent developed mobile technologies such as; higher processers, faster memories, and faster and easiest internet connection, they can be used for calling, surfing the internet, calling, chatting, and lot of fun activities.

The high rate of mobile technology functionality and their unique mobility has made them personal pal to human being; this could be clearly seen in the way mobile technologies are serving as a very vivid ground to many business industry, organizations, and different kind of age groups. Ho and Syu (2010) revealed that the

production of smart phone has been increased to 78.1% in 2010, which indicated how applicable and valuable they are, in various kinds of endeavors.

Generally mobile technology has immensely played a commendable role in organizational management, social, and economical relations. The level of which people perform activities now has practically changed, all the virtual activates that are done through computer are now executable on mobile technologies, example are M-ticketing, M-business and M-commerce (Lavanya et.al 2006; Muller, et. al 2004).

The advent of Wireless Application Protocol (WAP) technology that is practically built for mobile phone internet access has tremendously benefit people in the way they apply to offices, or order for commodities, anyplace and anytime (Nurul Zakiah, Ab. Razaq, and Halina, 2009). Since the internet connection and large memories to uphold application are like normal telephony and messaging functions in mobile phone recently, developing a mobile application that enable student to apply for official documents irrespective of their locations, are presumed achievable, with the supporting help of WAP on the modern mobile technology.

1.2 Application for Official Document

Online WikiAnswers (2010), define official documents as documents entailing relevant information. In this study, Official Documents are the documents students usually applied for, to affirm their studentship as a student of Universiti Utara Malaysia (UUM). Mostly, students are always in need of the document for their

studies undertakings, or on request pertaining to official issues outside their universities.

1.3 Problem Statement

The present process of application for official document in UUM is still in a paper form application, which appears must vulnerable, inefficient and time consuming. Applicants of the UUM official document always fill the application form three or more days before collecting the document at the college office. Since the form of official document application in UUM CAS is still on a paper base, mistakes usually occur on the final copy of the latter due to some illegible applicant hand writing, and applicant will be forced to come back or delayed before collecting the document, this is practically an ineffective system, and resources wastage, as documents may be reprinted before the final copy. With the development of a mobile application for applying for official document, all the above listed hindrance will be solved, since all are problems directed to time consumption and traditional paper system vulnerabilities.

1.4 Research Question

The study major issue, are presented below in form of questions, the completion of these research will provide relevant answers to all the listed questions.

1. What is the requirement model to develop an official document application through mobile technology?
2. What is the usability for the prototype of the mobile application?

1.5 Research Objectives

For the development of a mobile application that enables the online official document application, some achievable objective are constructed, and listed below;

1. To identify the requirements for developing a mobile-based application for official document application in UUM CAS.
2. To develop mobile application model and prototype
3. To conduct the functionality and usability test of the proposed application

1.6 Significant of the Study

The main benefit of developing the mobile application for official document is reduce mistakes and virtually improve the present traditional paper base process of applying for the official document in UUM like the certification of study, deferment of study, and release letter. The development of this application will be more effective and beneficial to both applicant and the issuing offices of UUM CAS. Applicant will have the benefit to apply online with their mobile phones, from any location they may be, and will benefit the customer by improving the efficiency to prepare document.

1.7 Scope of the Study

The functional scope for the proposed application is through the design of an electronic application, where applicant can apply and input data for the need of official document from his phone, and provide all the needed details by filling up the provided form, through a mobile phone. The department will process the document, upon receiving the application and send a successful email or SMS to the applicant

email or mobile phone, by this, UUM college of Art and Science the applicants will know the exact time to go for their document such : certification of study, deferment letter, release letter and confirmation letter. The general design of this application will be using WAP application as the software, all will be discussed in details in the study literature review.

1.8 Organization of the Study

The general write up of this study will entails five chapters that will be interlinking each other, upon the necessary steps towards the completion of this study. The chapters are listed below;

Chapter One: This chapter presents the background of the study, and mainly the problem statements which the completion this study will overthrow.

Chapter Two: past related studies are reviewed in this chapter, to justify and lay path that are followed in this study.

Chapter Three: the methodology adopted in this study is discussed and justified in this chapter.

Chapter Four: this chapter presents the developed system, and the interfaces of the application.

Chapter Five: this chapter discuses the study conclusion, recommendations, limitations to the study and the future guide for related study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter primarily presents the past studies literatures as related to this study to justify the process and execution of this study. This study literature review focuses more on the explanation of mobile technology applications, mobile applications infrastructures and requirements of designing mobile applications.

2.1 Mobile Technology

What-Is.Net (2006) define mobile phones as hand-able mini computers that usually posse's calculation program, calendar, and interactive communication possibilities. Chen & Kinshuk, 2005; Nilas, Sueset, & Muguruma, 2004; Schei & Fritzner, (2002) all define smart phones as mobile phones with normal telephony and messaging functions with personal device assistant (PDA), packed together to ease human living activities and business transactions.

Turban, Leidner, McLean and Wetherbe (2007) revealed that, mobile technology has come to correct all the deficiency and limitation faced using the desktop computers, and laptop computers. As their name denote, the high mobility, interactivity, and easy usability has made most popular computer users converted as popular mobile users. Dankers, Garefalakis, Schaffelhofer and Wright (2002) affirmed that, with the help of I-phones, WAP enable phones, and PDA's that are generally known as mobile

technologies, has change phases of people work, offices are now been created on the palm now, with the fast accessibility to customers, business partners, and all needed commercial information. Recently, the number of remote workers in European Union (EU) has practically increased for six percent to thirteen percent (Veksttrend, 2002).

Mostly, the main concern in developing mobile application is the unsaturated of the sophisticated mobile technology that capable of accessing the application. Nowadays, saturation of mobile technology is no more a concern, in support (Schei & Fritzner, 2002) revealed that the number of mobile phone users has increased drastically, in Norway. Above 71% of the population are mobile phone users. Relatively in USA, Malaysia and china, 30%, 42% and 16% and above respectively are mobile phone users. (Chen & Kinshuk, 2005) related the growth of mobile technologies to the saturation of i-phones; PDAs and WAP enable phones in technology market and their high functionality and easy usability.

2.2 Mobile Applications

Phyoung and Young Ju (2003) define mobile application as a web application, that are executable WAP enabled mobile phones, with the availability of all needed memory on the phone to uphold the full grounding technology of web application. The source reveled that, mobile technology has simplify the access of internet application, and even more efficient, compare to its original computer agent. The specific uniqueness in mobile phones is that, they are have added more efficiency to computer technology and internet browsing, they can be used on the move, and they connect to different networks according to their locations.

El-Alfy (2005) holds that mobile technologies are now competing with computer technology in serving as a vivid hub of information and virtual business spaces. The wide spread of mobile technology could be addressed to the high mobility which they serve to people and development of the more interactive communication compatibility, such as sending and receiving of email address, surfing the internet, chatting and much more. Carlsson, Carlsson and Walden (2005) with the everlasting mobility in mobile phones and PDAs and the growing interactive technology of mobile applications, have made them the best option to travelers. Virtual activities would be done easily on the way, anywhere and anytime.

Kalkbrenner & Nebojsa (2001) highlighted the usefulness of WAP application for university students and how supportive mobile technologies could be to the present world students. Their study holds that more educational information would be surfed and will help in making a lot of their educational undertakings. These justify the development of mobile application for official document application, which enables students to apply for official document electronically.

2.3 The Concept of WAP

Wireless Application Protocol (WAP) is a collection of wireless application protocol and specification standard that allows mobiles devices to communicate with the web server using the WAP browser and display the contents back on the mobile devices screen, basically, it is the protocol that allow mobile devices to access the internet (WapForum, 2002a). International Engineering Consortium (IEC) has introduced another definition: Wireless application protocol (WAP) is an application environment and set of communication protocols for wireless devices designed to

enable manufacturer, vendor, and technology independent access to the Internet and advanced telephony services (Consortium, 2007).

In the early day of wireless web, several companies produced their own proprietary application protocol, this made the wireless web developed that followed one company communication protocol standard can only be viewed by mobile phone that use that standard (Nylander, 2004). Lacks of standardization hinder the growth of wireless web, users were confused, and developers were screaming for standardization.

One of the most important aspects of wireless communications is standardization. WAP is intended primarily for Internet enabled digital phones, pagers and other handheld devices. It is designed to standardize development across different wireless technologies worldwide. In 1997, the Wireless Application Protocol (WAP) was developed by Nokia, Ericsson, Motorola and others to foster the emergence of the wireless Internet. It is designed to standardize development across different wireless technologies worldwide (Computing, 2000). Moreover, in June 2002, 350 member companies –involved WAP forum companies- joined together and formed the Open Mobile Alliance (OMA). They represent the world's leading mobile operators, device and network suppliers, information technology companies, application developers and content providers (Open Mobile Alliance (OMA), 2004).

According to analysts at Lehman Brothers Inc (Kustin, 2002), the number of wireless Internet access devices being utilized worldwide is expected to double annually from approximately 50 million units in the year 2000 to approximately 600 million units in the year 2004. Based on this data, recognizing the upcoming need to have pricing information and purchasing opportunities available for users of handled Internet

access devices is essential for companies looking to become the most preferred suppliers of consumer goods on the Web. Moreover, IEC (Consortium, 2007) believes that the future for WAP will be bright; based on 75 percent of the world company's stand behind the mobile telephone market and the huge development potential of WAP.

2.4 Related Research

Clark, (2009); & Guillaume, (2009) in Spain and Australia developed a mobile rail ticketing and bus ticketing application respectively. Both studies affirmed the functionality of mobile phones to overwrite paper bus and railway ticketing. Post development usability test done by Guillaume, (2009) on the developed system resulted that user benefited significantly from the mobile ticketing in the area of time management, and longtime delay eradication. Similarly this study intends to develop a mobile system for student that eradicates time wastage in the process of applying and collecting their official documents.

Abkda (2009) design a mobile based application for bus ticketing service (MBTS), for the credible mobility in mobile technology. The application was design to be accessible anywhere anytime and was purposely to eradicate long time waiting in bus stop, and to effectively introduce WAP application into Malaysia transportation companies. The source revealed that, SDRM was adopted as the method used in achieving the study objectives. The source justify the method selected in this study, both studies are assumed to be aiming same objective but in different directions.

The ubiquitous significant potentials of mobile technologies have transformed many life styles and many inherited and traditional processes (Haslinda, et al. 2009). Cheverst, Davies, Mitchell, & Friday (2000) harvested these mobile potentialities for a great benefit of tourist, the source present a mobile system developed to provide tourist with all needed information and guides to link their destinations. The system was just a direct conversion of tourist guide book a mobile tourist guide system. This is apparently related to this study objective, by diverting the paper based official document application into a mobile version.

As related to this particular study, Ali (2009) designs a mobile tracking application for postgraduate office at UUM. The source revealed that student has been an addicted user of mobile technology, thus mobile technologies are popularly used in today's universities. Developing mobile applications for students and university may not be hindered. In their study, mobile application for tracking admission status is developed with the technical support of WAP technology on mobile phones, such study justify the stand of the proposed application.

For many studies to have established that, mobile technologies have greatly transformed from being a voice transferring devices only, to an internet accessing phones. Al_Zoubi (2009) successfully developed a mobile-based notifying system for UUM. The developed system was objectively developed to send university events notifications to their staffs. The recorded success of this study motives this particular

present study to develop a liking system that helps to student in applying for official letters on a mobile-based application.

This study stands that mobile technologies can host mobile internet applications to increase users' mobility and flexibility of accessing needed information, could be justified with the past study by Abdalma (2009) whom developed a mobile system for Malaysians pilgrims to access information about mecca and hajj activities on their spot of need. The study claim the designed system was tested and satisfied by users. Such study motivates the execution and the continuation of this study.

Mallat, Rossi, Tuunainen, Oorni (2008) revealed in their studies of Mobile ticketing adoption that cost of usage has never been a hindrance of mobile ticketing adoption. This can be directly related to the development of mobile application for student. Although it has not been empirically studied but, cost of usage should be considered in any student involving innovation. Similarly cost of usage would never be a hindrance for student to assess the proposed system.

Additionally, HandsOn (2010) affirmed that paper-based processes such as the one presently existing in the UUM official application process is inherently inefficient, it's directly prone to error, and could appear difficult and problematic when it is adopted to serve many people such as university students, hospital patients and banks costumers. The real-time access to information is essential to student of any level, most critically university student these could encourage mobile devices applications (EMTEL 1999).

2.5 Summary

This chapter entails all the related past studies reviewed in relevant to this study. Mobile technology functionalities are greatly explained mobile applications infrastructures, WAP, and more of the related studies. The following chapter will discuss the research methodology.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The adopted methodology for an effective design of the mobile application for official documents is discussed in this chapter. Sekaran (2000) revealed that research methodology plays a great and direct influencing role for any successful research, thus there is a need of choosing a justifiable methodology for this study.

3.1 The Study Methodology

Hoffer, George, and Valacich, (2002) research methodology is the set of adopted systematical process in a research that direct the steps of the research activity, in accordance to the research objective achievement. Methodology laid the path for research, add more to it effectiveness, usually adopted from previous studies as related to the adopting research. Research methodology usually entails several steps that are directed towards the achievement of the research objectives (Vaishnavi and Kuechler 2008). The research methodology adopted in this study consists of three main phases including awareness of problem, suggestion, and evaluation, Figure 3.1 present the pictorial representation of the adopted research methodology.

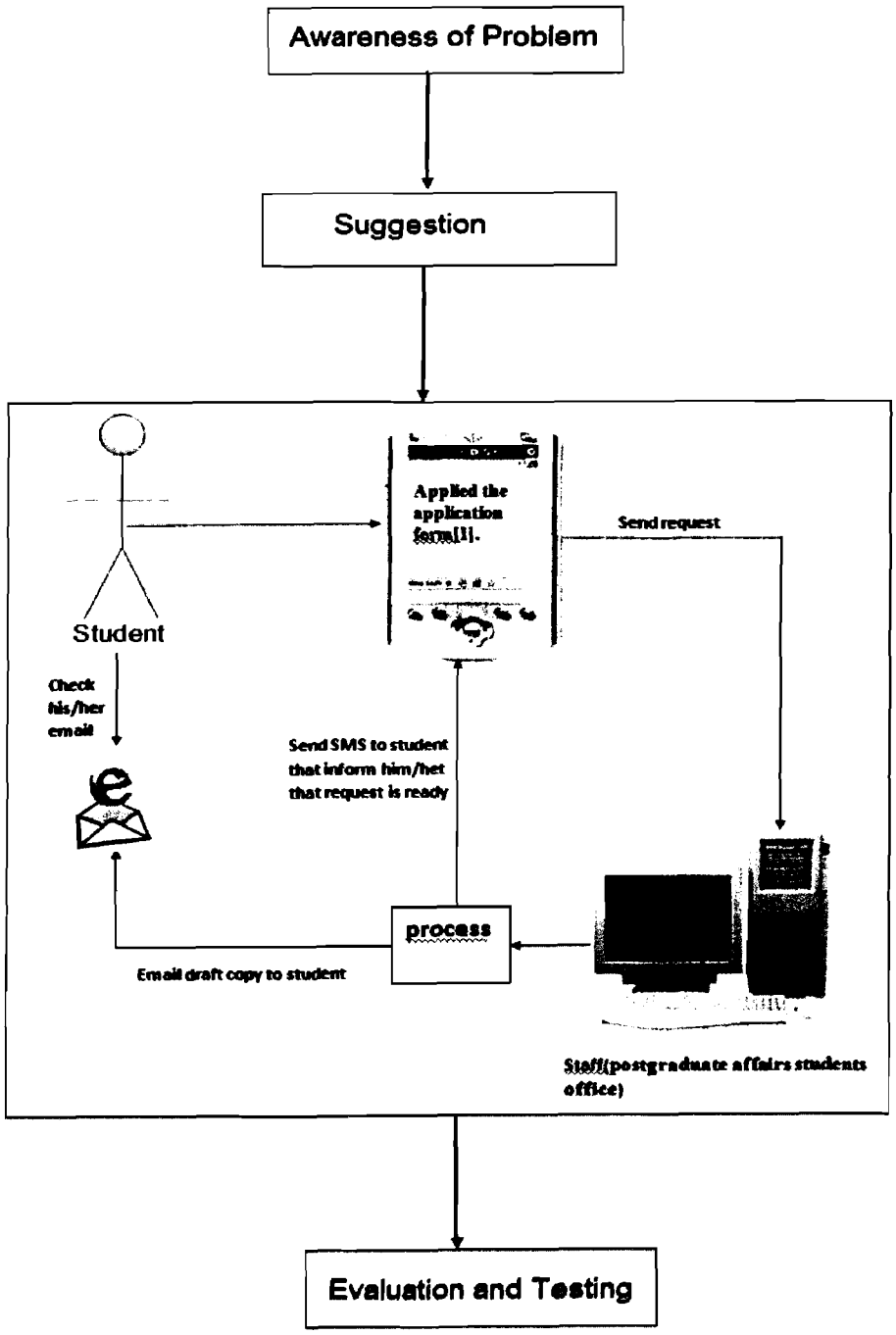

Figure3.1: Research Methodology Steps

3.2 Research Methodology Steps

3.2.1 Awareness of problem

It is a generally accepted philosophy that, when a problem is known it can be easily solved. Reasonably it is when a problem is understood that solution could be rightly suggested, which research purposely stand for. The first step of this study is to establish the existence of a problem, there are series of ways to be implicitly aware of a problem which include all the listed below:

- Asking users about their requirements: through the researcher experience and a little interaction with some student colleagues in UUM, the paper based official document application was underrated by students; their reasons are what constitute this research problem statement.
- Website observation: review the present related work of this study; promise the achievement of the proposed objective of the study. Truly technologies such as mobile technology have come to correct the deficiency of paper-based processes.
- Documentation: rigorous review of previous literature is also done, to justify steps in this study.

3.2.2: Suggestion

This study motive is to suggest the development of a mobile-based application that mobilize the process of applying for official document in UUM College offices. Thus prototype of the application will be designed, to present the feasibility proof of the proposed system in a practical situation.

3.2.3: Evaluation and Testing

In this phase, the tentative designed prototype will be evaluated and tested by users. Users' opinion serves as an evaluation in determining the success of the proposed application. This phase is regarded as the feedback phase for users to test, evaluate, criticize, and suggest their view towards the developed prototype.

3.3 System Development Methodology

This study adopted a universal process for developing a system, called; System Research Process Methodology (SRPM), as proposed by (Nunamaker *et al.* 1990), critical analysis to the process of the methodology, and review from previous studies justify the adoption of this methodology.

System Research Process Methodology entails five distinct steps, including; information gathering, develop system architecture, analyze and design, build prototype, and testing and evaluate the system. The Figure 3.2 explains the systematical process of the system development methodology.

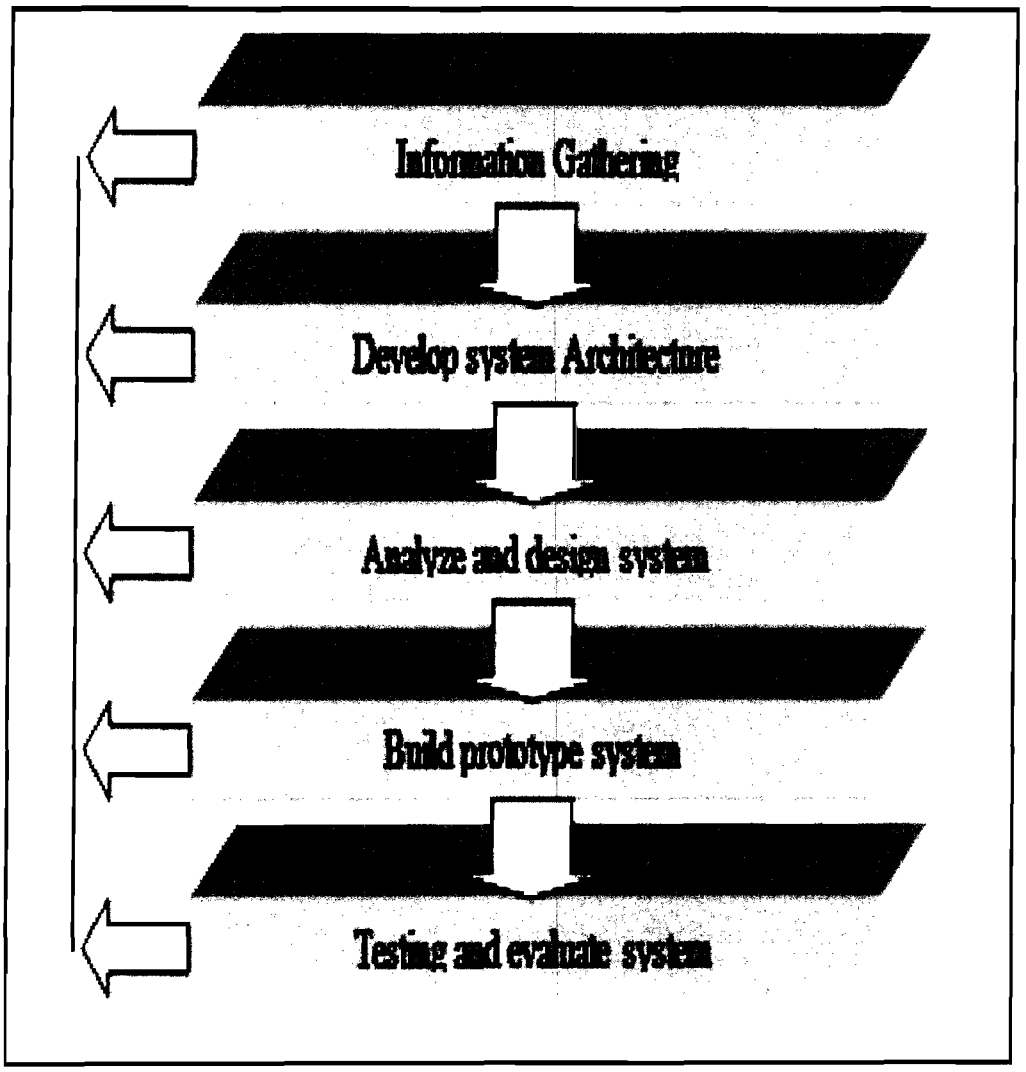

Figure 3.2: System Development Research Process Model

3.3.1 Information Gathering

As the Figure 3.2 present, this is the first step of the research, in this phase; rigorous review will be done, to gather all the needed requirements, for the development of a mobile WAP application. The review will be directed to focus only on the previous related research, and clear discussion on grounding technology for mobile and WAP application will be presented.

3.3.2 Software Requirement Specification

In reference to authorities in software development, such as IEEE, 1998) claim that software requirement specification (SRS) is the very initial process in developing any software. In this phase, this study will singularly interpret the requirements of developing software, into the needs of developing this particular application, to fit the specific motive behind this study.

3.3.3 Analyze and Design System

This section will be used to design the application mechanism; the system will be sketch out, in direction to the design objective. This phase will serve as the main plan in developing the system prototype.

3.3.4 Build Prototype System

The tentative design of the application will be design in this phase, regarding the specific requirement gathered from the literature review of past studies. The prototype will be subject to changes, as it will be open to users to evaluate and analyze it usability.

3.3.5 Testing and Evaluate the System

The developed application will be tested on the WAP, and the involved aspect will be lunched, to make it a complete system. Questionnaire will be distributed to respondent after using the system, to affirm the usability and the effectiveness of the developed application.

3.4 Summary

This chapter retains all the followed steps in this study. The general adopted methodology and the system development methodology are also discussed therein. The following chapter will present the interfaces of the developed system.

CHAPTER FOUR

SYSTEM ANALYSIS AND DESIGN

4.1 Introduction

The design and development of the prototype developed for the purpose of testing has been presented in this chapter. A prototype has the same functionality as the final intended system but is a scaled down version. The development process was carried out following all the steps discussed in Chapter 3. Chapter 3 listed the process of the system development in the three step process of designing, modeling and prototype development. The Unified Modeling Language (UML) was used to design and model the system. The UML design diagrams are discussed in detail in this chapter.

4.2 Mobile-Based for Official Document (MAOD) Application Requirements

The Institution of Electrical and Electronic Engineers (IEEE, 1998) defined a requirement as the conditions of capability needed by a user to conduct the intended purpose. The Mobile-Based Application for Official Document application (MAOD) user requirements are defined and organized into two categories, namely; the non-functional requirements and functional requirements.

4.2.1 The MAOD Functional Requirement

The major objective to determine the functional requirements is:

- To define the system user requirements.
- To determine the non functional requirements type.

Based on (Bennett, 2002), the functional requirements define the required system components with their features to achieve the expected results. All the system components should be determined at the system requirements gathering phase (Dennis et. al., 2005). A list of the Mobile-Based for Official Document application (MAOD) can be seen in the following Table.

Table 4.1: MAOD list of the functional Requirements

Requirement ID	Requirement Designation	Actor: Student
MAOD _01	**LOG IN performance**	✓
	By this function the student has the ability to sign in the system , and manage his pages (the system requires a correct username and password)	
MAOD _02	**SIGN UP (Register)**	✓
	This function of the system allows the student to be a member of the system by permits them to create new profiles.	
MAOD _03	**Apply for Doc**	✓
	Through this function the can send request or application for official document such : **Certification of study** : it is a letter represent truly the studies periods of students **Deferment letter**: this letter confirm that the student defer or delay his study **Release letter**: it is confirmation letter, describe that the student completed his study. Student shall send request, the system will confirm and inform him via student status page.	
MAOD _04	**Manage profile**	✓
	By this function students can manage their profile by edit/ delete their account.	

4.2.2 The MAOD the Non-Functional Requirements list

In Software Engineering the role of the system's Non-Functional Requirements is to showing and clarifying a pragmatic and systematic approach to 'developing quality into' software systems. Systems should put on view software the measuring quality attributes, such as security, accuracy, modifiability and performance (Chung, Nixon, Yu, & Mylopoulos, 1999). As in Table 4.2

Table 4.2: The MOAD Non-Functional Requirements

Requirement _ID	Description	Priority
MOAD_05	**Reliability issues**	
	The MOAD application shall ensure 24*7 operations with an availability of 100%.	Mandatory
MOAD_06	**Usability**	
	The MOAD Application should have friendly interface, which ensure that the system is easy to use and usefulness.	Mandatory
MOAD_07	**Security**	
	The ability to prevent an authorize student to access data, also provides authentication to limit user with some permissions.	Mandatory
MOAD_08	**Maintainability**	
	The MOAD code source should be in a good structure so that make it easier to developer to maintain and extend the system or feedback.	Mandatory

4.3 System Architecture

Based on the research and the solution provided the road map for the application building process. This research proceeded with the design of the prototype based on the information gathered in the previous phase. The MOAD infrastructure is described in Figure 4.1. Student can access MOAD via wireless network through their mobile devices. They can also access the service via Wi-Fi through access points as well as via GPRS network through the respective WAP provider.

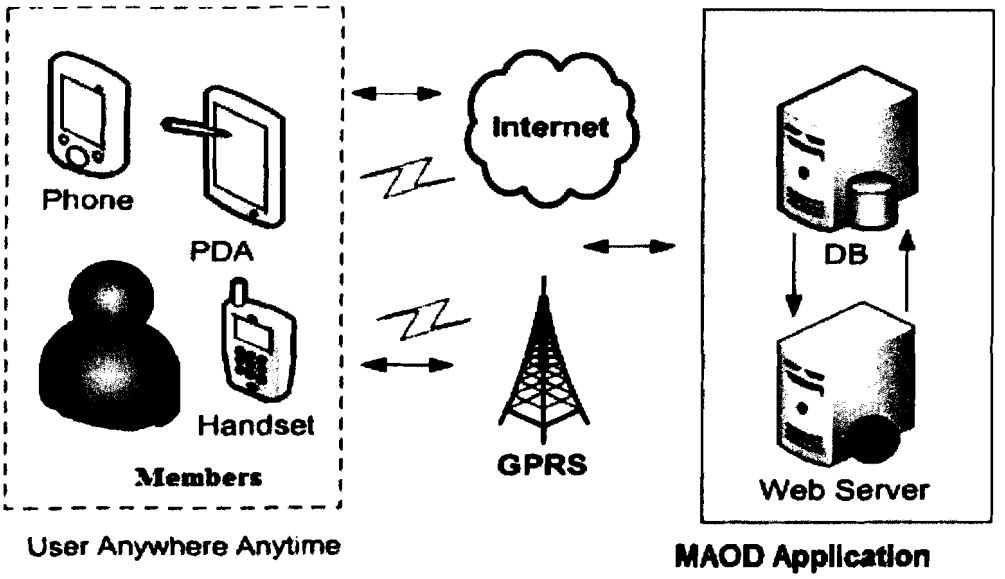

Figure 4.1: MAOD Architecture

4.4 Modeling of MAOD System

Design of the system has been carried out using UML. This section describes the design process in detail. Developers and users are presented with a different perspective of the system through UML diagrams at various degrees of abstraction. Visual modeling tools are commonly used to create UML diagrams. Use case diagrams, sequence diagrams and class diagrams are the commonly used UML diagrams (Barclay and Savage, 2004).

4.4.1 MAOD Use Case Diagram

Use case diagrams illustrate what a system does from the point of view of an observer from the external. The focus is on what a system does rather than how. The use case diagrams are closely linked to scenarios. A scenario, it can define is an example of events when someone interacts with the system. A use case is a review of scenarios for a single task or objective. An actor is what or who initiates the events involved in that task (Martin and Kendal, 2000).

Figure 4.2 describes the MAOD use case diagram

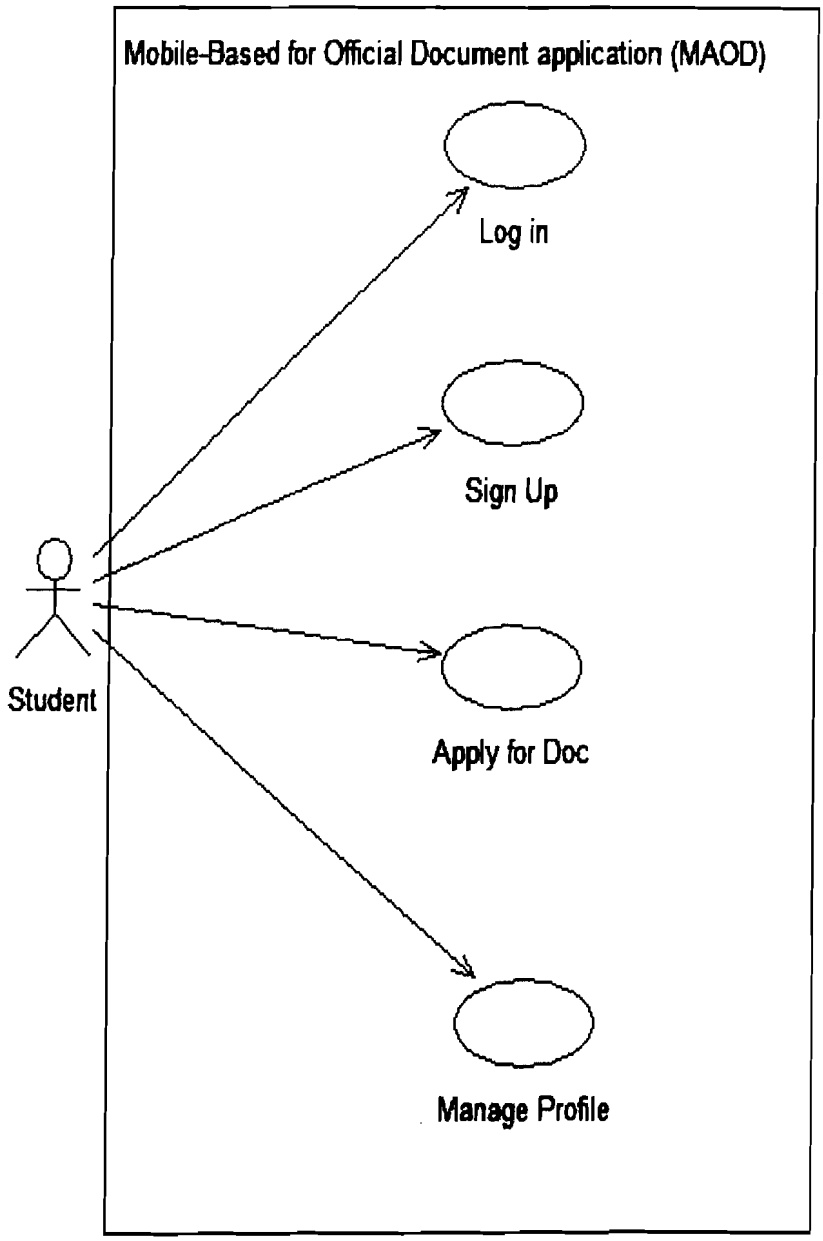

Figure 4.2: MAOD Use Case Diagram

4.4.2 MAOD Use Cases Description

The MAOD application use case descriptions are shown in Tables 4.3 to Table 4.6 respectively.

Table 4.3: Perform Log in use case Description

Use Case Name: perform **Login**	ID: **MAOD_1**	Importance Level: **High**
Primary Actor: **Student**		
Short Description: This use case describes how user can log in function ensures that only authorized users gain access to the system databases. An authorized user is a user who has an account on the system. The systems' users should key-in a valid password and username to gain access to the system		
Trigger: Student decides to login through key- in his/her username and password in the log in panel. Type: **External** / Temporal		
Major Inputs: **Description** — **Source** Student username & password — student info Log in button — System		**Major Outputs:** **Description** — **Destination** Student page — System
Major Steps Performed		**Information for Steps**
1. Student type his/her Username and Password through log in panel. 2. The Student clicks login button. 3. The system shall verify and validate the entered information and displays Student page if it is correct.		Username/password. Login button. Display Student page.

Table 4.4: Sign up use case Description

Use Case Name: **Sign Up**	ID: **MAOD _02**	Importance Level: **High**
Primary Actor: **Student**		
Short Description: This use case describes how Student registers into the system.		
Trigger: Student decides to sign up in the system. Type: **External** / Temporal		

Major Inputs:		**Major Outputs:**	
Description	**Source**	**Description**	**Destination**
Sign up link.	System	Display registration form	System
Name , Gender, date of birth, address, email, Metric number , study program	Student info		
Submit button	System		

Major Steps Performed	**Information for Steps**
1. The student clicks on sign up link	Sign up link.
2.The system will display registration form	Display Registration form
3. Fill up the Registration form fields (Name, Gender, date of birth, address, email, Metric number, and study program).	Name, Gender, date of birth, address, email, metric number, study program.
4. The student shall submit the application form by click on submit button.	Submit button.

Table 4.5: Manage Profile use case Description

Use Case Name: **Manage Profile**	ID: **MAOD _04**	Importance Level: **High**
Primary Actor: **Student**		
Short Description: This use case describe how can the students manage their profiles, student able to delete and edit their profiles.		
Trigger: The student decides to manage the profile Type: **External** / Temporal		

Major Inputs:		**Major Outputs:**	
Description	**Source**	**Description**	**Destination**
Manage Profile link	system	Profile updated	system
Selected function	system		
Delete button.	student	Display profile page.	System
Make change	student		
Save button	student		

Major Steps Performed	**Information for Steps**
1. The student clicks on Manage Profile link.	Manage Profile link
2. The system will offer the available function to the advisor (delete, edit, save)	Display manage profile page
3-The student select one from the available function (delete, edit, save)	Function selected
Edit customer File	
3. The insurance advisor clicks on edit button	Edit Button
4. The system will display the profile page	Display profile page
6. Insurance advisor edit the customer application (metric , name, date of birth, address, email, study program)	Make change on data (metric , name, date of birth, address, email, study program)
7. Student press save button.	Save button
8. System automatically save and database will be updated	Database updated

Table 4.6: Apply for doc use case specification.

Use Case Name: **Apply for doc**	ID: **MAOD _03**	Importance Level: **High**
Primary Actor: **Student**		
Short Description: The system allows the Student to make document request using the mobile.		
Type: **External** / Temporal		
Basic Flow of Events **Student** 1.Student click on apply for doc button. 3. student select the document 5. Student fills up the panel then submit.	**System** 2.System displays the list of document available (certification of study , deferment form). 4. system display the information panel 6. System save the request and send confirmation message.	
Alternatives Not applicable		
Exceptions **Exception E1 (incomplete form)** 2. Student acknowledges the message.	1. System display message "incomplete form" if the member forget to fill some field.	
CHARACTERISTIC OF ACTIVATION Click make request		
Pre-conditions System ready. student should be log in.		
Post-conditions New doc request.		

4.4.3 MAOD Sequence Diagrams

Based on (Johan, 2004), a sequence diagram is an interaction diagram that emphasizes the time ordering of the messages. Graphically, a sequence diagram is a table that shows objects arranged along the X-axis and messages, ordered in increasing time, along the Y-axis.

Typically you place the object that initiates the interaction at left, and increasingly more subroutine objects to the right. Next, you place the messages that these objects send and receive along the Y-axis, in order of increasing time from top to the bottom.

MAOD sequence diagrams are depicted in Figure 4.2 to Figure 4.5 respectively.

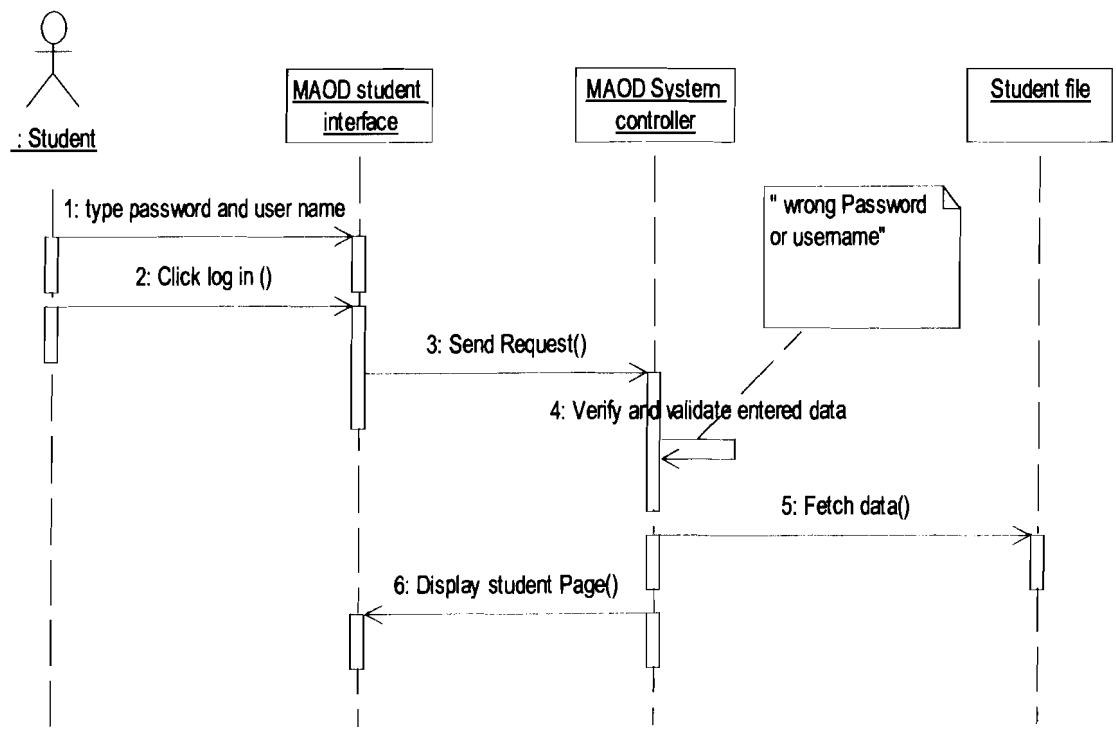

Figure 4.2: Log in Sequence Diagram

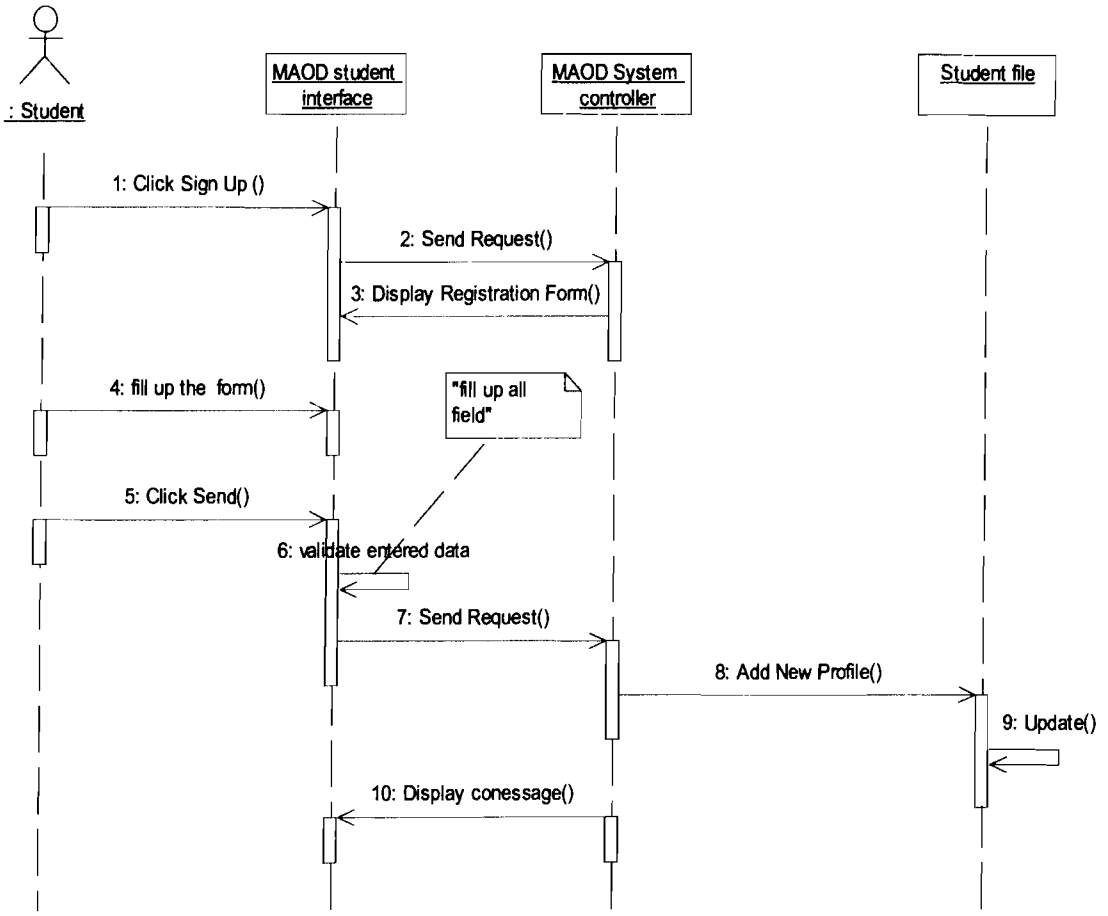

Figure 4.3: Sign up use Sequence Diagram

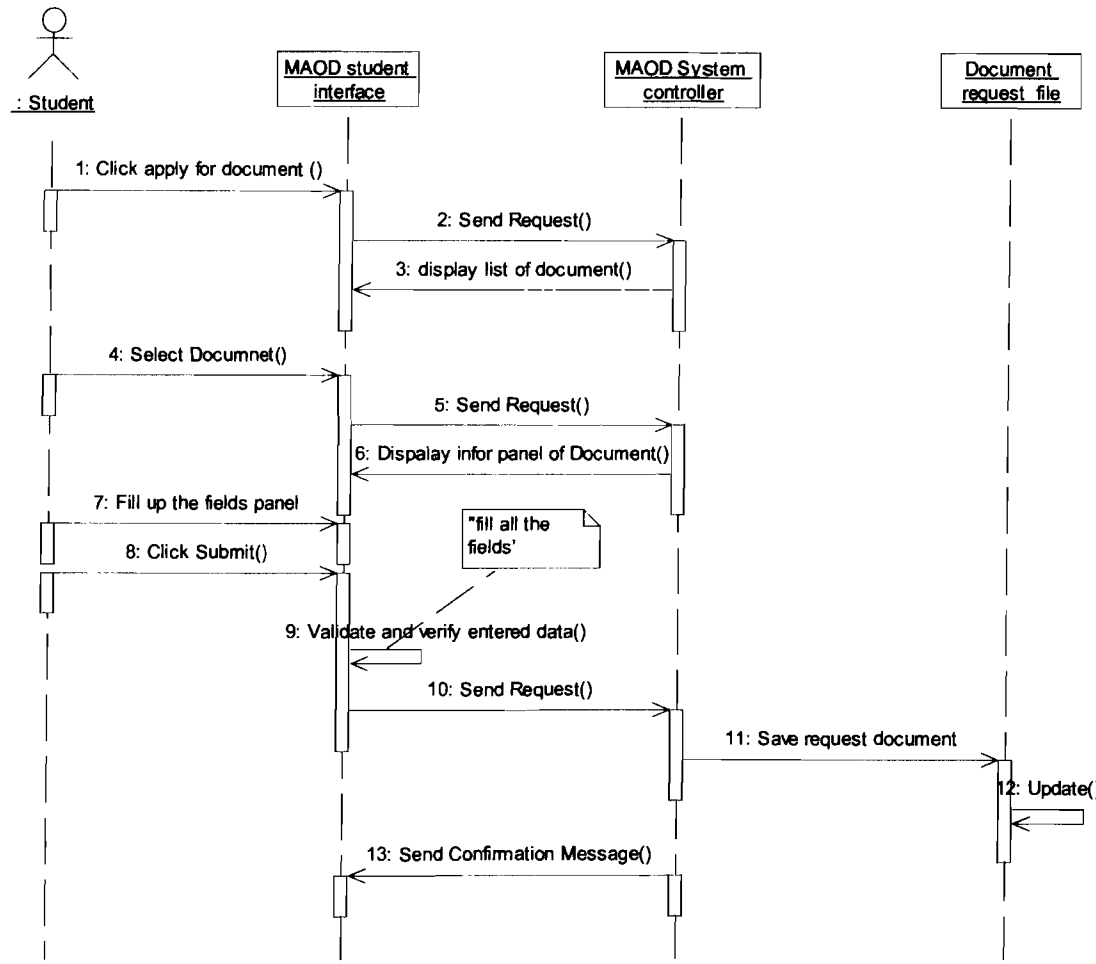

Figure 4.4: Apply for Doc Sequence Diagram

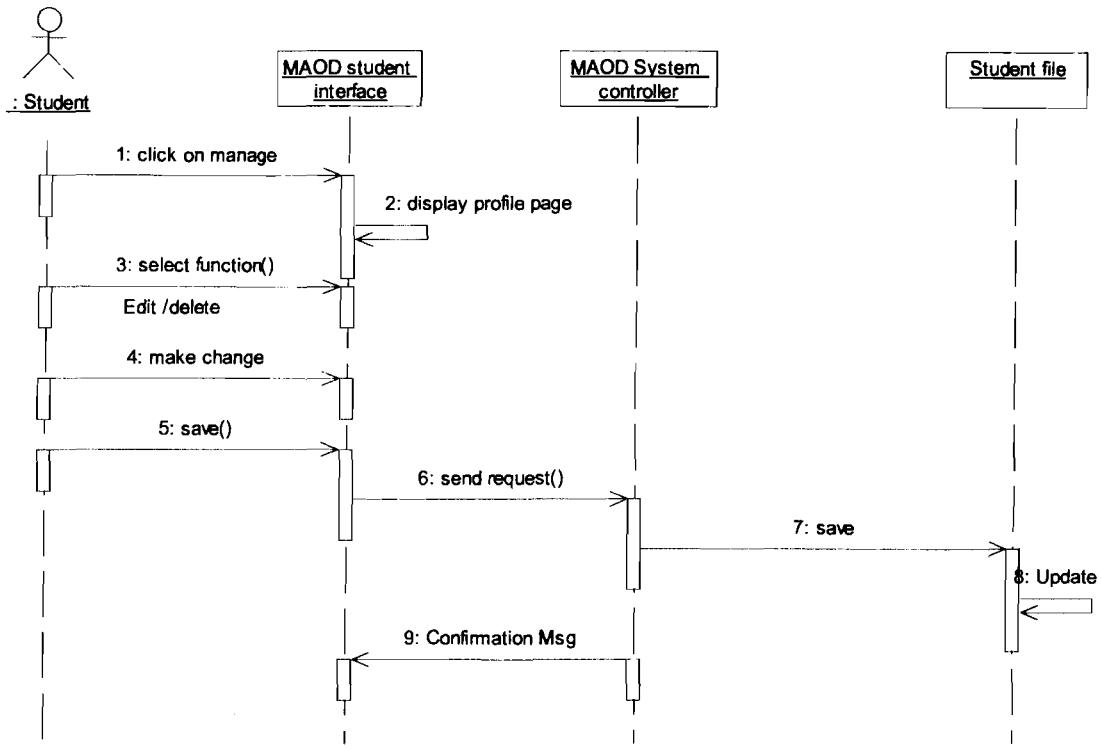

Figure 4.5: Manage Profile Sequence Diagram

4.4. 4 MAOD Class Diagram

Referring to Atle, et al, (2008), Class diagrams are the most common diagrams found in modeling object-oriented systems. A class diagram shows a set of classes, interfaces and collaborations and their relationships. Before drawing a class diagram consider the three different perspectives of the system the diagram will present; conceptual, specification, and implementation. It should not to focus on one perspective and it is better seeing how it all works together.

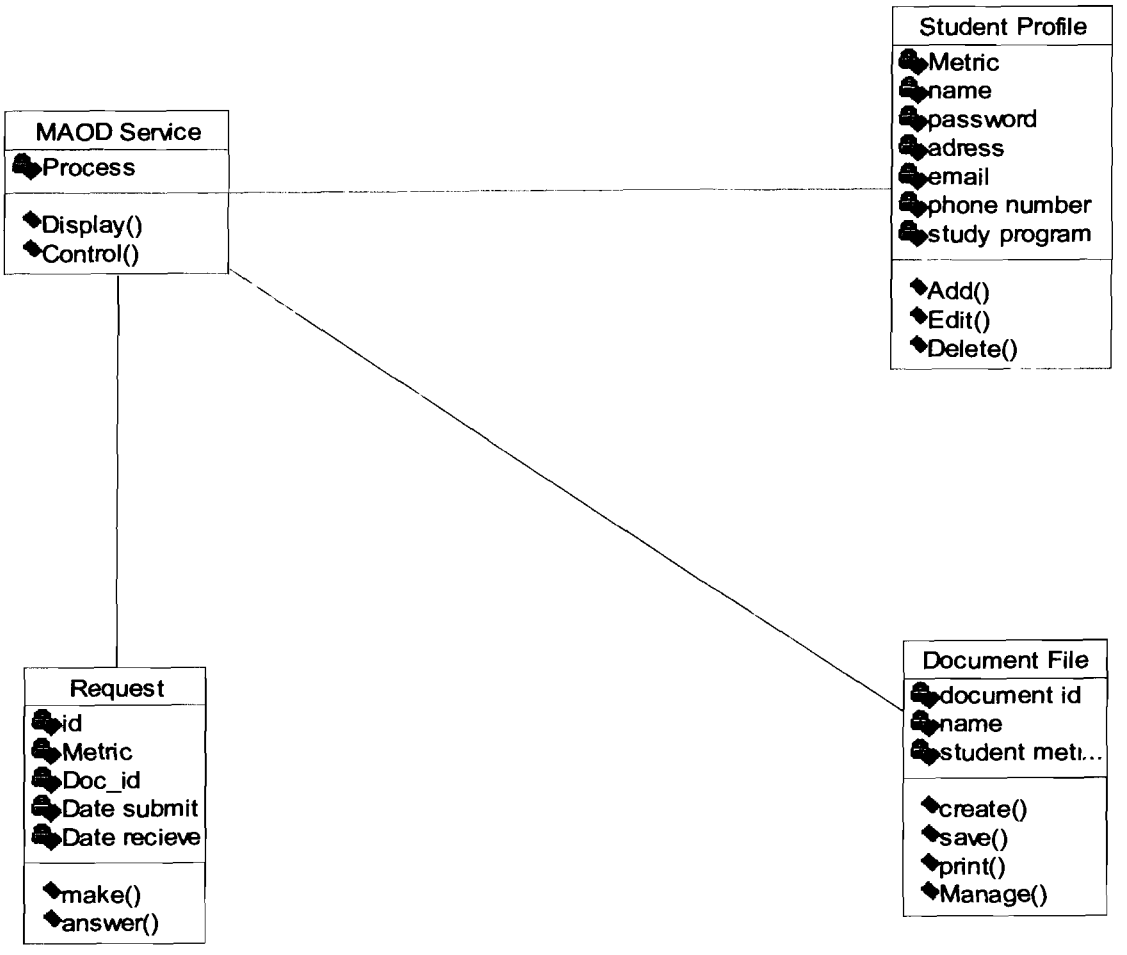

Figure 4.6: MAOD Class Diagram

4.5 Prototype Implementation &Screen Shoot Explanation

Mobile-Based Application for Official Document (MAOD) Application has been successfully implemented. All the functional requirements described before have been fully achieved. The prototype initially developed for testing has been fully converted to a working system. JAVA has been selected as the programming language with using JSP. The back end database was developed using Microsoft SQL Server 2005.

Mobile-Based Application for Official Document (MAOD) Application front end has been developed using JavaScript and html. The aesthetics of the appearance of the

user interface was given a prime attention to make the user experience as pleasant as possible. The following figures show a sample of user interfaces

The set of MAOD screens are depicted in Figure 4.7 to Figure 4.10 respectively.

Main Page Interface

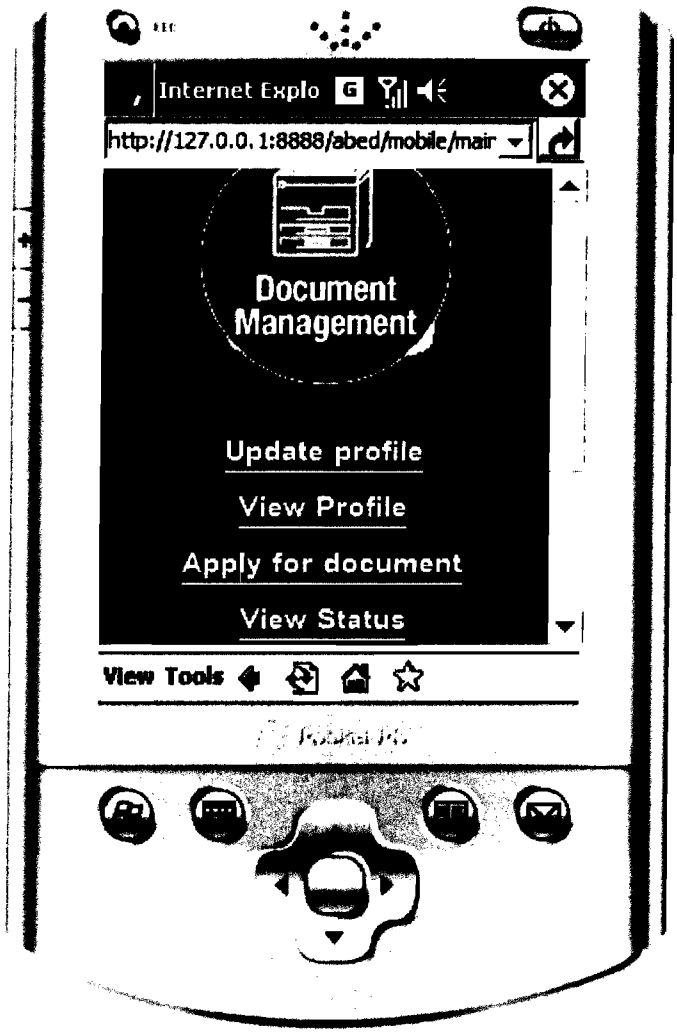

Figure 4.7: MAOD Main Page interface

Figure 4.7 shows the main page interface of the MAOD application. It is the first screen will be presented with when user gets access to the system. User will be required to enter a link of the application in internet browser. Via this page the user able to navigate in other system page.

Log In interface

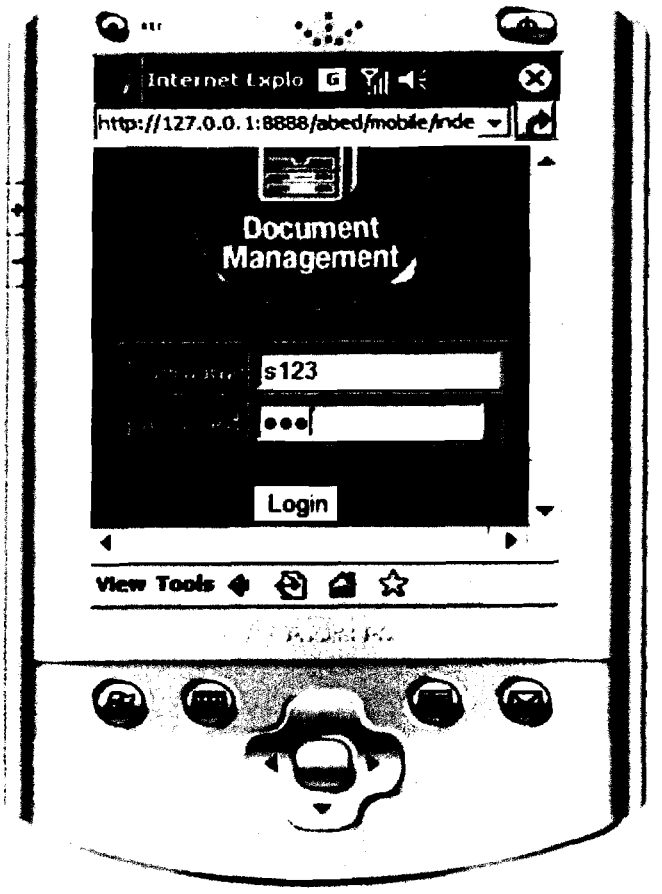

Figure 4.8: MAOD Log In interface

Figure4.8 describes the log-in interface to the MAOD system. It is the second screen a user will be displayed with when accessing the system. The system member required to enter a suitable username and password to log-in. For security purposes, the password entered by the user will be shown with dots, instead of plain text. Once a user enters the username password, they will be verified against the user information stored in the database. If successful, he/she would be allowed access to the other available services of the system.

Sign Up Page

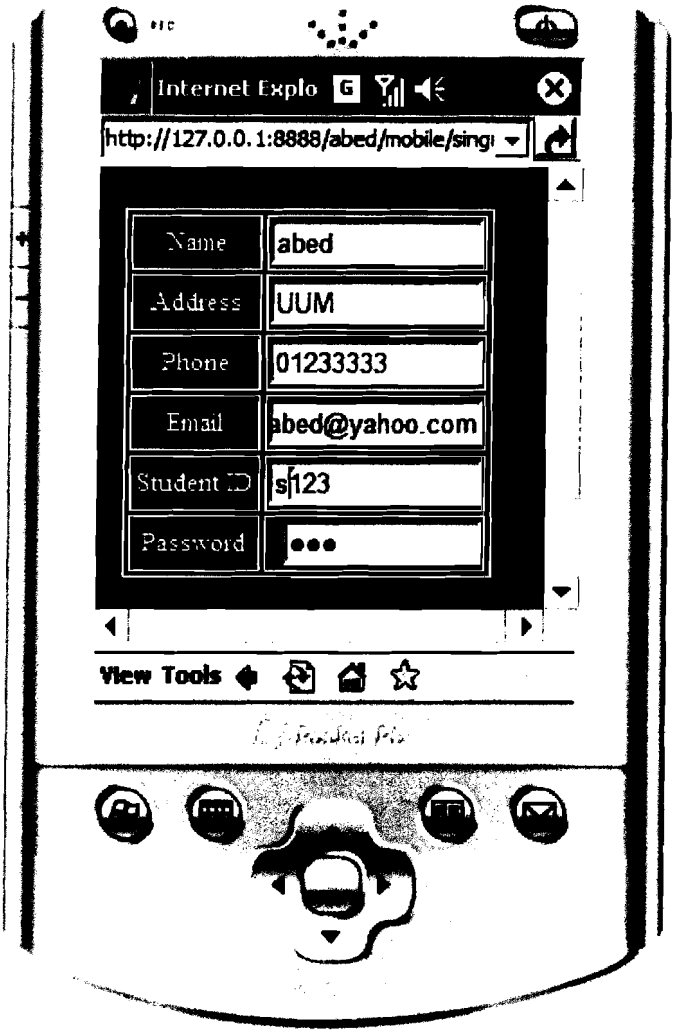

Figure 4.9: Sign Up Page

The presented page by the Figure 4.9 can be accessed from the main screen through Sign up link of information. This screen shows the user's sign up form with its required fields. For signing up the system a user required to key-in the Name, Log-in Name, Password, retyping password, and email address, metric number ended the sign up request through clicking on the sign up link as presented in the figure below.

Apply for document page

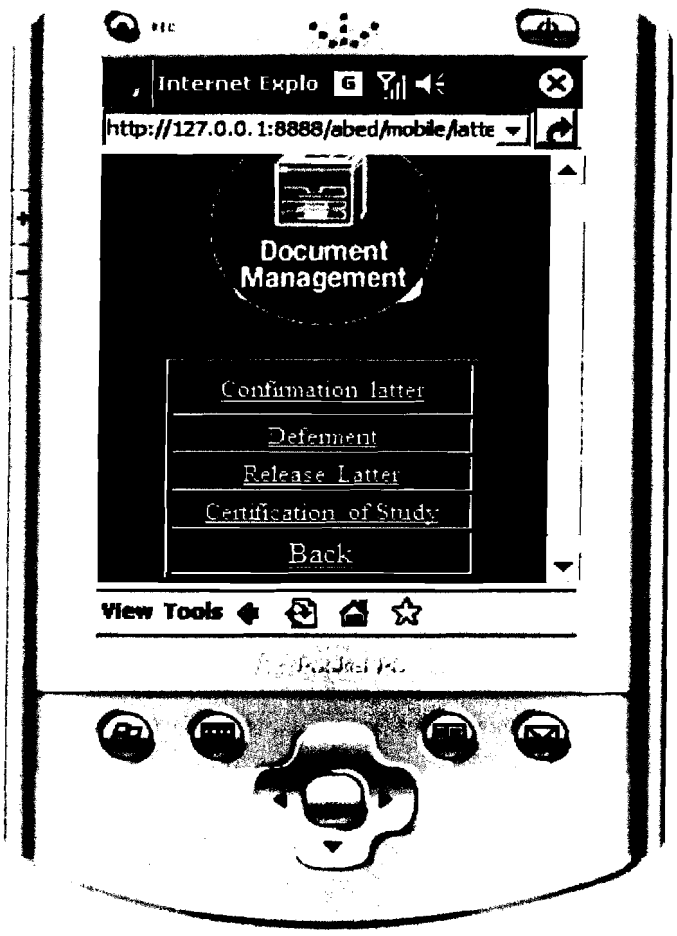

Figure 4.10: Apply for Document page interface

Figure 4.10 presents Apply for Document page, through this page the student can make online tasks, and apply for official document.

The student required to click on the matched link of the document needed (Deferment Letter, Release Letter or Certification of study) and student should click on submit button to send his request.

The system will automatically register student request in his status page as shown in the Figure 4.11

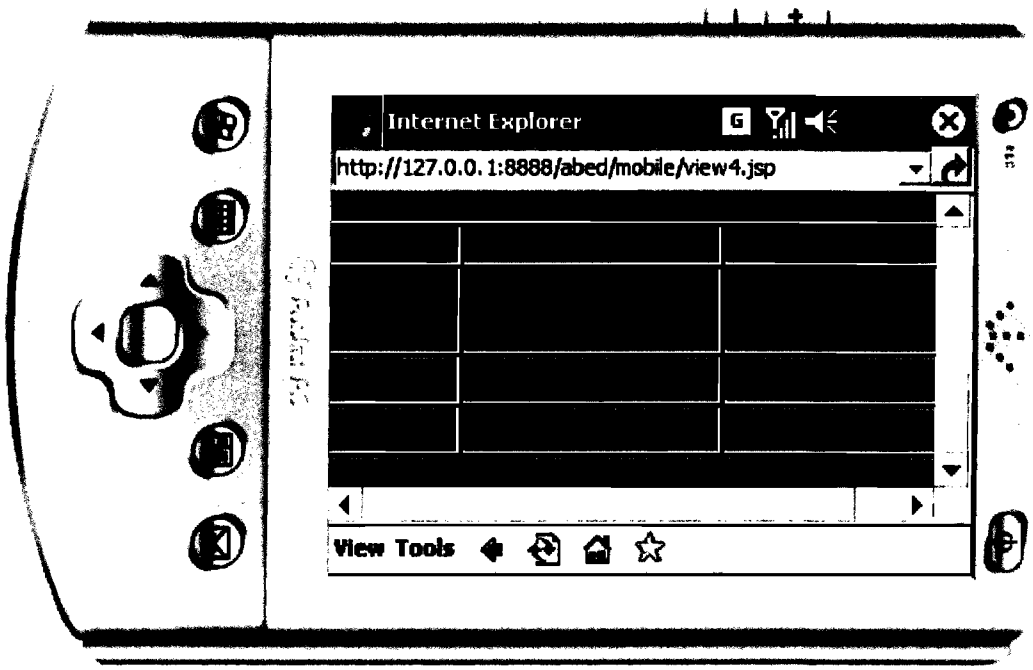

Figure 4.11: Student Status page

Figure 4.11 shows the status page of the student's document, trough this page the students can see their list of applied documents with its status, the status can be approved that is means that the students' document is done , rejected or pending in the case of the document still in process.

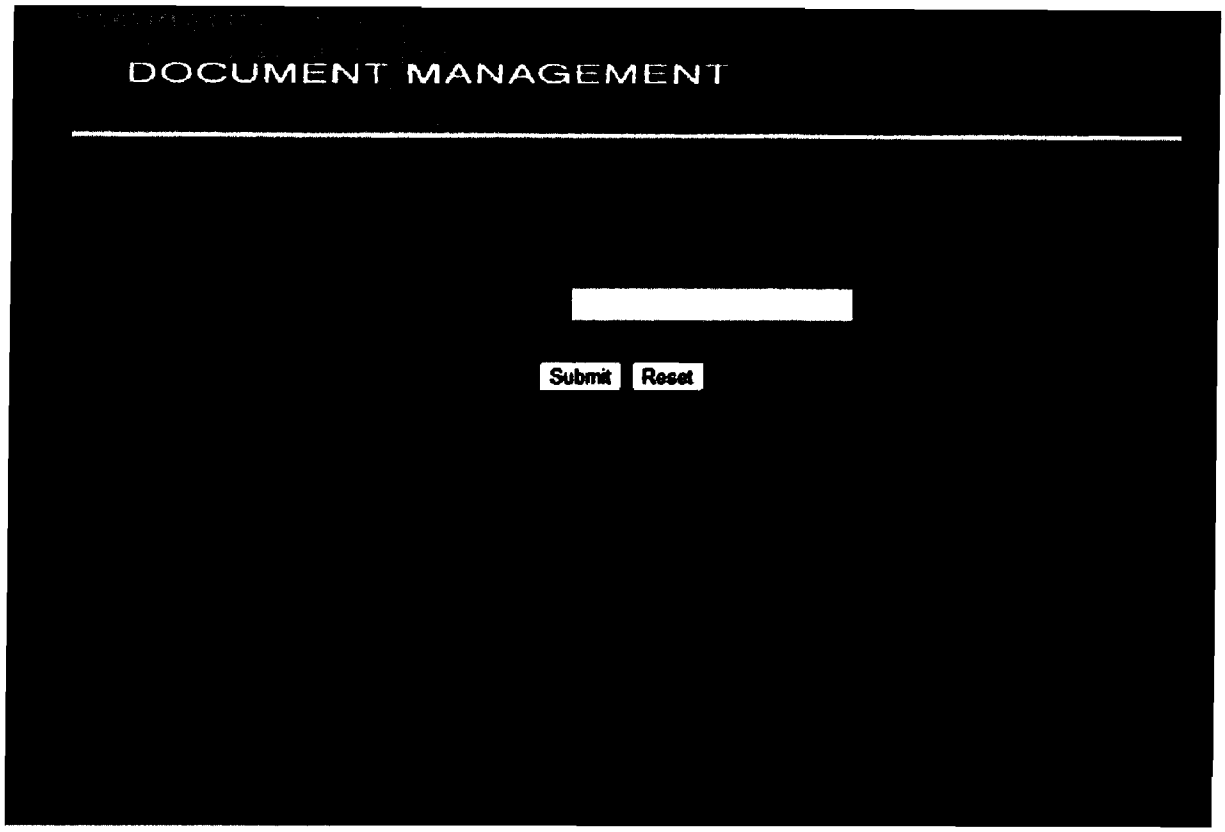

Figure 4.12: Student Status page (Server Side)

Through the page presented by Figure 4.12, the Admin able to check the applied document for each students. The admin required to insert the Student _id in the box panel and click on submit button, then the system automatically will display the list of the student's applied document.

Section 4.5 involved an introduction to the facilities available in the system for an authenticated user. Each screen a user will encounter in the system has been presented and discussed with special attention to the functionalities. The discussion started with the home page, log in user interface and then followed in sign up page ended by apply for document page.

4.6 Summary

This chapter carried out the design, implementation and development of the system at the prototype level. The functional and non functional requirements of the system were initially defined and then the system modeling was carried out the Unified Modeling Language (UML). The sequence diagrams and the class diagrams were also presented in this chapter as design stage. The system was implemented using JSP and Microsoft SQL Server 2008. The snapshots of the user interfaces for different functionalities and operation were finally discussed.

CHAPTER FIVE

RESULT AND DATA ANALYSIS

5.1 Introduction

This chapter presents the results of the statistical analysis carried out in this research to system prototype usability. The SPSS ver. 16 has been used for statistical analysis. The data analysis has been carried out in line with the research objectives stated in Chapter 1. The evaluation method carried out in this study was by the design of the questionnaire and the analysis methods that used to involve the usability test of the system.

5.2 Functionality Testing Evaluation

Functionality testing is carried out based on a standard set of tests followed by an interview. Closed environment and video equipment are used in order to increase the observability. During the interview, questions are only framed around their experience on the system, no opinions or predictions about non experienced items are asked (Nielso, 2000). The usability test with end users is one of the most fundamental methods in usability evaluation (Holzinger, 2005)

Neilsen, (2006), recommended that the reason for performing the usability testing is to define the level of usefulness, operability and ease of use of the system. MAOD

application Usability testing was achieved through the survey via the use of questionnaires given to the participants; to evaluate the system of the study a questionnaire had been given to 40 candidates. Each of the respondent had been taught to use the system prototype, the system functionlity, objective and description had been informed to the participants. The main objective to do that is to get the level of user satisfaction and agreement in term of the usfellnes and the ease of use with the operability of the MOAD prototype.

5.3 Instriments of the survey

User testing on the Functionality of MOAD prototype was evaluated using a testing session followed by a survey which use a questionnaire. This questionnaire was adopted on the instrument developed by other researchers namely Davis (1989), (Lund, 2001), (Lin, Choong, & Salvendy, 1997) and Lewis (1995).

The study's questionnaire involved two parts, namely *"Section A"* consists of the general information of the respondent and *"Section B"* contains the Usefulness and Ease of Use variables and under each variable a several items.

A 5-point Likert scale starting from "Strongly Disagree" (1) to Strongly Agree (5) was used to enumerate user preference.

5.4 Respondents' Information

Table 5.1 gives the profile of the respondents, from that Table it can be seen that majority of the respondents are males making a share of 82.5 percentage. In the age group category, 26-35 year olds make the largest respondent group with a 57.5 percent followed by 36-45 year olds with a 00 percent. All the respondents have undergone university education out of which a 62.5 percent has postgraduate qualification at master's level. Out of all the respondents, 100 percent did not have prior experience with similar systems.

Table 5.1: Respondents' Profile

	Percentage	Frequency (N=40)
Gender		
Female	17.5%	07
Male	82.5%	33
Age		
20-25 years	42.5%	17
26-35 years	57.5%	23
36-45 years	00%	00
above 45 years	00%	0
Level of Education		
Degree qualification	38.5%	15
Master qualification	62.5%	25
PhD qualification	00%	00
Other	00%	00
Have you got any experience on similar systems?		
Yes	00%	00
No	100%	40

5.5 The Items Analysis

Table 5.2: User Perception of Usability

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

PERCEIVED USEFULNESS	1	2	3	4	5	Means
The MOAD is useful.	0.00%	0.00%	05%	32.5%	62.5%	**4.5750**
It saves my time when I use the MOAD.	0.00%	0.00%	02.5%	47.5%	50%	**4.4750**
It saves my effort when I use it the MOAD.	0.00%	0.00%	02.5%	47.5%	50%	**4.4750**
The MOAD gives me more control over the activities in my life.	0.00%	0.00%	07.5%	42.5%	50%	**4.4250**
The MOAD makes the things I want to accomplish easier to get.	0.00%	0.00%	07.5%	42.5%	50%	**4.4250**
It does everything I would expect it to do.	0.00%	0.00%	02.5%	37.5%	60%	**4.3500**
PERCEIVED EASE OF USE	**1**	**2**	**3**	**4**	**5**	**Means**
It is easy to use.	0.00%	0.00%	02.5%	47.5%	50%	**4.4750**
It is flexible use.	0.00%	0.00%	02.5%	35%	62.5%	**4.6000**
It is simple to use.	0.00%	0.00%	05%	32.5%	62.5%	**4.5750**
It is user friendly.	0.00%	0.00%	02.5%	47.5%	50%	**4.4750**
It requires the fewest steps possible to accomplish	0.00%	0.00%	07.5%	42.5%	50%	**4.4250**
I can use it without written instructions.	0.00%	12.5%	12.5%	42.5%	32.5%	**3.9500**
I can recover from mistakes quickly and easily	0.00%	0.00%	02.5%	50%	47.5%	**4.4500**
I can use it successfully every time.	0.00%	0.00%	07.5%	42.5%	50%	**4.4250**

Table 5.2 shows the summary of the responses of the user experience and their perception of usability of the system. The values indicated in the cells represent the percentage of answers received for a specific option in terms of the question asked and the strength of the user opinion towards that question. For example, 00%, for 'Using MAOD would enable me to accomplish tasks more quickly' and 'Disagree' means, no respondent has disagreed to this choice. 62.5% for MAOD is simple to use' and 'Strongly' mean that 62.5 percent of the respondents strongly agree that the system was simple to use against 32.5% has lower opinion regarding this aspect of usability.

Usability of the system has been tested under two broad categories, namely 'perceived usefulness' and 'perceived ease of use'. The perceived usefulness tests the opinion of respondents on usefulness of this system for managing parking place in terms of availability of features. While the perceived ease of use measures the opinion of respondents in terms of accessing different features of the system.

A questionnaire has been developed containing several questions under these categories. The questions were developed in such a manner that a specific and narrow area is addressed in order to eliminate ambiguity in understanding the question. Eliminating ambiguity will help respondents answer the question objectively rather than subjectively.

5.6 Summary

This chapter provided the data analysis carried out in this study. Initially an introduction to the test parameters was given based on the experience of the senior researchers in this field. The profile of the respondents was presented before discussing the data collected and the interpretation of the results. From the analysis it was found that the usability of the system was very high on both aspects namely, usefulness and ease of use.

CHAPTER SIX

CONCLUSION

6.1 Introduction

This chapter describes the overall progress of the project by offering a full view based on the objectives of the research. Adding up, this chapter also involved project limitations and recommendation.

6.2 Objective Achievements

The mentioned objectives in the first Chapter have been completely reached through the success of the implementation of the MAOD Application. The first two Objectives set out in Chapter are to define the system requirements, rules and function for a MAOD application and develop the application prototype. These objectives were completely conducted at the completion of system implementation phase.

The findings resulted from the survey method. Researcher achieved that the MAOD application Prototype is easy use, clear, useful and easy to run it also with a friendly interface. The surveys of 40 respondents showed that almost all of the users of were satisfied and agree about the application architecture and its functionalities that is deal that the user's requirement was discovered and determined correctly. Therefore, the third objective of this project is successfully accomplished, to identify prototype functionality and usefulness testing.

6.3 Recommendation and Limitations

The proposed application was successfully implemented using JSP and WML technology. The SQL server was used to design the database system of the application. This system helps UUM student in CAS College to apply easy for administrative document required from the CAS College. However, there are some problems and limitations in implementing this application. Such as;

1. MOAD application has been tested using a local server with test data only. The proper system needs to be tested using real data.

2. Developing mobile application-pages with more complicated than developing pages for a standard Web browser because of restrictions on the size of the screen mobile space and internal memory in mobile devices. Under development, the developer should be concerned about the size of the screen. Where there are several studies has had assured for new versions for these issues especially with the new generation of WAP version 2

3. The limited time to do more in depth research and study is another challenge to gather the complete information and understanding for this study area. Better result will be achieved if the project period is lengthened.

As researcher can see no one can deny the importance of mobile technology it is become as the important field of the society, it must make the uses of the mobile technology to be wider in all the area because it is make everything easy and fast to be done.

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APPENDIX

QUESTIONNAIRE

Mobile Application for Official Document Issuance (MAODI)

System Prototype Evaluation

This questionnaire is divided into two sections (Section A, and B). Section A: addressing respondent general information; Section B measuring the Perceive of Usefulness and the Perceive of Ease of Use of MOAD. Respondent are required to answer all the questions in order to complete the session.

YOURS,
TAHANI SALIM ELHADI
College of Arts and Sciences (CAS)
Universiti Utara Malaysia (UUM)

Section A: Respondent General Information

This segment is about your background information. *Please fill up the blanks and mark [√] where appropriate.*

1. Gender: [ ] Male [ ] Female

2. Age: 20-25[ ] 26-35[ ] 36-45 [ ] Above 45 [ ].

3. Educational Level: Degree Qualification [ ] Master Qualification [ ] other [ ]

4. Do you use a similar application before [ ] Yes [ ] No

Section B

For the next segments, please tick or shade the answer to the following questions using the scale.

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

	PERCE IVED EASE OF USE	**1**	**2**	**3**	**4**	**5**
1.	It is easy to use.					
2.	It is flexible use.					
3.	It is simple to use.					
4.	It is user friendly.					
5.	It requires the fewest steps possible to accomplish					
6.	L can use it without written instructions.					
7.	I can recover from mistakes quickly and easily					
8.	I can use it successfully every time.					
	PERCEIVED USEFULNESS	**1**	**2**	**3**	**4**	**5**
9.	The MOAD is useful.					
10.	It saves my time when I use the MOAD.					
11.	It saves my effort when I use it the MOAD.					
12.	The MOAD gives me more control over the activities in my life.					
13.	The MOAD makes the things I want to accomplish easier to get.					
14.	It does everything I would expect it to do.					

Thank you